Interim Remedial Action Plan
Dated December 2005

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Interim Remedial Action Plan

29 December 2005

Prepared for

Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, California 91350

K/J Project No. 034803.00

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29 December 2005

Mr. Jose Diaz
Project Manager
Department of Toxic Substances Control
1011 N. Grandview Avenue
Glendale, California 91201

Subject: Interim Remedial Action Plan
Castaic Lake Water Agency, Santa Clarita, California
K/J 034803.00

Dear Mr. Diaz:

The enclosed Interim Remedial Action Plan (IRAP) is submitted to the Department of Toxic Substances Control (DTSC) by Kennedy/Jenks Consultants on behalf of the Castaic Lake Water Agency, Santa Clarita Water Company, Newhall County Water District and Valencia Water Company (collectively, the Water Purveyors). The IRAP is submitted in accordance with Task 4 of the Environmental Oversight Agreement executed by DTSC and the Water Purveyors in March 2003. The IRAP is prepared on behalf of the Water Purveyors to facilitate restored pumping of groundwater from two Saugus Formation production wells impacted by perchlorate. The IRAP incorporates comments received from DTSC and others on the draft IRAP distributed in May 2005. The IRAP also addresses comments received through the public participation process.

The IRAP incorporates and builds upon remedial investigation activities performed in OU7 and within the Whittaker-Bermite site by CH2MHILL on behalf of the Army Corps of Engineers and the Water Purveyors. The IRAP also incorporates the results of basin-wide quantitative hydraulic modeling performed by CH2MHILL on behalf of Valencia Water Company. Technical reports describing these activities have been previously submitted to DTSC.

In accordance with orders issued by the DTSC, Whittaker Corporation is responsible for further remedial investigation and implementation of additional remedial measures to address groundwater impacted by perchlorate and other chemicals within the area designated as Operable Unit 7 (OU7). The proposed restoration of groundwater pumping from the two Saugus Formation wells described in the IRAP is expected to provide hydraulic containment for Saugus Formation groundwater moving westward from the Whittaker-Bermite site. However, the proposed action is not intended to comprise the overall remedial solution for OU7 groundwater. The Water Purveyors expect that Whittaker Corporation will continue its efforts to implement source control measures and other remedial measures.

If you have any questions regarding the IRAP, please contact either Ken Petersen at (661) 297-1600 or Meredith Durant at (415) 243-2534.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Meredith G. Durant

Meredith G. Durant, P.E.
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Enclosure

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Executive Summary

This Interim Remedial Action Plan (IRAP) is submitted to the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) by the Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Water Company and Valencia Water Company (collectively, the Water Purveyors). The IRAP is prepared in accordance with Section 25356.1 of the California Health and Safety Code and is submitted in accordance with Task 4 of the Environmental Oversight Agreement executed by DTSC and the Water Purveyors in March 2003. The evaluations summarized in this IRAP are consistent with the requirements of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This IRAP addresses four Saugus Formation water supply production wells that have been impacted by perchlorate. These production wells are located along the South Fork of the Santa Clara river, west of the former Whittaker-Bermite site (the Facility). A fundamental objective, incorporated into the alternatives, is to provide containment of Saugus Formation groundwater west of the Facility that is impacted by perchlorate.

Remedial Investigation

For approximately fifty years ending in 1987, the Facility was used for the manufacturing, storage, and testing of a variety of explosives, munitions, and propellants. Subsurface characterization activities performed since that time have documented that soil and/or groundwater in various portions of the Facility have been impacted by releases of perchlorate, volatile organic compounds and other chemicals. In accordance with DTSC requirements, Whittaker Corporation (Whittaker) is continuing to perform soil and groundwater characterization activities within and near the boundaries of the Facility.

Assessment of the extent of Saugus Formation groundwater impacted by perchlorate relies on subsurface characterization activities performed to date in the area designated as Operable Unit 7 (OU7). The most recent of the subsurface characterization tasks was performed by the US Army Corps of Engineers and its consultant CH2MHILL. The remedial investigation activities completed west of the Facility are sufficient to proceed with evaluation and implementation of a measure to partially restore lost production capacity and contain Saugus Formation groundwater impacted by perchlorate.

Human Health Risk Assessment

Evaluation of potential risks to human health, as summarized in this IRAP, indicates that groundwater containing perchlorate should be treated prior to human consumption to reduce perchlorate concentrations to less than 6 micrograms per liter (µg/l) and/or as necessary to comply with the California Department of Health Services Policy for Extremely Impaired Water Bodies (DHS Policy 97-005) and the State Water Resources Control Board Non-Degradation Policy.

Evaluation of Alternatives

Development of alternatives for restoration of lost water production capacity and plume containment relied on a sub-regional groundwater model developed and calibrated by CH2MHILL under contract to the Water Purveyors. Model runs were performed to evaluate the extent of hydraulic containment associated with operation of Saugus Formation production wells currently impacted by perchlorate. Model results indicate that a pumping rate of 1,100 gallons per minute (gpm) for each of Saugus 1 and Saugus 2 should be sufficient to contain Saugus Formation groundwater impacted by perchlorate and prevent further migration of perchlorate in the Saugus Formation groundwater. Monitoring of groundwater elevations and evaluation of water level data during operation can be performed to confirm the effectiveness of hydraulic containment at the selected pumping rate.

Operation of the production wells for domestic supply purposes, in a manner that is protective of human health, is of primary importance and urgency to the Water Purveyors. Therefore, this IRAP is prepared and submitted to support this objective of restoring these production wells to active service. Whittaker is responsible for identifying, evaluating and implementing additional remedial measures both within the Facility boundaries and as needed, downgradient of the Facility in OU7. Restored operation of the production wells is expected to be one component of the overall long-term remedial action plan to be developed by Whittaker for OU7 groundwater.

The Water Purveyors performed pilot testing of three perchlorate treatment processes including a single-pass ion exchange system, biological treatment and membrane filtration. The results of the pilot tests, as well as information from full-scale perchlorate removal systems operating in California, were incorporated into the evaluation of alternatives for removal of perchlorate from extracted groundwater. The alternatives were evaluated using the nine criteria set forth in the NCP.

Preferred Alternative

This IRAP identifies a preferred alternative which consists of pumping groundwater at a constant flowrate of 1,100 gpm from each of Wells Saugus 1 and 2, removing perchlorate from the groundwater using a single-pass ion exchange system, followed by disinfection and pumping the treated groundwater into an existing 84-inch treated potable water line for blending and distribution. The other two Saugus Formation production wells that are impacted by perchlorate, Wells NC-11 and VWC-157, would be properly destroyed. This alternative has been discussed by the Water Purveyors and Whittaker and is generally acceptable to both parties (with some details to be negotiated). The preferred alternative provides containment for the plume of perchlorate in the Saugus Formation west of the Facility and satisfies the requirements for treatment of “extremely impaired” groundwater in accordance with DHS Policy Memo 97-005. The preferred alternative includes groundwater monitoring to evaluate potential changes in chemical concentrations in groundwater upgradient of the production wells and monitoring of the perchlorate treatment process to confirm its effectiveness.

Because the action proposed by the Water Purveyors involves returning an “extremely impaired” source water to use for domestic water supply, the procedural and performance requirements of the DHS Policy Memo 97-005 are applicable and will be complied with during selection and implementation of the preferred alternative.

Moreover, because implementation of the preferred remedial alternative will not fully restore the water production capacity that was lost due to contamination, construction of replacement water supply wells and associated infrastructure is anticipated. The infrastructure associated strictly with capacity replacement is outside the scope of this IRAP and is not evaluated herein, but it is nevertheless an important component of the resolution of outstanding issues between Whittaker and the Water Purveyors.

Section 1: Introduction

This Interim Remedial Action Plan (IRAP) is submitted on behalf of Castaic Lake Water Agency (CLWA), Newhall County Water District (NCWD), Santa Clarita Water Company (SCWC), and Valencia Water Company (VWC) (Water Purveyors). The IRAP is prepared in accordance with Section 25356.1 of the California Health and Safety Code and is submitted to the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) in accordance with Task 4 of the Environmental Oversight Agreement executed by DTSC and the Water Purveyors in March 2003. The evaluations summarized in this IRAP are consistent with the requirements of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The Water Purveyors operate groundwater production wells and provide water to approximately 50,000 connections in the Santa Clarita Valley in northern Los Angeles County. The project location is shown on Figure 1. Historically, groundwater from the Saugus Formation production wells has been used as an ongoing water source to blend with State Water Project (SWP) water deliveries and a water bank to compensate for SWP water curtailments. Perchlorate contamination of a portion of the Quaternary alluvium and Saugus Formation has rendered five groundwater production wells, with a combined capacity of 8,700 gallons per minute, unusable because the concentration of perchlorate detected in samples from the production wells has been in excess of the notification level (through 2004 referred to as the action level) established by the California Department of Health Services (DHS). The Whittaker-Bermite Facility (Facility), which had documented releases of perchlorate and other hazardous materials to the environment, is located generally upgradient of these production wells.

Perchlorate associated with the releases of hazardous substances to soil and groundwater at the Facility was detected in water samples from four Saugus Formation groundwater production wells in 1997. In response to the detected concentrations of perchlorate, these wells were removed from service. Perchlorate associated with the release of hazardous substances at the Facility was subsequently detected in a sample from an alluvial groundwater production well, which was removed from service in 2002. Prior to their removal from service, these five wells were essential sources of local water supply, particularly when other water supplies were reduced, such as in drought years.

The Water Purveyors are responsible for maintaining an adequate and reliable water supply for the residential and business communities in Santa Clarita, as well as for balancing water quality within different portions of the distribution system and between water supply sources. The Water Purveyors have considered several approaches for restoration of the groundwater production capacity that was lost due to impact by perchlorate. The general approaches include: importing additional water from the State Water Project; installation of replacement water supply wells outside the area currently impacted by perchlorate, with associated water distribution pipelines to return water to the service areas served by the perchlorate-impacted wells; and utilizing treatment to return the perchlorate-impacted wells to service for community water supply.

In considering these general approaches, the Water Purveyors determined that restoring groundwater pumping along the South Fork of the Santa Clarita River, where the perchlorate-impacted Saugus Formation production wells are located, is critical to protect downgradient portions of the Saugus Formation. The perchlorate-impacted Saugus Formation production wells are situated in an area where the restored extraction (pumping) of groundwater could hydraulically contain perchlorate migrating in groundwater to areas of the Saugus Formation that are not currently impacted by perchlorate. Therefore, the resumed pumping of groundwater from the production wells to provide hydraulic containment of perchlorate migrating westward in groundwater from the Facility and a rapid response to the groundwater production capacity that has been lost due to perchlorate contamination is essential to prevent further contamination of local and regional water resources and maintain sufficient and reliable water supplies for the Santa Clarita Valley.

During preparation of this IRAP, a sixth production well, alluvial Well Q-2 located north of the Santa Clara River at Bouquet Canyon Road, was found to be impacted by perchlorate. Planning is underway to install a perchlorate treatment system for this well by late 2005. Therefore, the loss of production capacity from Well Q-2 is considered temporary and this well is not considered in this IRAP.

1.1 Purpose

This document develops a preferred alternative that will prevent further perchlorate impacts to groundwater in the Saugus Formation, mitigate the loss of the water supply associated with the portions of the alluvium and Saugus Formation currently impacted by perchlorate, and reduce the potential for additional future water supply loss. The preferred remedial alternative is chosen in accordance with the provisions of Section 25356.1 of the California Health and Safety Code, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

The preferred alternative is presented by the Water Purveyors with the dual objectives of restoring lost water production capacity and providing containment for perchlorate in the Saugus Formation groundwater west of the Facility while complying with the requirements of DHS Policy 97-005. It is expected that the proposed alternative will be a component of the overall remedial plan to be developed by Whittaker Corporation to address groundwater in the area designated as Operable Unit 7 (OU7).

1.2 Scope

The primary focus of this IRAP involves the development and screening of technologies and performing a detailed analysis on a set of alternatives that include technologies and options retained from the development and screening phase. The alternatives are developed to be responsive to and satisfy Remedial Action Objectives (RAOs). The RAOs in turn are developed to address specific contaminants (perchlorate) and specified media (addressable media). It should be noted that these alternatives are developed based on the currently available information. It is anticipated that the technical understanding of site conditions may change based on additional information that will be provided when further remedial investigations and studies, particularly those conducted within the Facility, are complete.

The addressable medium for which this IRAP is concerned is groundwater in the Saugus Formation that is within the capture zone of four existing Saugus Formation domestic-supply water wells – Santa Clarita Water Company's Saugus Well No. 1 (Saugus 1) and Saugus Well No. 2 (Saugus 2), Newhall County Water District's Well No. 11 (NC-11), and Valencia Water Company's Well No. 157 (VWC-157) at their maximum pumping capacity. The locations of these wells are shown on Figure 2.

In addition, where practicable, this IRAP is concerned with adjacent areas of the Saugus Formation as well as portions of the overlying alluvium where the Santa Clarita Water Company's Stadium Well (Stadium Well) and Valencia Water Company's Well Q-2 have been impacted by perchlorate and continued migration of perchlorate could further impact the water supply within the capture zone of these four existing Saugus Formation domestic-supply water wells. However, remedial plans for addressing impacts to the Stadium Well and Well Q-2 have not been included in this IRAP. The Stadium Well is located generally downgradient from the northern portion of the Facility where elevated levels of perchlorate have been detected in soil and groundwater samples. Operation of the Stadium Well will be evaluated following completion of source area characterization activities and implementation of source area remedial measures by the Whittaker Corporation (Whittaker). Additional subsurface characterization in the vicinity of the Stadium Well was identified as a priority subtask for Operable Unit 7 (OU7) in a letter from DTSC to Whittaker representatives dated 10 March 2003. As noted above, a perchlorate treatment system for Well Q-2 is expected to be operational by the fall of 2005.

It should be noted that the Santa Clarita Water Company was acquired by CLWA, and is now known as the Santa Clarita Water Division of CLWA. However, for the purposes of this document, it will be referred to as the Santa Clarita Water Company.

As noted above, although five production wells with an aggregate production capacity of 8,700 gpm have been impacted by perchlorate, this IRAP addresses restoration of only a portion of the lost production capacity. The Water Purveyors intend to restore the remaining portion of the lost production capacity through installation of replacement wells outside the area of groundwater impacted by perchlorate and outside the scope of this IRAP which addresses remediation of perchlorate-impacted groundwater.

Section 2: Site Background

2.1 Site Description and History

2.1.1 Saugus Formation

Historically, groundwater from the Saugus Formation production wells has been used on an ongoing basis as a water source to blend with SWP water deliveries and also as a firming supply to compensate for SWP water curtailments. The Saugus Formation is a deep aquifer covering approximately 85 square miles. The areal extent of the Saugus Formation is shown on Figure 3. It contains roughly 1.65 million acre-feet of water of which thousands of acre-feet of water are pumped every year (RCS 2002). During normal weather years, 7,500 to 15,000 acre-feet of water are pumped from the aquifer and 11,000 to 15,000 acre-feet are pumped during dry years (CLWA 2000). The Saugus Formation has the potential to produce approximately 35,000 acre-feet of water per year for short periods (RCS 2002); therefore, it is an integral part of the Santa Clarita Valley's water supply, especially during dry years.

Groundwater extraction from the Saugus Formation was initiated in the early 1950s and production increased over time until the 1990s. The greatest extraction from the Saugus Formation has occurred in the area west of the Facility (CLWA 2000, RCS 2002).

2.1.2 Domestic Water Supply Wells

Domestic water supply wells are located hydraulically downgradient from the Facility, which is a former munitions plant known to have chemical releases containing perchlorate and other substances that have impacted onsite soils and groundwater in the underlying aquifer zones, including the alluvium and the Saugus Formation. Four production wells screened in the Saugus Formation and one production well screened in the alluvium have been shut down due to chemical impacts attributed to the historic releases from the Facility. The Saugus Formation domestic water supply wells downgradient from the Facility that have been impacted by chemicals include Saugus 1, Saugus 2, NC-11, and VWC-157. The alluvium domestic water supply wells that have been impacted by the Facility include the Stadium Well and Well Q-2. This IRAP is concerned with the water supply associated with these wells that was lost due to the presence of perchlorate and is migrating generally westward toward production wells that have not yet been chemically impacted.

Prior to being shut down, the four wells screened in the Saugus Formation combined to produce between 1,900 and 6,800 acre-feet per year during the early to mid-1990s, with an average production of 4,186 acre-feet per year. The combined pumping capacity of these four wells is 7,900 gallons per minute (gpm). The pumping capacity of the Stadium Well is approximately 800 gpm.

2.1.3 Whittaker-Bermite Facility

The Facility, which had documented releases of perchlorate and other hazardous materials to the environment, is generally upgradient of the production wells (Figure 2) and is located at

22116 West Soledad Canyon Road, Santa Clarita, California. The Facility is approximately 996 acres and is located to the east of the five production wells impacted by perchlorate and the South Fork of the Santa Clara River (South Fork, Figure 2).

From 1934 to 1987, the Facility was used for the manufacturing, storage, and testing of a variety of explosives, munitions, and propellants (Hargis 1999). Materials that were used in activities at the Facility include, but are not limited to: ammonium perchlorate, potassium perchlorate, hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), methyl ethyl ketone (MEK), and chlorinated solvents such as trichloroethene (TCE) and tetrachloroethene (PCE). Depleted uranium may also have been used at the Facility (CH2MHILL 2005).

At this time, subsurface characterization and localized soil remediation activities are being performed at several locations within the perimeter of the Facility to address elevated concentrations of perchlorate and several VOCs in soil and/or groundwater. These activities have been described and the resulting data presented in a series of reports prepared by representatives of Whittaker and Remediation Financial, Inc. as directed by the DTSC. Summary of this information is not within the scope of this IRAP, however, it should be noted that the data indicate that releases of perchlorate and VOCs to soil and/or groundwater occurred within the Facility.

2.1.4 Presence of Perchlorate

Perchlorate is an anion that results from the dissolution in water from ammonium, potassium, magnesium or sodium salts. Ammonium perchlorate is used as the primary ingredient in propellants for rockets, missiles and fireworks. The perchlorate anion is extremely soluble and mobile in surface water and groundwater.

In mid-1997, perchlorate was detected in the four production wells previously described (Saugus 1, Saugus 2, NC-11, and VWC-157) which are located along the South Fork. The wells withdrew groundwater from the Saugus Formation for domestic water supply. At that time, perchlorate was detected at concentrations near or in excess of the DHS action level of 18 micrograms per liter (µg/l). Following the detection of perchlorate, the production wells were shut down. In January 2002, DHS reduced the action level for perchlorate from 18 to 4 µg/l (DHS 2002a). Perchlorate was subsequently detected in the alluvial aquifer production well, Stadium Well, located near the main reach of the Santa Clara River, at a concentration as high as 5.9 µg/l. Following the detection of perchlorate, the Stadium Well was shut down. In March 2004, DHS established the Public Health Goal and action level for perchlorate at 6 µg/l. The combined production capacity of the five production wells that were shut down due to the presence of perchlorate is 8,700 gpm. In early 2005, during a very wet winter, perchlorate was detected in samples from Well Q-2.

2.2 Physical Characteristics

2.2.1 Topography

Elevations in the region range from approximately 800 to 1,400 feet above mean sea level within the Santa Clara River valley to 2,500 to 4,000 feet in the hills and mountains surrounding the valley. Terrain is rugged in some locations and climbs quickly away from the river valleys.

2.2.2 Human Populations and Land Use

The Santa Clarita Valley has a population of approximately 187,000 people. The total population is predominantly White with the minority population consisting of African Americans, Latinos, Asian Pacific Islanders, and American Indians (City of Santa Clarita 2001).

Historically, land use in the Santa Clarita Valley region included rural/agricultural uses as well as oilfield activities and industrial uses. The Santa Clarita Valley has in recent years experienced increasing urbanization, commercial and industrial development. Currently, the Santa Clarita Valley has significant residential land use and a diverse economy, including manufacturing services, retail trade, local government, wholesale trade, construction, finance and real estate, utilities, and agriculture (City of Santa Clarita 2004).

2.2.3 Climatology

The study area region is considered to be a Mediterranean climate with dry summers and wet winters. The average annual temperature is 61 degrees Fahrenheit. Rainfall in this region averages approximately 18 inches per year; however, annual precipitation values vary greatly (Hargis 1999).

2.2.4 Geology

The impacted Saugus Formation is located within the Santa Clara River Valley East Groundwater Sub-Basin (Sub-Basin) that is part of the Santa Clara River Valley Groundwater Basin (Basin), which is an east-west trending, elongated structural trough extending from the Santa Clara River Valley to the Pacific Ocean. Associated geologic structures within the Sub-Basin also generally trend east-west. The eastern part of the Sub-Basin, in which the contaminated production wells are located, is transected by the northwest trending San Gabriel fault (RCS 2002).

The freshwater-bearing deposits in the Sub- Basin include unconsolidated sediments (sands, gravels, silts, and clays, with some cobbles and boulders) constituting the alluvium of present-day alluvial fans, river channels and creeks and the underlying, partially consolidated sedimentary rocks (sandstones, conglomerates, siltstones, and shales) comprising the older stream terrace deposits and strata within the Saugus Formation. Deposition of the freshwater-bearing sediments began in the late Pilocene epoch (about 3 million years ago) and has continued to the present (RCS 2002). The Saugus Formation attains a maximum thickness of approximately 8,500 feet in the region near the center of the basin, of which, only the upper 5,500 feet are considered to be freshwater-bearing (RCS 2002).

2.2.5 Hydrogeology

The impacted water supply wells are located within the Santa Clara-Calleguas Hydrologic Unit, which includes the Santa Clara River watershed. Within the Santa Clara-Calleguas Hydrologic Unit, the wells are located within the Upper Santa Clara River Hydrologic Area and in the Eastern Hydrologic Subarea (Hargis 1999). The wells are located in the Santa Clara River Valley East Groundwater Sub-Basin, as described above (RCS 2002).

Lithologic units in the area of the four production wells have been generally grouped into water-bearing and nonwater-bearing formations, based on their ability to store, transmit, and yield groundwater (RCS 2002). Water-bearing units include the Quaternary alluvium and the Saugus Formation. Non water-bearing units include Tertiary sedimentary rocks of the Pico Formation, older igneous and metamorphic rocks of the San Gabriel Mountains, and Miocene-age terrestrial sediments of the Tick and Mint Canyon Formations.

Alluvium:
The Quaternary alluvium consists of sand, gravel, and boulders within the Santa Clara River channel, grading to finer flood plain deposits at the valley margins. Quaternary alluvium deposits are up to approximately 200 feet thick in the Santa Clara River Valley (RCS 2002). Transmissivity values calculated for the Quaternary alluvium in the Santa Clara River channel and floodplain range from 81,000 gallons per day per foot (gpd/ft) to 750,000 gpd/ft (RCS 2002).

Groundwater in the alluvium occurs under unconfined conditions, with groundwater flowing from east to west along the main river valley. The alluvium in the main river valley east of Interstate Highway 5 (I-5) is recharged primarily by infiltration through the bed of the Santa Clara River and discharges to the Saugus Formation through deep percolation, whereas west of I-5, groundwater in the alluvium is recharged by upward flow from the underlying Saugus Formation and discharges to the river. Along the South Fork, the groundwater flow direction is generally to the north and the alluvium is recharged by infiltration of stream runoff from the river (when flowing) (RCS 2002).

Terrace Deposits:
Pleistocene terrace deposits in the vicinity of the Saugus Formation domestic water production wells are not likely to exceed approximately 200 feet in thickness and are generally restricted to uplifted terrace platforms that are topographically higher than the Santa Clara River. Perched groundwater may be present locally (RCS 2002).

Saugus Formation:
The Saugus Formation consists of semiconsolidated sandstone, siltstone, and conglomerate up to 8,500 feet thick (RCS 2002). The Saugus Formation represents a significant reservoir for groundwater storage as it underlies the Santa Clara River Valley at a considerable thickness (Hargis 1999). In the vicinity of the Saugus Formation domestic water production wells, hydraulic conductivity values calculated for the Saugus Formation have historically ranged from 44,000 gpd/ft to 182,000 gpd/ft (RCS 2002).

Groundwater in the Saugus Formation exists under confined, semi-confined, and unconfined conditions, primarily within interstitial voids resulting from primary porosity. In some areas, particularly near its eastern and western margins, the Saugus Formation is in hydraulic communication with the overlying Quaternary alluvium along the channel of the Santa Clara

River. Recharge to the Saugus Formation likely occurs through downward seepage from the overlying alluvium in the eastern part of the basin with additional contributions from the direct infiltration of precipitation where the formation is exposed in the local hillsides. Water level elevations measured in Saugus Formation water wells have varied from approximately 900 to 1,300 feet above mean sea level between the start of groundwater extraction from the Saugus Formation in the 1950s to the present (RCS 2002). Depths to static water levels in these same wells have ranged from 22 to 250 feet below ground surface (bgs) over the same period.

2.2.6 Domestic Water Production Wells

The four Saugus Formation domestic water production wells that have been impacted by perchlorate include Saugus 1, Saugus 2, NC-11, and VWC-157. To date, two alluvium water production wells, the Stadium Well and VWC's Well Q-2, have been impacted by perchlorate. Table 1 summarizes construction details for each of the six wells.

Each of the four Saugus Formation wells is equipped with steel casing to total cased depths between 1,136 feet (NC-11) and 2,014 feet bgs (VWC-157). Saugus 1 and Saugus 2 were constructed with wire-wrap perforated casing installed at discrete depth intervals between approximately 500 and 1,600 feet bgs. VWC-157 was constructed with vertical slot type perforated casing installed over the entire depth interval from 587 to 2,009 feet bgs. NC-11 was constructed with louvered perforated casing installed over the entire depth interval from 200 to 1,075 feet bgs.

The upper non-perforated (blank) section of each well penetrates a relatively thin unit of Quaternary alluvium overlying the Saugus Formation. The alluvium in the general area of the impacted wells reaches a maximum thickness of approximately 190 feet at the location of VWC-157. NC-11 has the shallowest perforations of the four wells, with its uppermost perforations beginning at 200 feet bgs, approximately 20 feet below the base of the Quaternary alluvium at that location.

The Stadium Well was installed with knife-cut perforations extending from 33 to 130 feet bgs in the Quaternary alluvium.

The impacted Saugus Formation production wells (Saugus 1, Saugus 2, NC-11, and VWC-157) have not been pumped for several years and the pumps were removed from each of these production wells between 2001 and 2004. These wells are not currently equipped with permanent pumps, and have had removable caps installed.

2.2.7 Surface Water

The study area region is located within the Santa Clara River Watershed. The South Fork flows northward during precipitation events and converges with the west-flowing Santa Clara River. The two rivers converge approximately one mile northwest of the Facility. Both the Bouquet Canyon and Mint Canyon tributaries flow into the Santa Clara River upstream from the intersection of the two rivers. Placerita Creek Canyon, Newhall Creek Canyon, and Pico Canyon all converge with the South Fork. Both San Francisquito Creek and Castaic Creek converge with the Santa Clara River downstream of the intersection of the two rivers.

2.3 Regulatory Framework

The California Department of Toxic Substances Control (DTSC) is the lead regulatory agency overseeing the remedial actions and has determined that Santa Clarita LLC and Whittaker are responsible parties at the Facility. DTSC has entered into an Enforceable Agreement with Santa Clarita LLC and Whittaker, dated February 2001, however Santa Clarita LLC has defaulted on its obligations under the Enforceable Agreement and DTSC has subsequently issued an Imminent and Substantial Endangerment Determination and Order and Remedial Action Order, dated November 2002, to Whittaker.

The Facility and surrounding area containing impacted groundwater have been divided into seven operable units (OUs) based on the location of known source areas, former Facility operations, local surface watersheds, and the affected media (DTSC 2001). For the purposes of subsurface characterization and remediation, the Facility has been divided into six soil OUs; OU1 through OU6. Whittaker is currently performing subsurface investigation activities and will be evaluating remedial alternatives for these OUs within the Facility. OU7 encompasses onsite and offsite areas where groundwater has been impacted by chemicals released from former Facility operations, including the five impacted production wells. The remedial investigation activities, risk assessment, and alternatives evaluation summarized in this IRAP apply to a portion of OU7 located west of the San Gabriel Fault, but are intended to be consistent with future remedial actions to be performed by Whittaker.

DTSC and the Water Purveyors have entered into an Environmental Oversight Agreement, dated March 2003, pursuant to H&SC Section 25201.9, whereby DTSC may provide consultative services and assistance to the Water Purveyors in complying with regulatory requirements. Under this agreement, DTSC will provide oversight of the actions undertaken by the Water Purveyors to respond to the perchlorate contamination in the vicinity of the impacted domestic water production wells within OU7.

Additionally, other agencies may have specific requirements that must be met based on the particular alternative implemented. Other regulatory agencies with significant oversight authority include the California DHS and the Regional Water Quality Control Board (RWQCB). DHS Policy Memo 97-005 is applicable to the production wells impacted by perchlorate, both on the basis of detected perchlorate concentrations in samples from the wells and due to their location downgradient of a known source of contamination. DHS will require treatment of the groundwater prior to its use for community water supply purposes. Furthermore, returning the perchlorate-impacted production wells to service for community water supply will require submitting a permit application package and obtaining a permit to operate from DHS.

Discharges of treated or untreated groundwater to surface water bodies or the storm drain system (such as during redevelopment of the production wells or other system maintenance activities) will require regulatory approval, typically in the form of National Pollutant Discharge Elimination System permits from the RWQCB.

Section 3: Summary of Remedial Investigation

3.1 Water Quality at Production Wells

Groundwater samples have previously been collected on a regular basis from the four domestic supply wells and analyzed for those chemicals required by the DHS. Samples have been collected and analyzed from VWC-157 beginning in 1966, from NC-11 beginning in 1975, from Saugus 2 beginning in 1990, and from Saugus 1 beginning in 1991. Samples were collected from Saugus 1 and Saugus 2 until approximately 1998. Routine groundwater monitoring was discontinued when the production wells were removed from service in 1998.

In mid-1997, perchlorate was detected in groundwater samples from the four production wells at concentrations at or above the DHS action level of 18 µg/l, that was in effect at that time. The wells were re-sampled in 1998. Detected concentrations of perchlorate at that time ranged from 9 µg/l in VWC-157 to 47 µg/l in Saugus 2 (RCS 2001). Analytical data for perchlorate in samples collected from the four production wells are summarized in Table 2. Samples collected from the four production wells were also analyzed for volatile organic compounds (VOCs). TCE was detected in each of the four wells at concentrations ranging from 0.7 µg/l in Saugus 2, to 3.9 µg/l in Saugus 1. Bromodichloromethane, bromoform, chloroform, cis-1,2-dichloroethene, dibromochloromethane, PCE, and xylenes were also detected in at least one sample from at least one of the four wells (RCS 2001).

As part of the Groundwater Production Response Action for the Saugus Formation, depth-discrete samples were collected from Saugus Formation production wells Saugus 1, Saugus 2, and NC-11 during the first part of 2003. Field activities for the depth-discrete sampling of the three production wells began on 3 February 2003 and concluded on 27 June 2003. Because the wells had been out of service for several years, each well was redeveloped prior to sample collection. However, the intensity and duration of well development was limited by the need to collect, store, and treat development water prior to discharge. In addition, the depth-discrete samples were collected under reduced pumping conditions. Therefore, the results may not be representative of groundwater entering the wells at specific depth intervals during normal use for domestic supply purposes and have not been included in this IRAP. However, the analytical results did confirm the presence of perchlorate in each of the three production wells.

Upgradient remedial investigations have been and are currently underway, as described in Section 3.4. Upgradient monitoring wells installed within the impacted Quaternary alluvium and Saugus Formation downgradient of the Facility have been monitored regularly by the United States Army Corps of Engineers (USACE) and monitoring wells located onsite at the Facility are monitored regularly by Whittaker. The results of remedial investigation and upgradient well monitoring offsite of the Facility are summarized in Section 3.4. Recent site characterization and well monitoring results are not yet available from Whitaker for remedial activities currently underway at the Facility.

3.2 Potential Sources and Nature of Release

The chemicals of interest (COIs) in the production wells are believed to have originated at the Facility. In accordance with various work plans submitted to DTSC, Whittaker is continuing subsurface characterization activities. These are expected to provide additional information regarding the sources of the COIs. The results and findings of ongoing many of the remedial investigation activities conducted onsite at the Facility by Whittaker have not yet been published, and have consequently not been incorporated into this IRAP.

3.3 Early Site Characterization Activities

At the direction of DTSC, the property owner, Remediation Financial, Inc., performed site characterization activities including collection and analysis of soil, groundwater and surface water (stormwater runoff) samples and installation of monitoring wells. These investigations identified several onsite potential source areas for COIs, including VOCs, perchlorate and explosives (Acton Mickelson Environmental Inc. 1995; Hargis 1999). These investigations also identified several onsite areas where soil and/or groundwater was impacted by COIs. Groundwater characterization, including installation of groundwater monitoring wells, was conducted in the northern portion of the Facility, OU5, during an investigation of chemical releases to groundwater resulting from former manufacturing activities at the Facility. Perchlorate, NDMA, TCE, PCE, HMX, and RDX were detected in monitoring wells within OU5 (Hargis 2000). Perchlorate and VOCs were also detected at elevated concentrations in reconnaissance groundwater samples collected at offsite locations approximately half a mile west of the Facility. Additional information on the analytical results and findings of the site investigation activities performed prior to 2002 is available in the source documents.

3.4 Eastern Santa Clara Sub-Basin Groundwater Study

In April 2002, the United States Army Corps of Engineers (USACE) and the Water Purveyors entered into a Feasibility Cost-Sharing Agreement to address groundwater contamination in the Eastern Santa Clara Basin. Site characterization activities were subsequently performed by USACE to characterize the perchlorate contamination within the alluvium and Saugus Formation. Although the Whittaker Facility and the perchlorate-contaminated aquifers have not been placed on the federal National Priorities List (NPL), the study was conducted following the guidelines of the CERCLA program to be consistent with the NCP.

On the basis of the site characterization activities performed by the USACE, conclusions regarding the hydrogeology and groundwater quality within OU7 have been developed and presented in the *Eastern Santa Clara Sub-Basin Groundwater Study, Santa Clarita, California – Conceptual Hydrogeology Technical Memorandum* dated January 2005 and prepared by CH2MHILL of Santa Ana, California on behalf of the USACE (CH2MHILL 2005). The scope of site characterization activities focused on evaluating the nature and extent of groundwater impacts within the eastern Santa Clara Valley, near the confluence of the Santa Clara River and the South Fork, approximately 2 miles northeast of Newhall, in Los Angeles County, California. This section of the IRAP summarizes the remedial investigation activities performed by USACE, as documented in USACE's technical memorandum (CH2MHILL 2005). The results of remedial activities performed by Whittaker at the Facility upgradient of the perchlorate-impacted Saugus Formation production wells are not yet available and have not been included in this IRAP.

The remedial investigation activities performed by the USACE were mainly directed at sufficiently characterizing existing groundwater conditions within OU7 to develop and evaluate interim and long-term remedial solutions, as applicable, to address perchlorate impacts to groundwater. Specific tasks performed by the USACE to meet this objective included:

- Collecting subsurface characterization data, such as lithologic, hydraulic, and groundwater chemical data within the alluvium and Saugus Formation.
- Conducting a baseline groundwater quality assessment.
- Conducting subsequent groundwater sampling and analysis to confirm the baseline groundwater quality assessment and evaluate groundwater quality changes with time.
- Collecting data on chemical parameters that affect the efficiency or applicability of potential groundwater treatment processes.
- Participation in ongoing public participation activities pertaining to perchlorate-impacted groundwater

Remedial investigation field activities were performed between October 2002 and April 2004. USACE conducted two major phases of drilling and monitoring well installation, followed by aquifer testing and groundwater monitoring.

***Drilling and Monitoring Well Installation*:**
Reconnaissance groundwater sampling and monitoring well locations were chosen to better understand the groundwater conditions within OU7 and to evaluate potential contaminant migration pathways. Drilling and well installation activities were conducted in two major phases from October to December 2002, and from August to September 2003.

Reconnaissance groundwater samples were collected from the Quaternary alluvium using a cone-penetrometer testing (CPT) rig advanced along five transects oriented perpendicular to groundwater flow. Reconnaissance groundwater samples were collected from 10 of the 17 CPT borings at depths ranging from 40 to 81 feet bgs (CH2MHILL 2005). Based on the results from these reconnaissance groundwater samples, seven monitoring wells were installed at five locations to assess water quality and groundwater flow conditions in the Quaternary alluvium. Monitoring well clusters at two of the five locations were installed to assess the vertical extent of chemical impacts in the alluvium. Monitoring wells were installed at depths ranging from 65 to 117 feet bgs (CH2MHILL 2005).

Five Westbay® Multiport monitoring wells, two conventional monitoring wells, and one three-well cluster were installed in the Saugus Formation. Conventional and multiport monitoring wells were installed at depths ranging from 165 to 1,588 feet bgs (CH2MHILL 2005).

***Groundwater Monitoring*:**
Following monitoring well installation, groundwater monitoring was conducted to evaluate the extent of chemical impacts to groundwater and the groundwater flow conditions within OU7. Water level measurements were recorded on a quarterly basis from January 2003 through July 2003, and on a monthly basis from October 2003 through April 2004.

As of October 2004, wells installed during Phase 1 were sampled three times and wells installed during Phase 2 were sampled twice (CH2MHILL 2005). Initial groundwater samples were analyzed for a comprehensive suite of analytes to establish “baseline” conditions, whereas subsequent monitoring targeted a more focused list of analytes. Samples were also collected from existing monitoring wells EM-1, EM-2, and EM-3 located at the Exxon-Mobil service station near Bouquet Junction west of the Site.

Analytical Results:
The initial analytical suite was developed through application of the Data Quality Objectives as presented in the project-specific Quality Assurance Project Plan (CH2MHILL 2005). Inputs to the analytical suite were partially based upon results of earlier site characterization and data evaluation activities, which were used to identify preliminary chemicals of potential concern (COPCs) including perchlorate, explosives (HMX and RDX), NDMA, VOCs, hexavalent chromium, and nitrate. Additionally, SVOCs, heavy metals, and depleted uranium were included as COPCs, pursuant to the Enforceable Agreement between DTSC and Whittaker (DTSC 2001).

Samples collected during alluvium reconnaissance groundwater sampling were analyzed for perchlorate and VOCs. Baseline samples collected from monitoring wells were analyzed for perchlorate, VOCs, nitroaromatics and nitroamines (explosive compounds including HMX and RDX), nitrosamines (including NDMA), other COIs (including 1,4-dioxane, SVOCs, chlorate, gross alpha and gross beta, cyanide, hexavalent chromium), metals (including major cations), major anions, alkalinity, total Kjeldahl nitrogen, nitrate, nitrite, ammonia, total dissolved solids, BOD, COD, and TOC (CH2MHILL 2005).

The location of reconnaissance groundwater sampling and monitoring well locations are shown on Figures 2-1 and 2-2 in Appendix A. Tables 3-8 through 3-11 of Appendix A summarize the analytical results for reconnaissance and monitoring well samples collected during the remedial investigation activities.

Although 28 different chemicals were detected in one or more groundwater samples, perchlorate, TCE, and PCE were detected with the greatest frequency in both onsite and offsite groundwater samples at concentrations exceeding the following regulatory action levels (CH2MHILL 2005):

Chemical	Notification Level	Source
Perchlorate	6 µg/l	California Department of Health Services Notification Level (DHS NL) and California Office of Environmental Health Hazard Assessment Public Health Goal (California PHG)
PCE	5 µg/l	California Environmental Protection Agency (Cal-EPA) Maximum Contaminant Level (MCL) and United States Environmental Protection Agency (USEPA) MCL
	0.08 µg/l	California PHG
TCE	5 µg/l	Cal-EPA and USEPA MCL
	0.06 µg/l	California PHG

The maximum concentrations of perchlorate, PCE, and TCE were detected in well MP-2_01 within the Facility (Note: “MP” indicates a Westbay® Multiport monitoring well, “-2” indicates multiport well number 2, and "_01" indicates vertical screen interval number one). Perchlorate, PCE, and TCE were detected at maximum concentrations of 64,500, 10, and 2,000 µg/l, respectively (CH2MHILL 2005). Outside of the Facility, within OU7, perchlorate was detected at a maximum concentration of 63.9 µg/l in Well EM-3. The maximum concentration of PCE in OU7 was 4.5 µg/l detected in well MP-5_03. The maximum concentration of TCE in OU7 was 13 µg/l in a reconnaissance groundwater sample from Boring AL-9A (CH2MHILL 2005). Detectable concentrations of PCE and TCE generally corresponded with perchlorate detections (CH2MHILL 2005).

Other chemical compounds were detected sporadically in reconnaissance groundwater and monitoring well samples (CH2MHILL 2005):

- The nitroaromatic explosive compound 1,3-dinitrobenzene was detected in only one sample (AL-9B at 0.42 µg/l); no regulatory notification level exists for this compound.
- The nitrosamine compound n-nitrosodiphenylamine was detected at a maximum concentration of 1.05 µg/l in onsite well MP-4_01; no regulatory notification level exists for this compound.
- Solvent compounds, other than PCE and TCE, detected include carbon tetrachloride and 1,2,3-TCP. The maximum onsite and offsite concentrations of carbon tetrachloride exceed the regulatory action level of 0.1 µg/l (California PHG), and 1,2,3-TCP was detected at concentrations exceeding the regulatory notification level of 0.005 µg/l (California DHS NL) in MP-3_03 (0.02 µg/l) and MP-5_04 (0.02 µg/l).
- Benzene was detected at concentrations exceeding the regulatory action level of 1 µg/l (California Primary MCL) and 0.15 µg/l (California PHG) within OU7.
- Common laboratory contaminants, methylene chloride and bromochloromethane, were detected at maximum concentrations of 30,000 and 26.7 µg/l, respectively in one analytical batch from one monitoring well within the Facility.
- Acetone was detected at a maximum concentration of 28 µg/l in offsite reconnaissance groundwater samples, but was not detected in any monitoring well samples.
- The SVOC bis(2-ethylhexyl)phthalate was detected in only one sample (SS-1 at 17 µg/l).

Detectable concentrations of these chemicals generally corresponded with perchlorate detections (CH2MHILL 2005).

Aquifer Testing:
Aquifer testing was performed at local and regional scales. Thirteen rising-head slug tests were performed from 19 to 21 November and 12 to 16 December 2002 on Screens 1, 2, 4, 6, 7, and 9 of multiport monitoring well MP-1, Screens 1, 2, and 5 of MP-2, and Screens 1, 2, and 5 of MP-4 to estimate aquifer properties at discrete lithologic intervals within the immediate vicinity of the well screens. Separate regional-scale pumping tests were performed at Saugus Formation production wells V-205 and NC-13 in March 2004 to estimate aquifer properties from distinct aquifer zones over a larger area. The resulting aquifer performance data was used to evaluate

the working model for the conceptual hydrogeology, hydraulic function of the Holser Fault, and to serve as a calibration data for the locally-scaled Regional Model.

***Conceptual Hydrogeology*:**
Based on measurements of hydraulic head, observed responses to pumping from Saugus Formation production wells, geophysical and lithologic boring log interpretations, and March 2004 aquifer tests at NC-13 and V-205, 10 hydrostratigraphic units (HSUs) have been defined (CH2MHILL 2005), including:

- One Quaternary alluvium HSU
- Eight HSUs south of the San Gabriel Fault
- One Saugus HSU north of the San Gabriel Fault

Results of the aquifer testing described above suggests that there is a slight hydraulic connection between the Quaternary alluvium HSU and the upper Saugus HSUs, and pumping from the Saugus Formation may cause leakage across the Saugus HSUs (CH2MHILL 2005).

Hydraulic conductivity estimated for each of the HSUs using data collected during the aquifer testing varied by three orders of magnitude, which is consistent with the heterogeneities expected in the Saugus Formation. Hydraulic conductivity for the Saugus HSUs ranged from 0.1 to 38.6 ft/day, and were generally less than prior estimates (CH2MHILL 2005).

Based on groundwater level elevation data, groundwater flow in the alluvium is directed westward along the main reach of the Santa Clara River at a gradient of approximately 0.005 ft/ft, northward along the South Fork of the Santa Clara River at a gradient of approximately 0.0007 ft/ft, and westward downstream of the point where the two reaches of the Santa Clara River meet at a gradient of approximately 0.003 ft/ft (CH2MHILL 2005). Groundwater flow in the Saugus Formation is directed northwest in HSUs SI and SIII at gradients of 0.001 and 0.002 ft/ft, respectively, and west-southwest in HSU SVII at a gradient of 0.001 ft/ft. Vertical groundwater flow across the Saugus HSUs is generally downward at gradients ranging from 0.02 to 0.8 ft/ft, with the exception of HSUs SVIII and SVII, and varies seasonally with the operation of production wells (CH2MHILL 2005).

3.5 Groundwater Modeling

A three-dimensional numerical regional-scale groundwater flow model (Regional Model) of the valley based on the MicroFEM® finite-element software (Kemker and de Boer 2003) has been developed by the Water Purveyors for long-term water resource planning, a version of which has been locally scaled to predict groundwater flowpaths and capture zones for hydraulic control of contaminants. Details regarding the construction and calibration of the Regional Model are described and discussed in the *Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration* (CH2MHILL 2004a). A detailed analysis of the pumping plan is presented in the report titled *Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California* (CH2MHILL 2004b). Both of these reports on the Regional Model were approved by DTSC as they pertain to containment of perchlorate.

The proposed pumping plan involves groundwater extraction from two existing production wells (Saugus 1 and Saugus 2) with the following objectives:

- Hydraulic containment of perchlorate in groundwater migrating westward from the Facility towards the production wells
- Protect production wells downgradient from impacted wells
- Restore lost capacity of impacted production wells
- Operate the impacted wells in a manner consistent with the Water Purveyor's regional groundwater resource management plan
- Simultaneously contain perchlorate migrating through the alluvial aquifer in groundwater from the northern portion of the Facility

The operating extraction rate will be sufficiently high to capture perchlorate migrating westward from the Facility in Saugus Formation groundwater, thereby providing hydraulic containment and preventing further migration of perchlorate in Saugus Formation groundwater towards additional water supplies located downgradient from the impacted production wells and the Facility (CH2MHILL 2004b). The pumping rate proposed for groundwater extraction has been based on local water supply needs and modeling of groundwater flowpaths and the locations and areal extent of groundwater capture zones predicted under the proposed pumping plan. The pumping plan would be an interim measure employed by the Water Purveyors during Whittaker's development and implementation of long-term remedial actions at the Facility, although it is expected that the pumping plan would be adapted for continued operation following implementation of the long-term remedial action to meet local water supply needs.

The Regional Model limits are largely coincident with the Santa Clara River Valley East Groundwater Subbasin limits and include the entire footprint of the Saugus Formation and portions of the alluvial aquifer extending beyond the Saugus Formation, as shown on Figure 1-1 in Appendix B. The Regional Model was used to simulate a 78-year period based on historical records of yearly variations in local hydrology, pumping demand, and availability of other water supplies. Model results were evaluated by examining the predicted hydrographs of water budget terms and groundwater elevations, and by analyzing predicted groundwater flowpaths using particle-tracking techniques to assess the extent of hydraulic containment provided by the pumping plan. A sensitivity analysis was also performed by varying pumping schemes and by varying the simulated degree of hydraulic connection between the alluvium and the Saugus Formation (CH2MHILL 2004b).

Based on the Regional Model results, hydraulic containment of perchlorate migrating westward from the Facility through the Saugus Formation could be achieved by utilizing Saugus 1 and Saugus 2, as shown on Figure ES-3 in Appendix B; neither NC-11 or additional production wells would be needed to achieve hydraulic containment (CH2MHILL 2004b). Furthermore, groundwater extraction from Saugus 1 and 2 are essential to hydraulically contain perchlorate-impacted groundwater that is migrating from the Facility (CH2MHILL 2004b).

3.6 Possible Pathways of Contamination

Studies performed to date at the Facility suggest the following potential pathways for contamination of the affected production wells:

- Migration via surface water runoff
- Migration through the northern portion of the Quaternary alluvium from the Facility
- Migration through the vadose zone and into the Saugus Formation
- Migration along the San Gabriel fault zone

The first pathway involves surface water runoff from the Facility with COI migration into the alluvium west of the Facility. From within the alluvium, COIs would continue migrating downward into the groundwater of the Saugus Formation, and subsequently to the Saugus Formation production wells (Hargis 1999). The results of the USACE's remedial investigation activities appear to support this contaminant pathway. Perchlorate concentrations were detected in samples collected from the alluvium in the South Fork as far south as the mouth of Oakdale Canyon, which collects drainage from source areas within the Facility (CH2MHILL 2005). During 2003, Whittaker implemented short-term measures to minimize perchlorate migration via surface water drainage (CH2MHILL 2005).

The second contaminant pathway involves water containing COIs from the Facility that subsequently migrates downward in the alluvium on the north side of the Facility, and then continues vertically and horizontally with groundwater migration through the alluvium, ultimately traveling downward with migrating groundwater into the Saugus Formation and to the production wells (Hargis 1999). The results of the USACE's remedial investigation activities may also support this contaminant pathway. Concentrations of perchlorate, TCE, and PCE were detected in groundwater samples collected approximately 1 mile west of the Facility as far as Bouquet Junction, and perchlorate was detected as far as 2,500 feet southwest of Bouquet Junction (CH2MHILL 2005). These results suggest that the COIs have migrated within the alluvium west from the Facility along the southern edge of the Santa Clara River into the confluence of the Santa Clara River and the South Fork (CH2MHILL 2005).

The third contaminant pathways involves transport of water (i.e. surface water) vertically downward within the Facility boundaries, formation of perched zones that transport COIs laterally away from the Facility, and groundwater transport within the Saugus Formation resulting in COI migration to the production wells (Hargis 1999). The results of the USACE's remedial investigation activities also suggest COI migration through this contaminant pathway. Concentrations of perchlorate were detected in Well MP-2 within the Facility and at least 2 miles west of the Facility in Well MP-5 (CH2MHILL 2005). The analytical results of groundwater samples collected from these wells suggest that HSUs SI and SIII contain perchlorate at concentrations as high as 11.9 µg/l (CH2MHILL 2005). The laterally extensive distribution of perchlorate in the upper portion of the Saugus Formation may be the result of COI migration through the vadose zone of the Saugus Formation, a mechanism by which NC-11 may also have been impacted (CH2MHILL 2005).

The final contaminant pathway involves COI migration with groundwater traveling along the San Gabriel Fault. However, the fault, which bisects the Facility, appears to be a barrier to groundwater flow and contaminant transport in the Saugus Aquifer (CH2MHILL 2005).

Furthermore, there are differences in the chemical "fingerprint" between samples collected from wells north of the fault and samples collected from the four production wells. These observations suggest that perchlorate detected in groundwater wells north of the fault is not impacting the four production wells.

Section 4: Summary of Human Health Risk Assessment

A human health risk assessment (HHRA) was performed to characterize the potential human health risks associated with domestic use of groundwater from the impacted production wells in the Saugus Formation, assuming that no reduction in concentration of contaminants through treatment or response actions occurs. The HHRA was conducted using methods and assumptions consistent with DTSC and USEPA guidance (DTSC 1994, USEPA 1989). The results of the HHRA were used in determining preliminary remediation goals (PRGs) for use in developing appropriate response actions.

4.1 Overview of Risk Assessment

The HHRA was performed by identifying chemicals of potential concern (COPCs), potentially exposed receptor populations and potentially complete exposure routes, and characterizing the potential health risk and hazards to potentially exposed human receptor populations. The HHRA was based on the most recent available groundwater data from the impacted Saugus Formation production wells and currently available toxicological data.

4.1.1 Chemicals of Concern

Groundwater data collected at the well-heads of the production wells are representative of the exposures that would occur from domestic use of the wells. Because the HHRA only evaluated risks associated with domestic use of the Saugus Formation production wells, only well-head data were used to identify COPCs requiring further evaluation. Available groundwater data from the most recent sampling events for the Saugus Formation production wells were used to identify the COPCs. Well-head samples were collected from Saugus 1, Saugus 2, and NC-11 in 2003. These samples were analyzed for multiple constituents, including perchlorate, VOCs, HMX, RDX, and NDMA.

Concentrations of chemicals detected in well-head samples were compared with drinking water standards to identify the COPCs. If the maximum detected concentration of a chemical was greater than the drinking water standard, that chemical was identified as a COPC requiring further evaluation. The comparison of detected concentrations in well-head samples with drinking water standards is presented in Table 3. Perchlorate was the only chemical identified as a COPC.

4.1.2 Exposure Assessment

The HHRA evaluated potential human health risks for individuals using water from within the pressure zones of the impacted production wells. Adult and child residents were identified as the potentially exposed populations based on consideration of current and future groundwater use scenarios.

Potential exposure pathways for domestic use of water are ingestion, inhalation, and dermal contact. Perchlorate is not volatile and droplets produced while showering are generally too large to be inhaled (OEHHA 2004), so inhalation was considered an incomplete exposure pathway. Perchlorate is completely ionized in aqueous systems and is expected to have limited permeability through intact skin (OEHHA 2004), so dermal contact was considered an incomplete exposure pathway. For perchlorate in domestic water, ingestion was the only potentially complete exposure pathway identified.

Recent well-head water data were limited, so the maximum detected concentration of perchlorate, 60 µg/l, was used as the exposure point concentration (EPC) in the HHRA. The EPC was used to calculate the chronic daily intake (CDI) for each of the receptor populations. The CDI calculations incorporated the reasonable maximum exposure assumptions for adult and child residents from DTSC guidance (DTSC 1994).

The HHRA only considered exposure to the groundwater in the Saugus Formation that is used for domestic supply.

4.1.3 Toxicity Assessment

The currently available toxicological data for perchlorate were used to estimate risks in the HHRA. The Office of Environmental Health Hazard Assessment (OEHHA) issued the final public health goal (PHG) for perchlorate in March 2004. The PHG document provided a review of available toxicological data from animal and human studies (OEHHA 2004). OEHHA derived the benchmark dose limit (BMDL) from a human study reported by Greer et al (2002). The BMDL is the lower limit of a one-sided 95 percent confidence interval of a perchlorate dose that reduces mean thyroidal iodide uptake by five percent. OEHHA also used an uncertainty factor of 10 to account for inter-individual variability.

A reference dose (RfD) represents the daily dose or concentration level to which humans, including sensitive subpopulations, may be exposed throughout their lifetimes without adverse health effects. The RfD for perchlorate was derived by dividing the BMDL by the uncertainty factor. The resulting RfD of 0.00037 milligrams per kilogram per day (mg/kg-day) was used in the HHRA.

4.1.4 Risk Characterization

Because the carcinogenicity of perchlorate has not been categorized, only the chronic noncancer health hazard was considered in evaluating the risks associated with exposure to perchlorate. The chronic noncancer health hazard was assessed by dividing the CDI by the RfD. This ratio of exposure to toxicity is called the hazard quotient (HQ). An HQ greater than 1.0 indicates adverse health effects are possible.

The HQ for each exposure was calculated in the HHRA. The chronic noncancer health hazards are presented in Table 4 and are summarized as follows:

- The HQ calculated for the adult resident is 4.4 indicating that perchlorate in groundwater at the detected concentrations may pose a health hazard to the adult resident.

- The HQ calculated for the child resident is 10.4 indicating that perchlorate in groundwater at the detected concentrations may pose a health hazard to the child resident.

4.2 Determination of Preliminary Remediation Goals

The results of the HHRA indicate that current concentrations of perchlorate in the Saugus Formation production wells could pose health hazards to adult and child residents if the impacted wells were used without treatment to supply water for domestic uses. The HHRA was based on available data for the production wells. Higher concentrations of perchlorate have been detected in upgradient groundwater monitoring wells, suggesting that the potential for health hazards could increase in the future.

Based on the results of the HHRA, a PRG for perchlorate needs to address the potential health hazards associated with domestic use of groundwater from the impacted production wells in the Saugus Formation. The OEHHA PHG of 6 µg/l was established for perchlorate in drinking water to be protective of sensitive subpopulations. Because the OEHHA PHG addresses the same populations and exposure pathways evaluated in the HHRA, the OEHHA PHG was selected as the PRG for perchlorate in groundwater from the impacted production wells.

Currently, there is no federal or state maximum contaminant level (MCL) for perchlorate. The notification level (NL) (which was referred to as an “action level” through 2004), used by the DHS for perchlorate is the same as the PHG.

The PRG clearly applies to residual concentrations of perchlorate in in-situ groundwater. However, achieving perchlorate concentrations equivalent to the PRG is not considered sufficient for groundwater to be provided for drinking water purposes. As a matter of practice and community acceptance, because the perchlorate-impacted production wells are considered “extremely impaired” with the framework of DHS Policy 97-005, therefore, it is anticipated that DHS will require that groundwater to be used for community supply purposes should be treated to achieve non-detectable concentrations of perchlorate.

Section 5: Identification, Screening, and Development of Remedial Alternatives

This section discusses the identification, development, and screening of alternatives for the Saugus Formation groundwater west of the Facility. The alternatives are developed to be responsive to and satisfy the remedial action objectives (RAOs). The RAOs in turn are developed to address a specific contaminant, perchlorate, and a specified medium, groundwater. Applicable or Relevant and Appropriate Requirements (ARARs) that potentially apply to remedial activities were identified and used to supplement the preliminary evaluation of technologies. General response actions (GRAs) considered capable of achieving the RAOs were identified, and applicable technologies within these general response actions were identified and screened based on their effectiveness, implementability, and cost.

5.1 Remedial Action Objectives

The RAOs used to evaluate remedial alternatives and develop the interim remedial action plan include specific technical objectives and broader strategic objectives that pertain largely to the location of OU7. RAOs are developed specifically for the COPC, exposure route, and media of interest, as discussed in Section 4, and consider the PRG. However, it is recognized that the final remediation goal (FRG) will be developed in discussions with regulatory agencies, particularly DTSC, in consideration of the ARARs and the risk-based levels discussed in Section 4.

Based upon the complexities of the OU7 as summarized in Section 3 of this IRAP and the continuing migration of perchlorate from upgradient sources into and through OU7, the following strategic RAOs have been identified:

- Meet the PRG as identified in Section 4 and the FRG as ultimately finalized by the regulatory agencies
- Protect human health and the environment
- Contain the perchlorate mass in OU7 Saugus Formation groundwater west of the San Gabriel Fault that may be attributable to source areas located at the Facility
- Perform the remedial activities in a cost-effective manner

The specific technical RAOs pertaining to interim remedial actions to be performed by the Water Purveyors are as follows:

- Protect, to the extent practicable, existing and reasonably anticipated future water supply wells from further unacceptable water quality degradation due to perchlorate traveling in groundwater
- Reliably provide a public water supply that does not contain perchlorate at concentrations exceeding the PRG and satisfies DHS Policy 97-005 requirements for treatment

- Restore the water supply capacity that was lost due to the presence of perchlorate in the Saugus Formation and to meet the timing and volume of expected demand

The schedule for implementation of the remedial strategy is a critical element of the RAOs. Timing is critical because the expected demand for this water supply, in part, is driven by expectations that the frequency of future drought years will follow historical patterns. Therefore, it can be expected that demand for this water supply will arise in the near future. In addition, there are anticipated demands for this water supply due to projected growth.

Although the Stadium Well and Well Q-2, alluvial aquifer production wells, have been impacted by perchlorate and removed from service, they are not part of this evaluation. The Stadium Well and Well Q-2 are located near the Santa Clara River generally downgradient from the northern portion of the Whittaker Facility (north of the San Gabriel Fault) where elevated levels of perchlorate have been detected in soil and groundwater samples. Operation of the Stadium Well will be evaluated following completion of source area characterization activities and implementation of source area remedial measures by Whittaker in the northern portion of the Facility. Additional subsurface characterization in the vicinity of the Stadium Well was identified as a priority subtask for OU7 in a letter from DTSC to Whittaker representatives dated 10 March 2003.

This IRAP is prepared by the Water Purveyors to evaluate alternatives for containment of the perchlorate plume in the Saugus Formation groundwater west of the Facility, and for restoration of the lost production capacity. As such this IRAP addresses a portion of OU7 groundwater. In accordance with its agreements with DTSC, Whittaker is currently performing additional groundwater investigations and will evaluate alternatives for remediation of other portions of OU7. Thus, this IRAP proposes a remedial measure that will be a component of the overall remedy to be selected in the future for OU7.

5.2 Applicable or Relevant and Appropriate Requirements

Although the area encompassing the capture zone of the four domestic water supply wells is not on the NPL, this IRAP has been developed to be consistent with the NCP. In evaluating remedial alternatives, the NCP requires consideration of ARARs, which it defines as follows (40 CFR 300.5):

> Applicable requirements are "...those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site."
>
> Relevant and appropriate requirements are "...those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not 'applicable' to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site."

ARARs are categorized as chemical-, action- or location-specific. Chemical-specific requirements are typically health or risk-based concentrations for specific substances in the various environmental media. Action-specific requirements generally set performance, design or other similar action-specific controls related to the management of hazardous substances. Location-specific ARARs address restrictions on activities or permissible chemical concentrations in a particular location. For example, projects in sensitive areas such as wetlands or a flood plain would include ARARs specific to these attributes of the project site in the evaluation of alternatives.

In addition to ARARs, which are regulatory requirements, to-be-considered (TBC) material should also be identified. TBC are nonbinding criteria, advisories, guidance, and proposed standards that might provide useful information or recommended procedures for developing standards that protect human health and the environment.

ARARs have been developed for the perchlorate-impacted portion of the Saugus Formation using federal, state and local statutes, regulations and guidance. Table 5 presents chemical-specific ARARs that address concentration limits for perchlorate that has been detected in groundwater samples from the four Saugus Formation water production wells. Because there is minimal likelihood of exposure of terrestrial or aquatic species to groundwater containing perchlorate, Table 5 addresses human health, and not ecologically-based criteria. Other ARARs and TBC criteria that may apply to specific water supply restoration alternatives or selected actions are presented in Table 6, along with a brief evaluation of applicability and relevance. Compliance with the ARARs and TBC criteria identified in Tables 5 and 6 will be considered during the preliminary screening of technologies. Compliance with ARARs will be used as a threshold criterion during detailed analysis of the alternatives.

Of particular importance relative to the restoration of the drinking water resource are DHS Policy Memo 97-005 and State Water Resources Control Board Resolution 68-16. DHS Policy Memo 97-005 addresses both the intent to maintain and reliably provide high quality drinking water sources, and identifies process and performance conditions which must be satisfied prior to issuance of a permit for restoration of the use of an “extremely impaired” water source for drinking water supply. Due to the concentrations of perchlorate in the Saugus Formation wells, and the proximity of the wells to a known contamination source, the wells are considered “extremely impaired” within the framework of DHS Policy 97-005. One applicable performance condition is that the groundwater must be treated to achieve non-detectable concentrations of perchlorate prior to introduction into the water distribution system.

Resolution 68-16 (also referred to as the Non-Degradation or Anti-Degradation Policy) speaks to maintenance of water quality to protect the maximum benefit of the people of the State.

5.3 General Response Actions

The GRAs are broad categories of remedial methods developed to be responsive to and satisfy the RAOs. The GRAs are developed in consideration of the addressable media (groundwater) for which this IRAP is concerned as well as the site characteristics and the current understanding of the COPC (perchlorate). The GRAs responsive to the RAOs and that potentially contribute to satisfying the RAOs are as follows:

- No Action
- Institutional Action
- Monitoring
- Alternate/Replacement Water Supply
- Monitored Natural Attenuation
- Containment
- Collection
- Treatment (In Situ and Ex Situ)
- Management/Reuse of Groundwater

The No Action response is necessary to establish a baseline for comparison with the other potential remedial actions. The No Action response assumes that no remedial action will be performed to reduce toxicity, mobility, or volume of perchlorate in groundwater. Therefore, the No Action response would include continued shutdown of the impacted Saugus Formation water production wells. However, the No Action response would still include ongoing groundwater monitoring to assess changes in chemical concentrations over time.

Institutional actions include legal, administrative, and procedural measures that will mitigate the risks of exposure to contaminated groundwater in the Saugus Formation by restricting access to the groundwater. Alternative/Replacement water supply actions involve the replacement of the impacted groundwater resources by unimpaired sources of water.

Containment involves implementation of a remedial action that significantly reduces the mobility of perchlorate in groundwater. Containment typically involves restricting the migration of the groundwater. Collection actions are methods for extracting groundwater from its present location in order to achieve hydraulic containment and perform treatment. Treatment involves implementation of a process that reduces chemical toxicity or transfers and concentrates chemicals in another medium, which may then require additional treatment. Management and/or reuse of groundwater actions are applied to treated groundwater following ex-situ treatment.

Response actions that are precluded by addressable media characteristics or identified as not applicable on the basis of increased understanding of addressable media conditions are eliminated from further consideration. This process will include identification of COPC characteristics that limit the effectiveness or applicability of certain technologies.

5.4 Initial Screening of Potential Technologies and Process Options

A range of potential technologies and more specific process options were identified for implementation of each GRA. Because perchlorate in groundwater is the only COPC, only technologies and processes considered effective in the remediation of perchlorate were considered. The following technology and process options were identified for the GRAs:

General Response Action	Remedial Technology	Process Option
Institutional Action	Proprietary Controls	Land Purchase
		Deed Restrictions
		Deed Notices
		Easements
		Covenants
	Governmental Controls	Land Use Restrictions
		Groundwater Use Restrictions
		Advisories
Monitoring		In-situ Groundwater Monitoring
		Public Water System
Alternative/Replacement Water Supply		New Water Supply Well
		New Water Supply
		Well Abandonment
Monitored Natural Attenuation	Monitoring/Verification	Groundwater Monitoring
Containment	Hydraulic Barriers	Vertical Extraction Wells
		Horizontal Extraction Wells
		Extraction and Recharge Wells
		Interceptor Trenches
	Vertical Barriers	Slurry Walls
		HDPE Curtain Wall
		Reactive Metals Wall
		Phytoremediation
Collection	Groundwater Extraction	Vertical Extraction Wells
		Horizontal Extraction Wells
		Recharge Wells
In Situ Treatment	Stripping	Air Sparging
		In-Well Aeration/Stripping
	Physical Treatment	Electrokinetics
	Biological Treatment	Enhanced Biological Reduction
Ex Situ Treatment	Physical Treatment	Granular Activated Carbon
		Air Stripping
		Filtration
		Membrane Filtration
	Chemical Treatment	Ion Exchange
		Ultraviolet Irradiation/Chemical Oxidation
		Pre-Loaded Granular Activated Carbon
		Electrochemical Processes
		Aeration of Metals
		Reactive Metals Aboveground Reactor
		pH Adjustment
	Biological Treatment	Aerobic Bioreactor
		Cometabolic Bioreactor (Biological Reduction)
		Anaerobic Bioreactor
Management/Reuse of Groundwater	Treated Groundwater Management	Direct Potable Water Supply
		Indirect Potable Water Supply
		Non-Potable Water Reuse
		Streamflow Augmentation
		Discharge to Publicly Owned Treatment Works
		Groundwater Recharge
		Deep Well Injection
	Untreated Groundwater Management	Discharge to Publicly Owned Treatment Works
		Deep Well Injection
		Streamflow Augmentation

Initial screening of the potential technologies and process options was based on technical implementability. The initial screening of potential technologies and process options is summarized on Figure 4. Those technologies and process options considered to be technically implementable were further screened based on effectiveness, administrative and technical implementability, and the relative range of cost as discussed in Section 5.5.

5.5 Evaluation of Technologies and Process Options

A further evaluation of the technologies and process options that were retained following the initial screening was conducted based on the screening criteria of effectiveness, and implementability, and the relative range of costs.

- Effectiveness addresses the ability of the technology to meet the RAOs for the COPC and quantity of impacted groundwater, mitigate potential impacts to human health and the environment during construction and implantation, and perform reliably with respect to the COPC (perchlorate) and conditions within the study area. Technologies were also rated in terms of their relative effectiveness compared to other technology options for the same GRA.

- Implementability is an evaluation of the site-specific technical and administrative feasibility factors involved in applying the technology. Factors affecting implementability include available resources, site hydrogeology and soil types, physical obstructions such as buildings, permitting requirements, and availability and proximity of treatment and disposal facilities.

- Overall costs were evaluated based on the components of both capital costs and long-term operation and maintenance (O&M) costs. Costs are estimated on the basis of engineering judgment, with each option evaluated as high, medium, or low relative to other options in the same category. Cost has a limited role in this phase of evaluation.

A summary of the evaluation of technologies and process options based on effectiveness, implementability, and cost is shown on Figure 5. The technologies and process options that were eliminated from further consideration are also indicated on Figure 5.

Section 6: Detailed Analysis of Remedial Alternatives

Following preliminary screening, those technologies and process options considered feasible were assembled into remedial alternatives to address perchlorate-impacted Saugus Formation groundwater within a portion of OU7. The alternatives usually involved the implementation of more than one technology. A detailed analysis of each alternative was then performed to identify and recommend the remedial alternative best suited for addressing impacts to groundwater in the Saugus Formation. The remedial alternatives were evaluated in detail using the nine evaluation criteria set forth in CERCLA guidance documents.

6.1 Potential Remedial Alternatives

Technologies and process options that passed the screening process presented in Section 5 are further evaluated in the following sections. This phase of the evaluation process includes refinement of the initial technologies and process options on the basis of currently available information. However, it is recognized that new information may become available as a result of ongoing site characterization activities being performed by Whittaker. The following technologies and process options have been identified as applicable strategies for remediation of groundwater containing perchlorate in the Saugus Formation:

- No Action
- Groundwater and public water system monitoring
- Alternative/Replacement water supply
- Containment and collection with vertical groundwater extraction wells
- Ex-situ treatment with filtration
- Ex-situ treatment with ion exchange
- Ex-situ treatment with cometabolic bioreactor
- Ex-situ treatment with membrane filtration
- Treated groundwater management

Implementable remedial alternatives were developed by assembling relevant combinations of these technologies and process options. Four principal remedial alternatives are considered in this detailed evaluation:

- Alternative 1: No action
- Alternative 2: Hydraulic containment and collection, aboveground treatment with ion exchange technology, and treated water reuse
- Alternative 3: Hydraulic containment and collection, aboveground treatment with aboveground biological technology, and treated water reuse
- Alternative 4: Hydraulic containment and collection, aboveground treatment with aboveground membrane filtration technology, and treated water reuse

These remedial alternatives were developed to address the RAOs presented in Section 5. All of the remedial alternatives include continuing groundwater monitoring and provisions to recover the lost domestic water supply capacity resulting from perchlorate impacts to groundwater within the Saugus Formation. Alternatives 2, 3, and 4 include resumed operation of Saugus 1 and 2, proper abandonment of VWC-157 and NC-11, modifications to the existing water distribution system, ex-situ treatment of the extracted groundwater at a site owned by CLWA, reuse of the treated groundwater, and development of additional water supply resources to mitigate production capacity lost due to the presence of perchlorate. The four remedial alternatives developed in the IRAP are described in more detail below and summarized on Figure 6.

6.1.1 Alternative 1: No Action

The No Action Alternative includes no remedial activities. The only technology implemented for Alternative 1, the No Action alternative, is groundwater monitoring. This alternative would include abandoning the four perchlorate-impacted Saugus Formation production wells, installation of two additional groundwater monitoring wells, and long-term monitoring of groundwater to monitor the movement of contaminants in groundwater. In accordance with the NCP, the No Action Alternative must be assessed for baseline comparison with other alternatives.

6.1.2 Alternative 2: Containment and Ion Exchange Treatment

Alternative 2 consists of hydraulic containment of perchlorate-impacted groundwater in the Saugus Formation by pumping from existing production wells Saugus 1 and 2, abandonment of Wells VWC-157 and NC-11, modifications to the existing domestic water supply distribution system, ex-situ treatment of groundwater by ion exchange using a resin that selectively removes perchlorate, and discharge of the treated groundwater to local domestic water supply service areas. The hydraulic containment pumping concept and proposed improvements to the existing water distribution system are described in Section 6.1.5. The ex-situ ion exchange treatment process is described in this section.

Under this alternative, an ion exchange treatment system would be located adjacent to the Rio Vista Intake Pump Station (RVIPS) on property that is owned by CLWA. The engineering components of the ion exchange system include pH adjustment, filtration to remove suspended solids, two ion exchange vessels with single-use perchlorate-selective resin operated in series, disinfection by chloramination, and a booster pump to discharge the treated groundwater into the 84-inch treated water pipeline from the Rio Vista Water Treatment Plant (RVWTP). The spent resin would require periodic removal, replacement, and offsite incineration. During incineration the perchlorate ion undergoes complete thermal destruction, eliminating the possibility of generating a new waste stream.

Operation and maintenance elements for Alternative 2 include sentinel groundwater monitoring, electrical power for operation of the well pumps, on-going monitoring of influent and treated water, resin replacement, disinfection chemicals, and management of spent resin. The generalized conceptual process flow diagram is shown on Figure 7.

On behalf of CLWA, Carollo Engineers (Carollo) conducted a bench-scale analysis of ion exchange treatment to evaluate the effectiveness of ion exchange for treating water from the Saugus Formation. Three single-pass perchlorate-selective ion exchange resins were evaluated at the bench-scale (Carollo 2004). Perchlorate breakthrough (identified as perchlorate concentration greater than 1 µg/l) was observed at 25,000 to 76,000 bed volumes, or 26 to 79 days of operation. This is equivalent to treated water volumes of 187,000 to 569,000 gallons per cubic foot of resin (gal/cu-ft). Resins were also tested for potential to form NDMA. Analytical results indicated that in two of the resin types tested, no detectable concentrations of NDMA precursors leached from the resins. In one of the resin types tested, NDMA was detected at concentrations less than half of the DHS Action Level (starting in 2005, known as Notification Level) of 10 nanograms per liter (ng/l). A California Total Threshold Limit Concentration (TTLC) analysis showed that metal concentrations were mostly less than the laboratory reporting limits in all three spent resins, and those metals present at concentrations exceeding the detection limits were significantly below the Title 22 TTLC levels (Carollo 2004).

DHS has approved the use of ion exchange to accomplish removal of perchlorate from drinking water at several other locations in California.

6.1.3 Alternative 3: Containment and Biological Treatment

Alternative 3 consists of hydraulic containment of perchlorate-impacted groundwater in the Saugus Formation by pumping from existing production wells Saugus 1 and 2, abandonment of Wells VWC-157 and NC-11, modifications to the existing domestic water supply distribution system, ex-situ treatment of groundwater by cometabolic biological reduction, and discharge of the treated groundwater to the raw water supply line for further treatment at the RVWTP and ultimate distribution to local domestic water supply service areas. The hydraulic containment pumping concept and proposed improvements to the existing water distribution system are described in Section 6.1.5. The ex-situ biological treatment process is described in this section.

The biological treatment process involves a fixed-film biomass attached to sand or granular activated carbon in a fluidized bed reactor (FBR) or attached to stationary sand or plastic media in a fixed bed reactor (FXB). The FBR system requires additional pumping to maintain the upward flow velocities needed to suspend the attached growth media. As such, FBR systems have higher pumping/energy costs, but have higher surface areas for attachment and growth of microorganisms for potentially increased removal efficiencies. FBR systems also have a low pressure drop across the bed. FXB systems require periodic backflushing to remove biosolid buildup on the media and to prevent plugging. An organic substrate such as acetic acid or ethanol, and nutrients are required (DTSC 2004).

The engineering components of the biological treatment system include pH adjustment, either FXB or FBR, filtration, disinfection by chloramination, and a booster pump to discharge the treated groundwater into the 102-inch raw water pipeline supplying the RVWTP to undergo further treatment before being distributed to CLWA customers. The biomass residual and treated backwash water may be discharged to the sewer.

Operation and maintenance elements for Alternative 3 include sentinel groundwater monitoring, electrical power for operation of the well pumps and booster pump, on-going monitoring of influent and treated water, substrate and nutrient usage, residuals management and post-treatment of the groundwater at the RVWTP. A conceptual process flow diagram for Alternative 3 is shown on Figure 8.

On behalf of CLWA, Carollo also performed a pilot scale study of biological treatment for perchlorate-impacted groundwater. The study included testing of both the FBR and FXB biological treatment systems (Carollo 2004). Perchlorate removal to concentrations less than the laboratory detection limit was consistently achieved in the FXB system using only organisms indigenous to the Saugus Formation. Effluent from the FXB system was biologically stable and contained no fecal coliforms. Challenge tests showed that the FXB system was robust with respect to backwashing episodes, changes in feed water quality, system shut-downs, and electron donor addition failures. Analysis of disinfection bypropducts (DBP) for the FXB system resulted in trihalomethane (THM) and haloacetic acid (HAA) concentrations lower than the MCL established under the EPA Stage 2 Disinfection Byproduct Rule (Carollo 2004).

During the pilot test, the FBR system did not achieve perchlorate removal to concentrations below the detection limit over a period greater than eight days. Testing did demonstrate that biological removal of perchlorate can be achieved using indigenous microorganisms in a FBR system, a result that had not been previously demonstrated for the FBR system (Carollo 2004).

The biological reduction process is currently in use at other sites where groundwater is impacted with perchlorate. DHS requires case specific approval of treatment technologies for perchlorate removal for drinking water. DHS has given a conditional acceptance of biological treatment using an FBR to remove perchlorate from drinking water at another site; however, DHS has not issued a permit to any facility that uses biological treatment for domestic water supply.

6.1.4 Alternative 4: Containment and Membrane Filtration Treatment

Alternative 4 consists of hydraulic containment of perchlorate-impacted groundwater in the Saugus Formation by pumping from existing production wells Saugus 1 and 2, abandonment of Wells VWC-157 and NC-11, modifications to the existing domestic water supply distribution system, ex-situ treatment of groundwater by membrane filtration, disinfection by chloramination and discharge of the treated groundwater to local domestic water supply service areas. The hydraulic containment pumping concept and proposed improvements to the existing water distribution system are described in Section 6.1.5. The ex-situ membrane filtration treatment process is described in this section.

Membrane filtration technology makes use of semi-permeable membranes to remove undesired dissolved ions in water. There are three main types of membranes, which include high-pressure reverse osmosis (RO) membranes, nanofiltration (NF) membranes, and low-pressure RO membranes. RO membranes are expected to achieve removal of perchlorate ions, however, there is currently little available performance data on perchlorate removal using membrane technologies. The American Water Works Association Research Foundation (AwwaRF) is supporting an ongoing research project to investigate the feasibility of membrane filtration technology for the removal of perchlorate from water sources of different quality (DTSC 2004).

A bench scale study of perchlorate rejection by high-pressure membranes, and brine stream treatment by chemical and biological processes, was conducted by the University of Colorado using synthetic water based upon Saugus Formation groundwater samples provided by CLWA. Two types of RO membranes and two types of NF membranes have been tested. Only one of the four membrane types was shown to satisfy the PRG of 6 µg/l of perchlorate. Concentrated perchlorate reduction in the brine by zerovalent iron (Fe^0) was also tested. Perchlorate reduction in the brine by Fe^0 was slow because Fe^0 was not effectively corroded at a pH of 4. A slight enhancement at a pH of 2.5 was observed (University of Colorado 2004).

The engineering components of Alternative 4 include pre-filtration to remove suspended solids, treatment by membrane filtration, potential pH adjustment, disinfection by chloramination, and a booster pump to discharge the treated groundwater into the 84-inch treated water pipeline from RVWTP. Facilities to collect the RO reject water (brine) would also be necessary. The brine would contain high concentrations of perchlorate and total dissolved solids (TDS) and would require treatment or proper disposal. Membranes can be fouled by hardness-induced scaling or biological growth. Unselective removal of dissolved ions produces a more corrosive, lower pH effluent, and degradation of the membrane may also occur in treating perchlorate (DTSC 2004). A conceptual process flow diagram for Alternative 4 is shown on Figure 9.

Operation and maintenance elements include high energy requirements (high-pressure RO membranes have an influent pressure to the membranes greater than 150 pounds per square inch) and production of a brine (the volume of which can be as high as 15 to 20 percent of the total volume of water treated). DHS requires case specific approval of treatment technologies for perchlorate removal for drinking water. To date, DHS has not issued a permit for a membrane filtration treatment system for perchlorate in drinking water.

6.1.5 Existing Water Distribution System Modifications

Each of the remedial alternatives, except for the No Action alternative, incorporates hydraulic containment and collection, ex-situ treatment and management of the treated groundwater in the existing water distribution system. To provide for collection of the untreated groundwater, modifications to the existing water distribution system are necessary. Proposed modifications to the existing water distribution system include renewed operation of two groundwater production wells and a piping system to deliver contaminated groundwater to treatment facilities to be constructed at the RVIPS. The proposed modifications to the existing water distribution system are shown on Figure 10. Although discussed herein for the purposes of completeness, it should be noted that approval of the proposed modifications to the water distribution system is not within the jurisdiction of DTSC.

New variable-speed drive pumps, each capable of pumping up to 1,200 gpm, will be installed in existing water supply Wells Saugus 1 and 2. CLWA would operate Wells Saugus 1 and 2 as containment wells for Saugus Formation groundwater containing perchlorate that is moving northwesterly from the Facility. An initial pumping rate of 2,200 gpm would be used to assess the adequacy of containment. The long-term pumping rate to optimize containment would be based on long-term field testing after the containment system started operating. The initial pumping rate will be 1,100 gpm at each well. Adjustments to this pumping rate may be made according to criteria developed by the Water Purveyors in consultation with DTSC. In the event that groundwater in excess of the pumping rate required for containment is required for water supply purposes, the pumping rate may be increased up to 2,400 gpm.

The contaminated groundwater pumped from Wells Saugus 1 and 2 will be discharged into a contaminated groundwater delivery pipeline, which will include converting a portion of CLWA's existing 21-inch Newhall Lateral from the delivery of imported water to the transmission of contaminated groundwater, shown as a thick broken line on Figure 10. Containment water from Wells Saugus 1 and 2 would discharge to the converted Newhall Lateral through an existing 14-inch SCWD pipeline that crosses the South Fork. A new 10-inch pipeline (thick unbroken line on Figure 10) would be installed to connect Wells Saugus 1 and 2 to the existing 14-inch SCWD pipeline. Contaminated groundwater will cross the Santa Clara River through a new 16-inch pipeline (thick unbroken line on Figure 10), which would deliver contaminated water to the RVIPS on Bouquet Canyon Road where the water would be treated to remove perchlorate.

A groundwater treatment system rated for a capacity of at least 2,400 gpm would be constructed immediately west of the existing RVIPS on land owned by CLWA that is secure and has existing support facilities. Construction will include installation of a connection to allow pumping of treated groundwater into either the existing 84-inch treated water distribution pipeline or the 102-inch raw water supply pipeline that are located adjacent to the RVIPS. Containment water delivered to the treatment system would be treated by CLWA according to the requirements of DHS. Although the treatment system would not be staffed on a continuous basis, it would be monitored remotely through a SCADA system from the RVWTP, which is staffed 24 hours per day. CLWA operators would visit the treatment system as required. Either treated surface water from the RVWTP or raw surface water entering the RVWTP would be used as a source of blending water to blend with and dilute the treated groundwater. The RVWTP currently has a capacity of 20,800 gpm with an average flowrate of 10,400 gpm. The specific pipeline selected to provide blending is dependent on the alternative chosen to treat the groundwater. Tie-in locations were discussed in more detail in the sections describing the three treatment alternatives.

Existing Wells VWC-157 and NC-11 will be properly abandoned. A new cluster monitoring well would be installed near Well Saugus 1, as well as additional wells necessary to provide a sentinel and performance monitoring network. The new monitoring wells would address the requirement of DHS Policy 97-005 and would provide groundwater monitoring in both the Alluvium and Saugus Formation. The upgradient monitoring wells required by DHS Policy 97-005 would be monitored by CLWA at a frequency established by DHS and DTSC. Monitoring events would be coordinated with the monitoring activities conducted at the Facility.

6.1.6 Replacement of Lost Production Capacity

The Water Purveyors have experienced lost water production capacity as a result of perchlorate contamination in the production Wells Saugus 1, Saugus 2, VWC-157, and NC-11. As proposed in this IRAP, future groundwater production from the existing impacted wells will be less than the production capacity prior to contamination of the wells. Pumping rates will be limited to less than the pre-contamination pumping rates in order to balance the need for containment of the perchlorate plume in groundwater with the need to design and operate a cost-effective perchlorate treatment system.

As a water supply issue, replacement of the remaining lost water production capacity is outside the scope of this IRAP, but it is nevertheless a significant component of pending agreements between the Water Purveyors and Whittaker. For the purpose of completeness, this section provides a brief summary of the issue and its potential resolution to provide the reader with a sense of the overall plan for restoration of lost production capacity. Costs for water supply replacement components in excess of facilities associated with pumping from Saugus 1 and Saugus 2 are not included in this document.

Prior to contamination, Wells Saugus 1 and 2 had a production capacity of 2,600 gpm each, for a combined total of 5,200 gpm. Wells VWC-157, NC-11, and the Stadium Well could operate at pumping rates of 1,500, 1,200, and 800 gpm, respectively. Based on the hydraulic containment concept, Wells Saugus 1 and 2 would be operated at a combined flow of 2,200 gpm, Wells VWC-157 and NC-11 would be properly abandoned, and the Stadium Well would remain inactive. The net lost production capacity that would result from the containment pumping is 6,500 gpm. Also, the selection of Alternative 3, which utilizes biological treatment, would result in additional loss of overall water production capacity, because the biologically treated groundwater would be pumped to RVWTP for further treatment, resulting in a displacement of available capacity for treatment of raw surface water. Selection of Alternative 4, utilizing membrane treatment, would result in some loss of water through the generation of the non-potable brine solution.

Several strategies to replace lost production capacity, such as installation of new wells and associated water delivery piping system, were considered by the Water Purveyors and Whittaker. The following were the proposals considered to replace the lost capacity of 6,500 gpm:

- Oversize the CLWA water delivery facilities
- Construct new production wells in the Saugus Formation
- Utilize variable speed pumps at Wells Saugus 1 and 2, provide a new Saugus production well to replace Well VWC-157, and oversize the perchlorate treatment facilities at RVIPS (to provide treatment capacity for a maximum flowrate of 5,200 gpm).

6.1.7 Common Components of Alternatives

Alternatives 2, 3 and 4 share several common elements that were developed in part to reduce long-term implementation costs. One common element is that groundwater would be pumped from Wells Saugus 1 and 2 at flowrates no higher than necessary to provide hydraulic containment (estimated at a combined rate of 2,200 gpm).

Although it is very important to extract groundwater from the impacted Saugus Formation production wells at rates sufficient to provide hydraulic containment, the long-term costs associated with treating the entire hydraulic capacity of these production wells are not justified. Constructing conveyance and treatment infrastructure (pipelines, pumping systems and a perchlorate treatment system) with hydraulic capacity of more than 5,000 gpm, although the infrastructure would typically handle a flowrate closer to 2,200 gpm, would require capital expenditures and infrastructure capacity that would be infrequently utilized. Therefore, installation of replacement water supply wells appears to be the more cost-effective approach for restoration of the balance of the hydraulic capacity previously provided by the perchlorate-impacted Saugus Formation wells.

Furthermore, the Saugus Formation is used as a firming supply when other water supplies are reduced. Continual extraction of groundwater at a rate equal to the hydraulic capacity of the production wells would reduce the amount of water available in the Saugus Formation and threaten its availability as a firming supply. Moreover, operating the Saugus Formation wells continually at their hydraulic capacity is inconsistent with the Water Purveyors' Urban Water Management Plan. Constructing replacement wells that will not require perchlorate treatment and that would be operated on an as-needed basis, is considered a more cost-effective approach for providing potable water during conditions of reduced supplies from other water supply sources.

Alternatives 2, 3 and 4 contemplate construction of a perchlorate treatment system immediately west of the RVIPS. Treatment of groundwater at the RVIPS offers the advantage of the land already owned by CLWA, thus reducing land acquisition costs potentially associated with construction of a perchlorate treatment system at another location. Proximity of the proposed perchlorate treatment system to the existing RVIPS is expected to provide operational synergies. Moreover, an existing 84-inch diameter pipeline conveying treated water is located adjacent to the RVIPS, and injecting the treated groundwater into this 84-inch pipeline will provide considerable dilution of the treated groundwater and thus redundancy regarding potential agency or community concerns regarding removal of perchlorate and protection of human health. Alternatively, for Alternative 3 involving biological treatment to remove perchlorate, the groundwater could be pumped from the perchlorate treatment system into the existing 102-inch diameter raw water pipeline running from the RVIPS to the RVWTP.

Implementation of Alternatives 2, 3 or 4 would also include ongoing monitoring of groundwater upgradient of Wells Saugus 1 and Saugus 2 to evaluate potential changes in chemical concentrations in groundwater approaching the production wells. Sentinel wells would be installed and monitored for this purpose. Chemicals other than perchlorate have been detected in groundwater samples collected from other wells, and the purpose of the sentinel monitoring program would be to provide sufficient early warning regarding the approach of chemicals in groundwater that could potentially require modification of the treatment system. If necessary, additional unit processes could be added to the treatment system to provide treatment for the newly-arriving chemicals in groundwater.

In accordance with applicable DHS requirements, Alternatives 2, 3 and 4 would also include monitoring of the treatment process to confirm its effectiveness and provide process control.

6.2 Detailed Analysis of Alternatives

To provide a basis for the selection of a preferred alternative, the four remedial alternatives developed in the previous section have been analyzed to evaluate the extent to which they meet the RAOs. The remedial alternatives were evaluated against the criteria established in the NCP.

6.2.1 Statutory Requirements

The detailed analysis addresses the statutory requirements for the remedial action. The statutory requirements state that the remedial actions should:

- Be protective of human health and the environment
- Attain ARARs or provide grounds for invoking a waiver
- Be cost-effective

- Utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable
- Satisfy the preference for treatment that reduces toxicity, mobility, or volume of the COPC as a principal element (or provide an explanation as to why it does not)

6.2.2 Nine Evaluation Criteria

Nine evaluation criteria have been developed as guidelines under CERCLA to address the statutory requirements identified above, as well as additional technical and policy considerations that have proven to be important to the process of selecting remedial alternatives. The nine evaluation criteria, which include two threshold criteria, five balancing criteria, and two modifying criteria, are as follows.

- Overall protectiveness
- Compliance with ARARs and other guidelines
- Long-term effectiveness and permanence
- Reduction of mobility, toxicity, or volume of COPC through treatment
- Short-term effectiveness
- Implementability
- Cost
- State acceptance
- Community acceptance

The first two criteria are considered *threshold* criteria:

- Overall protectiveness
- Compliance with ARARs and other guidelines

These criteria must be met before a remedy can be selected. Evaluation of the overall protectiveness of an alternative focuses on how well the alternative will achieve protection over time and how well it will reduce risks. That assessment is intended to determine how well the risks posed by each pathway associated with the addressable media are eliminated, reduced, or controlled through treatment, engineered controls, or institutional controls. The evaluation of overall protectiveness criteria addresses the long- and short-term effects of each alternative under consideration. Each alternative is assessed with regard to how well it mitigates long-term exposure to perchlorate and protects human health. To determine if an alternative satisfies ARAR criteria, the effects of federal, state, and local requirements, regulations, and other institutional considerations relative to the design, operation, and timing of each alternative is evaluated. ARARs and other standards to be considered are identified in Tables 5 and 6.

The next five criteria are primary *balancing* criteria:

- Long-term (term over which the RAOs are achieved) effectiveness and permanence
- Reduction of mobility, toxicity, or volume through the use of treatment
- Short-term (term over which response objectives are met, i.e. construction and implementation phase) effectiveness

- Implementability
- Cost

Risk is an important factor in the analysis of effectiveness and permanence. The analysis evaluates the residual risk after the response objectives have been met. The evaluation also considers the potential impacts on human health and the environment if the remedy fails. The evaluation is performed in a narrative fashion for each of the five balancing criteria.

The last two criteria are considered *modifying* criteria and do not include risk information:

- State acceptance
- Community acceptance

These criteria are evaluated after public comments are received on the proposed IRAP.

These evaluation criteria are used to conduct a detailed analysis and to select an appropriate remedial action. Application of these criteria is address in the USEPA Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (USEPA 1988). A detailed evaluation of the four remedial alternatives is presented in the following sections and Tables 7 through 10 summarize the assessment of each alternative with respect to the nine evaluation criteria. The assessment incorporates the cost analysis discussed in Section 6.2.7 and summarized in Table 11.

6.2.3 Alternative 1: No-Action Alternative

Overall Protection of Human Health and the Environment:
While discontinued operation of the impacted production wells is a stop gap measure to protect the community from ingestion of perchlorate, Alternative 1 provides no overall protection for human health and the environment because it does not remove perchlorate from the drinking water resource. Alternative 1 does not address existing and continued further impacts to groundwater, nor does Alternative 1 provide measures to contain the migration of contaminated groundwater in the Saugus Formation. Without containment measures in place, downgradient wells that are currently not impacted by the perchlorate are more likely to be impacted in the future.

Compliance with ARARs:
Alternative 1 will not achieve compliance with ARARs because it does not reduce perchlorate concentrations to water quality objectives within a reasonable period of time. Prior to the identification of perchlorate impacts in the Saugus Formation, this groundwater resource was used for drinking water supply. Alternative 1 is inconsistent with State Water Resources Control Board Resolution 88-63 (Sources of Drinking Water Policy), Resolution 68-16 (Non-Degradation Policy) and the Water Quality Control Plan for the Los Angeles Region. Resolution 88-63 designates all groundwater within the state as a potential source of drinking water except where concentrations of total dissolved solids exceed 3,000 parts per million (ppm) or the yield from a single well is less than 200 gallons per day. The Non-Degradation Policy addresses preservation of water quality to preserve beneficial uses. The Water Quality Control Plan for the Los Angeles Region, authorized under Division 7 of the California Water Code, designates municipal water supply as a beneficial use of the Saugus Formation groundwater.

***Long-Term Effectiveness and Permanence*:**
The controls provided in Alternative 1 are not adequate to achieve the RAOs for the reasonably foreseeable future. The residual risk that would be present as a result of implementing Alternative 1 would preclude utilization of the affected water supply. Protection is provided to the community only to the extent that the impacted groundwater is not used for domestic/municipal water supply. Alternative 1 will not be effective in providing containment for Saugus Formation groundwater impacted by perchlorate.

***Reduction of Toxicity, Mobility, and Volume Through Treatment*:**
No reduction of toxicity, mobility, and volume through treatment is provided with Alternative 1. Because Alternative 1 does not provide measures to contain the groundwater currently impacted by groundwater, it is likely that the volume of perchlorate-impacted groundwater could increase under this alternative. Without containment measures in place, downgradient wells that are currently not affected by the contaminant plume are more likely to become impacted in the future, thereby exacerbating water supply management. Perchlorate is known to be very stable and mobile in the environment, and it is unlikely that any naturally-occurring in-situ mechanisms will reduce its toxicity or mobility.

***Short-Term Effectiveness*:**
Similar to long-term effectiveness, the short-term controls provided in Alternative 1 are not adequate to achieve the RAOs for the near future. The residual risk that would be present as a result of implementing Alternative 1 would preclude utilization of the affected groundwater for water supply over the short term. This protection is provided to the community only to the extent that the impacted groundwater is not used for domestic/municipal water supply. No protection against further environmental impacts (such as groundwater degradation) is provided.

***Implementability*:**
Alternative 1 is implementable within one year. In addition, Alternative 1 provides the flexibility to undertake remedial actions in the future with respect to both the RAOs contained in this IRAP and for RAOs that may be developed. However, deference of active remedial action with respect to the RAOs addressed in this IRAP will result in continued unavailability of a portion of the community water supply.

***Cost*:**
The estimated 30-year present value for Alternative 1 is $1.71 million. This cost is the lowest among the alternatives discussed in this IRAP.

***State Acceptance*:**
State acceptance is unknown at this time. However, based upon the lack of containment for the existing plume of perchlorate-impacted groundwater, state acceptance of this alternative appears unlikely.

***Community Acceptance*:**
Community acceptance is unknown at this time. However, based on the Water Purveyors' sense of the public water system user needs, the community would be unlikely to accept a solution resulting in inadequate local water supply capacity.

6.2.4 Alternative 2: Containment and Ex-Situ Treatment – Ion Exchange

***Overall Protection of Human Health and the Environment*:**
Currently, institutional controls (discontinued operation of the production wells impacted by perchlorate) ensure protection of human health only to the extent that the affected groundwater is not used for water supply. The groundwater pumping component of Alternative 2 reduces existing and continued further impacts to a public water supply (Saugus Formation groundwater).

Under Alternative 2, ex-situ treatment of groundwater utilizing a DHS-approved technology, as confirmed by ongoing monitoring of the treatment system, will provide adequate protection to the water system users. Moreover, groundwater treated by ion exchange and chloramination will be pumped into the 84-inch treated water distribution line and blended with imported water that has been treated at the RVWTP. Blending of the treated groundwater with imported CLWA water provides increased reliability and protection of human health.

***Compliance with ARARs*:**
Based on current understanding, it is expected that compliance with identified chemical-specific, location-specific, and action-specific ARARs can be achieved with Alternative 2. The state has promulgated a PHG of 6 µg/l of perchlorate in drinking water. The perchlorate PHG is considered a chemical-specific ARAR for evaluation of alternatives for water supply restoration.

During design and construction of the groundwater piping and treatment systems, ARARs can be satisfied. The proposed treatment of groundwater will satisfy the requirements of DHS Policy 97-005.

During operation, it is anticipated that the ion exchange treatment process will reduce perchlorate to concentrations less than 6 µg/l. However, compliance with chemical-specific ARARs can be evaluated through groundwater monitoring and monitoring of the groundwater treatment process.

***Long-Term Effectiveness and Permanence*:**
Ion exchange technology is proven to be effective over the long term with proper operation. This alternative will mitigate the loss of the water supply associated with the portion of the Saugus Formation currently impacted by perchlorate and reduce the potential for additional water supply loss. Alternative 2 provides for partial recovery of water production capacity compared with capacity available prior to the shutdown of wells impacted by perchlorate. The groundwater pumping component of Alternative 2 is expected to reduce the risk of perchlorate migration in the Saugus Formation and potential loss of other water production wells. Based upon the current understanding of the nature and extent of groundwater impacts, Alternative 2 provides the flexibility to achieve hydraulic containment of the groundwater as well as providing a system that can be managed to respond to future information regarding contaminant mobility or to optimize the system.

***Reduction of Toxicity, Mobility, and Volume Through Treatment*:**
Perchlorate mass will be removed from the subsurface by groundwater pumping, and from the extracted groundwater by the ion exchange treatment process. Alternative 2 satisfies the

preference for treatment that reduces toxicity, mobility, or volume as a principal element. The amount of chemical mass removed from the Saugus Formation is a function of the groundwater extraction rate and the perchlorate concentrations in the extracted groundwater.

Assuming perchlorate concentrations ranging from 9 µg/l to 60 µg/l in extracted groundwater and a PHG of 6 µg/l, the mass of perchlorate removed is estimated at 0.008 to 0.15 pounds per acre-foot (lb/ac-ft) of extracted groundwater. However, there is some uncertainty regarding both the quantity of groundwater that will be extracted and the actual concentrations of perchlorate in the groundwater that will be present over time once groundwater extraction begins. Unknown quantities of perchlorate are expected to remain in the Saugus Formation as well as upgradient impacted areas, particularly at the Whittaker-Bermite Facility, until such time as appropriate remedial measures are implemented to address the source areas.

The ion exchange resin will not be regenerated. Therefore, the possibility of the perchlorate being transferred from the well water to another water source through brine disposal has been eliminated. Incineration of the resin results in the destruction of perchlorate and thus, perchlorate will not be transferred to another medium.

Short-Term Effectiveness:
Alternative 2 can be implemented in a relative short time (one to two years) and is expected to be effective in achieving the water supply RAOs immediately upon implementation. The effectiveness of hydraulic containment can be evaluated through groundwater monitoring during operation.

In a letter dated 8 April 2002, DHS acknowledged ion exchange as an acceptable technology for removal of perchlorate from drinking water, but recommended that site-specific pilot studies be performed so that appropriate design and operating parameters can be established (DHS 2002b). The effectiveness of ion exchange in removing perchlorate from Saugus Formation groundwater has been demonstrated through a site-specific bench-scale pilot study (Carollo 2004).

Implementability:
Construction and operation of the groundwater extraction and treatment components is well understood. The treatment process is reliable and will be monitored to ensure that the system is effective. The ion exchange technology has been approved by DHS at other locations for removal of perchlorate in a drinking water supply. Approvals from regulatory agencies are obtainable and coordination with other agencies is possible where necessary. The treatment system is available from an experienced vendor who may provide implementation and/or operational support where needed. It is anticipated that there will be some disruptions in local vehicle traffic as new water conveyance pipelines are constructed within City streets.

Cost:
Alternative 2 has high estimated 30-year present value ($51.84 million) relative to Alternatives 1 and 3. Alternative 2 has a significantly lower present value than Alternative 4.

State Acceptance:
DHS has approved the use of ion exchange for perchlorate removal from drinking water supplies in other locations. Therefore, State acceptance of this alternative is considered likely.

Community Acceptance:
Community acceptance is unknown at this time. However, based on the Water Purveyors' sense of the public water system user concerns, the community would be likely to accept ion exchange treatment to restore the water supply capacity. As noted above, blending of the treated groundwater with treated surface water is expected to alleviate potential concerns of the water consumers.

6.2.5 Alternative 3: Containment and Ex-Situ Treatment – Bioreactor

Overall Protection of Human Health and the Environment:
Currently, institutional controls (discontinued operation of the production wells impacted by perchlorate) ensure protection of human health only to the extent that the impacted groundwater is not used for water supply. The groundwater pumping component of Alternative 3 reduces the existing and future impacts to a public water supply (Saugus Formation groundwater).

Ex-situ biological treatment is recognized as a means of removing perchlorate from water. In addition, the treatment process monitoring component will provide adequate protection to the water system users. Moreover, groundwater treated by biological treatment will be pumped into the 102-inch CLWA raw water pipeline for further treatment (blending, filtration and disinfection) at the RVWTP. Blending of the treated groundwater with imported CLWA water provides increased reliability and protection of human health. Biological treatment may provide the added benefit of some removal of VOCs such as TCE and PCE through volatilization and microbial consumption.

Compliance with ARARs:
Based on the current understanding, it is anticipated that compliance with identified chemical-specific, location-specific, and action-specific ARARs can be achieved with Alternative 3. The state OEHHA has promulgated a PHG of 6 µg/l for perchlorate in drinking water. The perchlorate PHG is considered a chemical-specific ARAR for evaluation of alternatives for water supply restoration.

During design and construction of the groundwater piping and treatment components, ARARs will be considered and incorporated. The proposed treatment of groundwater will satisfy the requirements of DHS Policy 97-005.

During operation, it is anticipated that the biological treatment process will reduce perchlorate to concentrations less than 6 µg/l in the extracted groundwater, however, compliance with chemical-specific ARARs will be evaluated through monitoring of the groundwater treatment process. The effectiveness of the groundwater pumping in achieving ARARs will be evaluated through groundwater monitoring.

Long-Term Effectiveness and Permanence:
Both biological treatment systems are shown to remove perchlorate. A pilot study on biological treatment was conducted on behalf of CLWA to confirm whether biological treatment would be able to achieve the PHG established for perchlorate. Consistent removal of perchlorate to concentrations less than the detection limit was achieved in the FXB system, however the FBR system did not achieve consistent perchlorate removal to concentrations less than the detection limit (Carollo 2004). However, there is an FBR perchlorate removal system that has been

operated for several years in northern California, suggesting that an FBR system can be operated successfully to remove perchlorate. Based upon communications with treatment system vendors, further evaluation of the biological treatment alternative, including cost information, is based upon the use of an FRB system.

Alternative 3, groundwater extraction and ex-situ biological treatment with the FBR, could provide partial recovery of the water production capacity compared with the capacity available prior to shutdown of wells impacted by perchlorate. The groundwater pumping component of Alternative 2 is expected to reduce the risk of perchlorate migration in the Saugus Formation and potential loss of other water production wells. Based upon the current understanding of the nature and extent of groundwater impacts, Alternative 3 provides the flexibility to achieve hydraulic containment of the groundwater as well as to provide a system that can be managed to respond to future information regarding contaminant mobility or to optimize the system.

***Reduction of Toxicity, Mobility, and Volume Through Treatment*:**
Perchlorate mass will be removed from the subsurface through groundwater pumping and destroyed through biological treatment. The amount of perchlorate mass removed from the Saugus Formation is dependent on the groundwater pumping rate, as well as the perchlorate concentrations in the extracted groundwater.

Assuming perchlorate concentrations ranging from 9 µg/l to 60 µg/l in extracted groundwater and a PHG of 6 µg/l, the mass of perchlorate removed is estimated at 0.008 to 0.15 pounds per acre-foot (lb/ac-ft) of extracted groundwater. However, there is some uncertainty regarding both the quantity of groundwater that will be extracted and the actual concentrations of perchlorate in the groundwater that will be present over time once pumping begins. Unknown quantities of perchlorate are expected to remain in the Saugus Formation, as well as in upgradient areas, until such time as appropriate remedial actions are implemented to address the source areas.

Alternative 3 satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. Biological treatment provides the advantage of destruction of the perchlorate, with minimal residuals requiring further treatment or disposal.

***Short-Term Effectiveness*:**
Alternative 3 can be implemented in a relative short time (two to four years). Based upon the full-scale biological treatment at other locations, the FBR biological treatment system is expected to be effective in achieving the water supply RAOs upon implementation. The effectiveness of hydraulic containment can be evaluated through groundwater monitoring during operation.

***Implementability*:**
Pilot testing has already been conducted on behalf of CLWA. The treatment system is available from an experienced vendor who may provide implementation and/or operational support where needed. It is anticipated that there will be some disruptions in local vehicle traffic as new water conveyance pipelines are constructed within City streets. Startup and stabilization of the biological treatment process may take more time and effort than startup of the ion exchange treatment process.

***Cost*:**
Alternative 3 has a high estimated 30-year present value ($45.13 million) relative to Alternative 1. Alternative 3 has a lower present value than Alternative 2 and a much lower present value than Alternative 4.

***State Acceptance*:**
DHS has provided conditional site-specific acceptance for an FBR system at another location in California. Review and formal approval for any proposed design using this technology for specific water systems will be handled on a case-by-case basis. Because the use of biological treatment in drinking water applications is relatively uncommon, state acceptance may be more difficult than for Alternative 2.

***Community Acceptance*:**
Community acceptance is unknown at this time. However, based on the Water Purveyors' sense of the public water system user needs, the community may be resistant to the use of biological treatment for drinking water.

6.2.6 Alternative 4: Containment and Ex-Situ Treatment – Membrane Filtration

***Overall Protection of Human Health and the Environment*:**
Currently, institutional controls (discontinued operation of the production wells impacted by perchlorate) ensure protection of human health only to the extent that the impacted groundwater is not used for domestic/municipal water supply. Existing and continued further impacts to groundwater would be reduced through the groundwater pumping component of Alternative 4.

Under Alternative 4, ex-situ treatment of groundwater, as confirmed by ongoing monitoring of the treatment process, will provide protection to consumers. Moreover, groundwater treated by membrane filtration and chloramination will be pumped into the 84-inch treated water distribution pipeline and blended with imported water that has been treated at the RVWTP. Blending of the treated groundwater with imported CLWA water provides increased reliability and protection of human health.

***Compliance with ARARs*:**
Based on the current understanding, it is anticipated that compliance with identified chemical-specific, location-specific, and action-specific ARARs can be achieved with Alternative 4. The state OEHHA has promulgated a PHG of 6 µg/l for perchlorate in drinking water. The perchlorate PHG is considered a chemical-specific ARAR for evaluation of alternatives for water supply restoration.

During design and construction of the groundwater piping and treatment components, ARARs will be considered and incorporated. The proposed treatment of groundwater will satisfy the requirements of DHS Policy 97-005.

During operation, it is anticipated that the membrane filtration process will reduce perchlorate concentrations in the extracted groundwater to less than 6 µg/l, however, compliance with chemical-specific ARARs will be evaluated through monitoring of the groundwater treatment process.

Long-Term Effectiveness and Permanence:
Although membrane filtration is gaining acceptance for water treatment applications, especially for salinity reduction, currently there is little available performance data on full-scale perchlorate removal systems using membrane filtration technologies. The AwwaRF is supporting an ongoing research project to investigate the feasibility of membrane filtration technology for the removal of perchlorate from water sources of different quality (DTSC 2004).

Alternative 4 provides for partial recovery of water production capacity compared with capacity available prior to the shutdown of wells impacted by perchlorate. The groundwater pumping component of Alternative 4 is expected to reduce the risk of perchlorate migration in the Saugus Formation and potential loss of other water production wells. Based upon the current understanding of the nature and extent of groundwater impacts, Alternative 4 provides the flexibility to achieve hydraulic containment of the groundwater as well as providing a system that can be managed to respond to future information regarding contaminant mobility or to optimize the system.

A membrane filtration pilot study using synthetic groundwater prepared to imitate Saugus Formation groundwater samples demonstrated that this technology can satisfy the goal of less than 6 µg/l of perchlorate. The brine or retentate from the membrane filtration system is expected to contain high concentrations of perchlorate and TDS. Disposal of the brine and/or reduction of the perchlorate concentrations may pose a significant challenge. Because the brine solution represents approximately 15 percent of the influent volume, this technology results in a loss of useable water from the system. Further research is required to improve the effectiveness of treating the brine solution resulting from membrane filtration.

Membrane fouling caused by hardness or biological growth is another concern. Unselective removal of dissolved ions produces a more corrosive, lower pH effluent. Due to these uncertainties and the potential impact on capital and operation costs, perchlorate removal via membrane filtration may not be cost effective.

Reduction of Toxicity, Mobility, and Volume Through Treatment:
Perchlorate mass will be removed from the subsurface through groundwater pumping and removed from the groundwater by membrane filtration. The amount of perchlorate mass removed from the Saugus Formation will be dependent on the groundwater pumping rate, as well as the perchlorate concentrations in the extracted groundwater.

Assuming perchlorate concentrations ranging from 9 µg/l to 60 µg/l in extracted groundwater and a PHG of 6 µg/l, the mass of perchlorate removed from the Saugus Formation is estimated at 0.008 to 0.15 pounds per acre-foot (lb/ac-ft) of extracted groundwater. However, there is some uncertainty with regard to both the quantity of groundwater that can be extracted under the constraints of the system and the actual concentrations of perchlorate in the groundwater that will be present over time once pumping begins. Unknown quantities of perchlorate are expected to remain in the Saugus Formation, as well as in upgradient areas, until such time as appropriate remedial actions are implemented to address the source areas.

Alternative 4 satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element in that chemical mass is removed from the groundwater by the membrane filtration process. However, the residual brine solution is expected to contain high concentrations of perchlorate and other dissolved solids, and must be appropriately treated and disposed.

Short-Term Effectiveness:
Alternative 4 will be effective, subject to the limitations previously discussed, in achieving the water supply RAOs. The effectiveness of hydraulic containment of Saugus Formation groundwater can be evaluated through groundwater monitoring during operation.

Additional pilot testing, and possibly full-scale testing, would probably be required to demonstrate the effectiveness of membrane filtration in removing perchlorate. It is anticipated that there will be some disruptions in local vehicle traffic as new water conveyance pipelines are constructed within City streets.

Implementability:
Alternative 4 can be implemented in two to four years. Construction and operation of the pumping and treatment components are well understood. The treatment process can be monitored to ensure that the system is effective and reliable. Regulatory agency approvals are expected to be obtainable. Coordination with other agencies is possible where necessary. The required equipment is available.

Cost:
Alternative 4 has the highest estimated present value ($73.08 million) relative to the other alternatives. Due to various unknowns, the estimated operation and maintenance costs, and estimated present value, do not include costs for disposal of reject water (brine) resulting from treatment by membrane filtration. These additional ongoing operational costs could be substantial.

State Acceptance:
State acceptance is unknown at this time. This criterion can be further addressed and evaluated when comments are received on this IRAP.

To date, DHS has not permitted membrane filtration systems for perchlorate removal. It is anticipated that additional pilot study and further evaluation of brine management would be necessary to obtain approval from DHS. Because the use of membrane filtration for perchlorate removal is relatively uncommon, state acceptance may be more difficult than for Alternative 2.

Community Acceptance:
Community acceptance is unknown at this time. However, based on the Water Purveyors' sense of the public water system user needs, the community would be likely to accept membrane filtration treatment to restore the water supply capacity.

6.2.7 Cost Analysis

The cost analysis for each alternative and its component technologies includes consideration of site-specific factors identified from available information and determined during development of the alternative. The cost estimates are planning level costs and are developed to plus 50% or minus 30% accuracy. The sources for these cost estimates include vendors, estimates for similar projects, standard costing guidance documents and professional judgment. This evaluation includes the following factors:

- Cost estimation (estimation of capital costs and operation and maintenance costs)
- Present-value analysis (calculation of annual costs and present worth on the basis of estimated costs)
- Summary of the costs of alternatives (summary of cost data, including total costs and distribution of costs over time)

Although cost factors are not as important as other criteria for selection of alternatives under CERCLA, they are considered whenever the cost of an alternative far exceeds (by at least an order of magnitude) that of other alternatives without a demonstrated and equivalent difference in protectiveness, implementability, and reliability.

Capital Costs:
Capital costs consist of direct (construction) and indirect (non-construction and owner overhead) costs. Direct costs include expenditures for equipment, labor, and installation materials. Capital costs that must be increased in future years as part of the remedial action alternatives are identified and noted for the year in which they will occur. Indirect costs include expenditures for engineering, financial, and other services that are not part of actual installation activities but that are required to complete the installation of the technologies constituting the alternative. The following are examples of direct and indirect capital costs:

- Construction – materials, labor, and construction equipment
- Equipment – remedial action and service equipment
- Land and site development – purchase of land and preparation of the site
- Buildings and services – utility connections, process and nonprocess buildings, purchased services
- Disposal – transporting and disposing of construction residuals
- Engineering – administration, construction supervision, design, treatability testing
- License and permits – administrative costs to obtain building and operating permits
- Start-up – activities to ensure that the systems are operational
- Contingency – funds for unforeseen circumstances (e.g., weather, unexpected levels of contamination)

Capital costs are summarized for each alternative in Appendix C.

Operation and Maintenance Costs:
Operating and maintenance costs are post-construction expenditures necessary to ensure the continued effectiveness of a remedial action. Typical operating and maintenance costs include the following:

- Labor – wages, salaries, training, and overhead
- Maintenance materials and labor – routine maintenance and equipment replacement
- Treatment residuals – offsite transportation and disposal

- Auxiliary materials and energy – chemicals, electricity, water, sewer, fuel
- Purchased services – sampling, analytical laboratory
- Periodic site reviews – may be required by DTSC as part of the overall remedial strategy for OU7 at least every five years as long as perchlorate remains present in groundwater

Operation and maintenance costs are summarized for each alternative in Appendix C.

***Present-Value Analysis*:**
Present value analysis is used to evaluate expenditures that occur over different time periods by discounting all future costs to the present. Due to the uncertainties associated with the distribution, quantity, movement, nature and extent of the perchlorate, there are likewise uncertainties associated with the required performance periods of the various alternatives. Therefore, the period of performance is limited to 30 years for the purpose of comparative analysis. Costs in each planning year are estimated in constant dollars, representing the general purchasing power at the time of construction. Consistent with CERCLA guidance, a real discount rate of 3.5 percent, with a base year of 2004, is assumed in the present value analysis, as indicated for a 30-year maturity in Circular A94 (OMB 2005). Data developed in the present value analyses are summarized for each alternative in Appendix C. The estimated 30-year present-value for each alternative is as follows:

- Alternative 1 – $1.71 million
- Alternative 2 – $51.84 million
- Alternative 3 – $45.13 million
- Alternative 4 – $73.08 million

6.2.8 Comparative Analysis

The technology assessments and risk management judgments from the individual criteria assessment are used to rank the alternatives based on the comparative advantages and disadvantages of each alternative. The relative performances of the alternatives are compared for each evaluation criterion to evaluate the strengths and weaknesses of the alternatives and identify substantive differences among alternatives.

The threshold criteria of overall protectiveness and compliance with ARARs must be met before a remedy can be selected. Alternative 1 does not meet criteria for overall protectiveness because existing and continued further chemical impacts to groundwater are not addressed. Alternative 1 does not comply with ARARs because it is inconsistent with SWRCB Resolution 88-63 (Sources of Drinking Water Policy), SWRCB Resolution 68-16 (Non-Degradation Policy), the Porter Cologne Water Quality Act, and the Water Quality Control Plan for the Los Angeles Region. Alternatives 2, 3, and 4 meet the threshold criteria. Comparison of the balancing criteria are discussed below and are summarized in Table 12.

***Long-Term Effectiveness and Permanence*:**
Alternative 1 ranks lowest with regard to long-term effectiveness and permanence. The controls provided in Alternative 1 are not adequate to achieve the RAOs for the reasonably foreseeable future. The residual risk that would be present as a result of implementing Alternative 1 would preclude utilization of the affected groundwater for water supply purposes. Protection is

provided to the community only to the extent that the affected groundwater is not used for domestic/municipal water supply.

Alternatives 2 and 3 rank high with regard to long-term effectiveness and permanence. Both alternatives are proven or are expected to be effective over the long term with proper operation. Due to little available performance data on perchlorate removal using membrane technology, the long-term effectiveness of Alternative 4 is uncertain and may rank lower than Alternatives 2 and 3. Alternatives 2, 3, and 4 will partially mitigate the loss of the water supply associated with the portion of the Saugus Formation currently impacted by perchlorate and reduce the potential for additional future water supply loss. Due to the loss of extracted groundwater to the brine solution, Alternative 4 will provide 85 to 90 percent of the potable water volume provided by either Alternative 2 or 3.

Reduction of Toxicity, Mobility, and Volume Through Treatment:
Alternative 1 ranks lowest in terms of reducing toxicity, mobility, and volume of perchlorate through treatment. No reduction of toxicity, mobility, and volume through treatment is provided with Alternative 1.

On the basis of the common groundwater pumping component, Alternatives 2, 3, and 4 rank relatively evenly in terms of reducing the toxicity, mobility, and volume of perchlorate currently present in the Saugus Formation. For these alternatives, chemical mass is removed on a "demand" basis through the treatment process. These alternatives satisfy the preference for treatment that reduces toxicity, mobility, or volume as a principal element. For these alternatives, the amount of perchlorate mass removed from the subsurface is a function of the rate of groundwater extraction for containment of the plume.

There is some uncertainty with regard to both the quantities of groundwater that will be extracted and, more significantly, with regard to the actual concentrations of perchlorate in the groundwater that will be present over time once pumping from Saugus 1 and Saugus 2 is reinitiated. Unknown quantities of perchlorate are expected to remain in the Saugus Formation, as well as in upgradient areas, until such time as appropriate remedial actions are implemented to address the source areas.

Alternative 3 provides an advantage in that perchlorate is consumed through the treatment process, and there is no perchlorate-laden residual such as ion exchange resin or membrane retentate requiring subsequent treatment or management.

Short-Term Effectiveness:
Similar to the assessment regarding long-term effectiveness and permanence, Alternative 1 ranks lowest in terms of short-term effectiveness. The controls provided in Alternative 1 are not adequate to achieve the RAOs immediately or for the reasonably foreseeable future. Protection is provided to the community only to the extent that the affected groundwater is not used for domestic/municipal water supply.

Alternative 2 ranks high in short-term effectiveness because it can be implemented in a relatively short time and will be effective relative to treatment RAOs immediately upon implementation. Alternative 3 will be less effective on a short-term basis primarily due to longer estimated time to implement. Similar to the ion exchange technology used in Alternative 2, Alternative 4 could potentially rank high in short-term effectiveness, however due to uncertainties related to limited performance data and agency acceptance for a full-scale perchlorate removal system, Alternative 4 may rank relatively lower than Alternative 2.

Implementability:
Alternative 1 ranks high in the implementability criteria because it can be implemented within 1 year with minimal construction impacts or regulatory interaction. In addition, Alternative 1 provides the flexibility of undertaking remedial actions in the future with respect to both the RAOs set forth in this IRAP and for RAOs that may be developed. However, deference of active remedial measures with respect to the RAOs in this IRAP will result in continued unavailability of a portion of the community water supply.

Alternative 2 ranks high in this criterion and can be implemented in 1 to 2 years. Alternatives 3 and 4 rank slightly lower than Alternative 2 and can be implemented in 2 to 4 years. Construction and operation of the system is well understood for both Alternative 2 and 4. The Alternative 2 and Alternative 4 technologies represent controlled physiochemical processes and can be monitored to ensure that the system is effective. Alternative 3 is not known to provide the same level of reliability and may incur increased downtimes relative to the other alternatives. Agency approvals are believed to be obtainable for all of the alternatives and coordination with other agencies is possible where necessary. The ion exchange process in Alternative 2 is already a DHS-approved technology for drinking water applications giving it an advantage in this category over the other alternatives.

Cost:
Alternative 1 ranks high in the cost criteria. However, Alternative 1 ranks the lowest of the alternatives with regard to three other balancing criteria. Estimated costs for Alternatives 2 and 3 are similar, although the cost estimates in this IRAP are developed to plus 50 percent or minus 30 percent accuracy and the differences in magnitude between Alternative 2 and Alternative 3 could be significantly less or greater. The estimated cost for Alternative 4 is the highest.

State Acceptance:
In general, state acceptance is unknown at this time for all of the alternatives. This criterion can be further addressed and evaluated when comments are received on this IRAP.

However, state acceptance of Alternative 1 is considered unlikely because it provides no protection for groundwater resources known to be otherwise suitable for water supply. State acceptance of Alternatives 3 and 4 is somewhat uncertain due to the relative lack of full-scale treatment systems demonstrating the effectiveness of the treatment process in reducing perchlorate concentrations. Largely due to the successful and effective operation of several similar ion exchange treatment systems State acceptance of Alternative 2 is considered most likely.

California DHS Policy Memo 97-005, which applies to water sources determined to be “extremely impaired”, requires performance of several evaluations prior to returning a chemically-impacted production well to use for community water supply purposes. These evaluations include: source water characterization, alternatives evaluation, risk assessment, process demonstration, and agency and public acceptance, submittal of a permit application and conducting a public hearing (DHS 1997). Implementation of Alternatives 2, 3 or 4, which involve restoring Wells Saugus 1 and Saugus 2 to production, will trigger the requirement for completion of the 97-005 process. Comments from state agencies will be further received and considered through this process.

Community Acceptance:
In general, community acceptance is unknown at this time. However, based on the Water Purveyors' sense of the public water system user needs, the community would be likely to accept a proven treatment technology to restore the water supply capacity. However, it is also expected that Alternatives 1 and 3 will be challenged to meet the community acceptance criteria for reasons unique to each alternative. For example, there may be greater resistance for Alternative 1 because the community would be unlikely to accept an inadequate water supply capacity and resistance to Alternative 3 may be due to use of the biological component for drinking water treatment.

Section 7: Selection of the Preferred Remedial Alternative

7.1 Recommended Remedial Alternative

The recommended remedial alternative is selected in accordance with the requirements of the NCP and CERCLA, as amended by SARA. Additionally, the recommended remedial alternative is based on the technology and process option screening and remedial alternative development and evaluation processes discussed in Sections 5 and 6. Based on the current understanding of the aquifer characteristics and the nature and extent of the perchlorate in groundwater, the detailed evaluation process described in Section 6 identifies Alternative 2 as the preferred remedial alternative. Alternative 2 involves ex-situ treatment of groundwater by ion exchange. The ion exchange system is the only system currently approved by DHS for removal of perchlorate from drinking water. A more detailed description of Alternative 2 is provided in Section 6, and a conceptual plan for Alternative 2 is shown on Figure 7.

Alternative 2, hydraulic containment with groundwater collection and ex-situ treatment with ion exchange, maintains the best estimated performance relative to the balancing evaluation criteria. Alternative 2 ranks high in long-term effectiveness and permanence and in reduction of mobility, toxicity, or volume of perchlorate in contaminated groundwater through the use of treatment and ranks high in short-term effectiveness. Chemical mass is removed on a "demand" basis through the ion exchange treatment process and the ion exchange technology is proven to be effective over the long term with proper operation. Alternative 2 can be implemented in 1 to 2 years and will be effective in meeting the RAOs immediately upon implementation. The ion exchange process is already a DHS-approved technology for drinking water applications. Although Alternative 2 has high estimated present value, it is similar in magnitude of cost to Alternative 3 and less than Alternative 4. In addition, Alternative 2 meets both of the threshold evaluation criteria and will likely meet the modifying criteria.

Based on the detailed analysis present in Section 6, Alternative 2 best satisfies the RAOs described in Section 5 of this IRAP. Alternative 2 affords a flexible design that can be tailored to meet the PRG (or FRG) once established. Additionally, Alternative 2 satisfies the statutory requirements because it is protective of human health and the environment, attains ARARs, is cost-effective; it utilizes a permanent solution and alternative treatment technologies to the maximum extent practicable; and it satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. A confirmation sampling program will be implemented to obtain data to evaluate the effectiveness of the groundwater extraction component and to confirm the effectiveness of the perchlorate treatment component. The proposed sampling program is summarized in Appendix D.

The schedule for implementation of the remedial strategy is a critical element of the RAOs. Timing is critical because the expected demand for this water supply, in part, is driven by expectations that the frequency of future drought years will follow historical patterns. Therefore, it is expected that demand for this water supply will arise in the near future. Alternative 2 provides the best certainty with regard to this key time element. This preferred alternative will partially mitigate the loss of the water supply associated with the portion of the Saugus Formation currently impacted by perchlorate and reduce the potential for additional future water supply loss. Alternative 2 provides a partial replacement of the contaminated water supply capacity consistent with the water wells in service prior to the shutdown resulting from the presence of perchlorate. Alternative 2 provides the flexibility to achieve containment of the plume based on the current knowledge as well as providing a system that can be managed to adjust to future information regarding plume mobility or to optimize the system.

Because the resumption of pumping groundwater from Wells Saugus 1 and Saugus 2 is time-critical for purposes of limiting the migration of perchlorate in the Saugus Formation and reducing the potential for perchlorate impact to other water supply wells, the Water Purveyors have initiated preparation of the documents associated with compliance with the procedural requirements of DHS Policy 97-005.

In this semi-arid region of the country, pumping groundwater that was a key component of the regional water supply prior to contamination by perchlorate into a storm drain or sanitary sewer does not represent a wise use of a scare resource. Extraction of groundwater will address the remediation issues (i.e. containment of the perchlorate plume in the Saugus Formation), however a failure to return the extracted groundwater to productive water supply would do nothing to address the Purveyor's objective of restoring the groundwater production capacity that was lost due to the impact of perchlorate associated with releases at the Facility. Therefore, treatment of the extracted groundwater followed by pumping the treated groundwater into the water distribution system is considered the best approach for the Water Purveyors to accomplish the objective of plume containment and to partially achieve the objective of restored production capacity.

As discussed previously, the groundwater modeling results indicate that containment of the perchlorate plume in the Saugus Formation can be achieved by extraction of groundwater at rates less than the hydraulic capacity of Wells Saugus 1 and Saugus 2. In the past, the pumping rates from these two wells have been selected to accommodate variations in other water supplies. However, designing and constructing a perchlorate treatment system large enough to treat the entire hydraulic sustained production capacity of Wells Saugus 1 and 2, while acknowledging that the full treatment capacity might be utilized infrequently was not considered cost-effective. Furthermore, installation of at least one additional water supply well would be needed to replace the production capacity previously provided by Wells NC-11, VWC-157 and the Stadium well. Therefore, installation of replacement water supply wells is considered the most cost-effective approach to provide restoration of the remaining lost production capacity.

It is anticipated that preparation of the DHS Policy 97-005 compliance documents will proceed simultaneously with completion and approval of this IRAP. There is some inherent duplication between the DTSC and DHS compliance processes, including evaluation of potential risks to human health, community review and acceptance, public hearings and regulatory agency approval. However, the concurrence of both DTSC and DHS is required for implementation of the proposed remedial alternative. DTSC approval of the proposed perchlorate containment component is required and DHS approval of the proposed groundwater treatment technology and other mechanisms to protect human health is also required.

7.2 Summary of Public Participation Activities

A draft of this IRAP was submitted to DTSC for review. Following receipt and incorporation of comments from DTSC, the final draft IRAP was available for public review in August 2005. A fact sheet summarizing the IRAP was prepared and distributed to parties on the DTSC and CLWA mailing lists in August 2005. A public notice was placed in the local newspaper in August 2005.

A Mitigated Negative Declaration was prepared by CLWA and filed in accordance with applicable requirements of the Public Resources Code. A copy of the document is included in Appendix E.

A public meeting was hosted by DTSC in the Santa Clarita City Hall on 7 September 2005 and a public hearing on the CEQA determination was held by CLWA on 14 September 2005. Copies of these meeting transcripts are included in Appendix F.

Comments were received from the public and written responses to these comments were prepared by DTSC in the form of a Responsiveness Summary. The Responsiveness Summary is included in Appendix G of this IRAP.

Appendix H provides a list of documents which were relied upon in preparing this IRAP and in developing the recommended remedial alternative.

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Tables

Table 1: Production Well Construction Details[a]

Well ID	Drill Date	Pilot Hole Depth (feet)	Total Cased Depth (feet)	Casing Diameter (inches)	Perforation Depth Intervals Top (feet)	Perforation Depth Intervals Bottom (feet)	Slot Type and Width of Perforations (inches)
Saugus 1	June 1988	1,682	1,640	18			
				2' Long Reducer			
				16	490	520	Wire Wrap 0.080
				16	570	630	Wire Wrap 0.080
				16	710	810	Wire Wrap 0.080
				16	890	1,000	Wire Wrap 0.080
				16	1,020	1,080	Wire Wrap 0.080
				16	1,130	1,190	Wire Wrap 0.080
				16	1,290	1,330	Wire Wrap 0.080
				16	1,400	1,620	Wire Wrap 0.080
Saugus 2	August 1988	1,649	1,612	18			
				5' Long Reducer			
				16	515	555	Wire Wrap 0.070
				16	585	725	Wire Wrap 0.070
				16	824	883	Wire Wrap 0.070
				16	923	983	Wire Wrap 0.070
				16	1,043	1,103	Wire Wrap 0.070
				16	1,212	1,251	Wire Wrap 0.070
				16	1,310	1,591	Wire Wrap 0.070
Stadium[b]	1946	130	130	NA[c]	33	130	Knife Cut
Q-2[b]	1954	170	170	NA	86	136	Unknown
NC-11	October 1973	1,117	1,136	16	200	1,075	Louvers
VWC-157	January 1962	2,013	2,014	14			
				1' Long Reducer			
				14	587	807	0.125 Vertical Slots
				12	808	2,009	0.125 Vertical Slots

(a) From Hargis 2000a.
(b) From RCS 2002.
(c) NA = Not Available.

Table 2: Perchlorate Analytical Results in Saugus Formation Production Wells[a]

Owner and Well No.	Sample Collection Date	Concentration (µg/l)[b]
SCWC Saugus 1	05/22/97	21
	04/30/98	34
SCWC Saugus 2	04/10/97	12
	05/01/97	14
	06/03/97	16
	04/30/98	47
NC-11	05/01/97	19
	05/22/97	17
	06/03/97	12
	04/30/98	18
	06/07/00	15
	08/17/00	13
VWC-157	06/12/97	14
	06/18/97	7
	03/05/98	ND[c]
	04/29/98	9
	03/15/00	ND
	06/07/00	ND
	Maximum	47
	Minimum	ND
	Mean	14.9
	95% UCL	19.6
	Standard Deviation	11.5
	Number of Samples	18
	t stat	1.734

(a) From California Department of Health Services database. Wellhead water samples were collected for analysis during operation of the production wells prior to shutdown.
(b) µg/l = micrograms per liter.
(c) ND = not detected above the detection limit.

Table 3: Determination of Chemicals of Potential Concern

Chemical Abstracts Service Registry Number	Chemical[a]	Maximum Detected Concentration (μg/l)[b]	Range of Detected Concentrations (μg/l)	Location of Maximum[c]	Maximum Contaminant Level/Notification Level (μg/l)[d]	Chemical of Potential Concern?
			Volatile Organic Compounds			
50-00-0	Formaldehyde	7	7	Saugus 2	100	NO
79-01-6	Trichloroethene	1	0.76 - 1	Saugus 1	5	NO
100-41-4	Ethylbenzene	2.5	0.7 - 2.5	NC-11	300	NO
1330-20-7	m,p-Xylene	18	9.4 - 18	NC-11	1,750	NO
1330-20-7	o-Xylene	4.6	2.5 - 4.6	NC-11	1,750	NO
123-91-1	1,4-Dioxane	0.31	0.25 - 0.31	Saugus 1	3	NO
117-81-7	Bis(2-ethylhexyl)phthalate	2.6	2.5 - 2.6	Saugus 2	4	NO
			Inorganics			
14797-73-0	**Perchlorate**	**60**	**14 - 60**	**Saugus 2**	**6**	**YES**
24959-67-9	Bromide	0.18	0.11 – 0.18	NC-11		NO
16887-00-6	Chloride (mg/l)[e]	28.4	14.4 - 28.4	NC-11		NO
16984-48-8	Total Fluoride (mg/l)	0.41	0.28 - 0.41	NC-11	2 mg/l	NO
7697-37-2	Nitrate as NO_3 (mg/l)	19	11.4 - 19	NC-11	45 mg/l	NO
7697-37-2	NO_2+NO_3 as N (mg/l)	4.3	2.7 - 4.3	NC-11	10 mg/l	NO
14808-79-8	Sulfate as SO_4 (mg/l)	309	106 - 309	NC-11		NO
7429-90-5	Aluminum – Dissolved	3.2	2.5 - 3.2	Saugus 2	1,000	NO
7440-39-3	Barium – Dissolved	61	38 - 61	Saugus 2	1,000	NO
7440-47-3	Chromium – Dissolved	1.7	0.91 - 1.7	Saugus 1	50	NO
7440-47-3	Chromium III – Dissolved	1	0.37 - 1	NC-11	50	NO
7440-47-3	Chromium VI – Dissolved	1.3	0.14 - 1.3	Saugus 1	50	NO
7440-50-8	Copper – Dissolved	1.4	0.84 - 1.4	Saugus 2	1,000	NO
7440-09-7	Potassium – Dissolved (mg/l)	2.6	2.1 - 2.6	NC-11		NO
7439-95-4	Magnesium – Dissolved (mg/l)	30	16 - 30	NC-11		NO
7439-96-5	Manganese – Dissolved	6.9	2.6 - 6.9	Saugus 2	500	NO
7440-02-0	Nickel – Dissolved	0.27	0.16 - 0.27	Saugus 2	100	NO
7782-49-2	Selenium – Dissolved	3.4	1.4 - 3.4	NC-11	50	NO
7440-62-2	Vanadium – Dissolved	4.9	4.3 - 4.9	Saugus 1	50	NO

Table 3: Determination of Chemicals of Potential Concern

Chemical Abstracts Service Registry Number	Chemical[a]	Maximum Detected Concentration (µg/l)[b]	Range of Detected Concentrations (µg/l)	Location of Maximum[c]	Maximum Contaminant Level/Notification Level (µg/l)[d]	Chemical of Potential Concern?
7440-66-6	Zinc – Dissolved	31	6.7 - 31	NC-11	5,000	NO
7440-36-0	Antimony – Dissolved	0.5	0.28 - 0.5	Saugus 2	6	NO
7440-38-2	Arsenic – Dissolved	0.12	0.11 - 0.12	Saugus 1	50	NO
			Radionuclides			
7440-61-1	Uranium (pCi/l)[f]	4.37	1.43 - 4.37	NC-11	20 pCi/l	NO
10043-92-2	Radon (pCi/l)	180	110 - 180	NC-11	300 – 4,000 pCi/l	NO
10028-17-8	Tritium (pCi/l)	449	0 - 449	Saugus 2	20,000 pCi/l	NO
12587-46-1	Gross Alpha (pCi/l)	4.44	1.29 - 4.44	NC-11	15 pCi/l	NO
12587-47-2	Gross Beta (pCi/l)	2.3	1.7 - 2.3	NC-11	50 pCi/l	NO
7440-14-4	Total Alpha Radium (pCi/l)	0.37	0.06 - 0.37	NC-11	15 pCi/l	NO
7440-14-4	Combined Radium 226 and 228 (pCi/l)	0.41	0.41	Saugus 2	5 pCi/l	NO
7440-24-6	Strontium-90 (pCi/l)	1.43	0 - 1.43	Saugus 2	8 pCi/l	NO

(a) Groundwater quality data from production well sampling event in 2003.
(b) µg/l = micrograms per liter. Concentration units unless otherwise noted.
(c) Locations refer to perchlorate-impacted domestic water supply wells screened in the Saugus Formation.
(d) California primary Maximum Contaminant Level values used where available, federal MCL values used where California MCL values are not available. California DHS Drinking Water Notification Levels used where MCLs are not available.
(e) mg/l = milligrams per liter.
(f) pCi/l = picocurie per liter

Table 4: Summary of Human Health Risks Associated with Contaminated Groundwater from the Saugus Formation Production Wells

Exposure Medium	Exposure Scenario	Noncancer Hazard Quotient	Preliminary Remediation Goal (µg/l)[(a)]	Primary Exposure Pathway
Groundwater	Adult Resident	4.4	6	Ingestion of well water containing perchlorate
Groundwater	Child Resident	10.4	6	Ingestion of well water containing perchlorate

(a) µg/l = micrograms per liter.
(b) Shaded cells represent noncancer hazards that exceed California Department of Toxic Substances Control (DTSC) target levels.

Table 5: Chemical-Specific ARARs and TBCs[(a)]

Compound	Chemical-Specific ARARs (µg/l)[(b)]					Chemical-Specific ARARs (µg/l) for Selected Actions
	California MCL[(c)]	California PHG[(d)]	California AL[(e)]	Federal MCL[(f)]	Federal MCLG[(g)]	NPDES[(h)] Discharge Limit
Oxidizers						
Chlorate	–[(i)]	–	800	–	–	–
Perchlorate	–	6	6	–	–	4
Trihalomethanes	100[(j)]	–	–	80[(j)]	–	–
Chloroform	–	–	–	–	–	100
Bromoform	–	–	–	–	0	4.3
Bromodichloromethane	–	–	–	–	0	–
Dibromochloromethane	–	–	–	–	60	0.401
Volatile Organic Compounds						
Acetone	–	–	–	–	–	700
Benzene	1	0.15		5	0	1
Carbon Disulfide	–	–	160	–	–	
Carbon Tetrachloride	0.5	0.1	–	5	0	0.25
1,1-Dichloroethene	6	10	–	7	7	0.057
cis-1,2-Dichloroethene	6	–	–	70	70	–
trans-1,2-Dichloroethene	10	–	–	100	100	10
1,4-Dioxane	–	–	3	–	–	–
Ethylbenzene	300	300	–	700	700	700
Methyl Tert-Butyl Ether	13/5[(l)]	13	–	–	–	5
Methylene Chloride	5	4	–	5	0	4.7
Tetrachloroethene	5	0.06	–	5	0	0.8
Toluene	150	150	–	1,000	1,000	150
1,1,1-Trichloroethane	200	–	–	200	200	200
1,1,2-Trichloroethane	5	–	–	5	3	0.60
Trichloroethene	5	0.8	–	5	0	2.7
1,2,3-Trichloropropane	–	–	0.005	–	–	–
1,2,4-Trimethylbenzene	–	–	330	–	–	–
Xylenes	1,750	1,800	–	10,000	10,000	1,750
Semivolatile Organic Compounds						
Bis(2-ethylhexyl)phthalate	4	12	–	6	0	–
Nitroaromatics and Nitroamines						
1,3-Dinitrobenzene	–	–	–	–	–	–
Nitrosamines						
n-Nitrosodimethylamine	–	–	0.01	–	–	0.00069
n-Nitrosodiphenylamine	–	–	–	–	–	–
Applicable Action	All Actions (Drinking Water Standards)					Discharge to Storm Drain or Surface Water

Table 5: Chemical-Specific ARARs and TBCs[a]

(a) This table presents chemical concentrations for groundwater specified in applicable or relevant and appropriate requirements (ARARs) or other material to be considered (TBCs) for the production wells impacted by perchlorate. This table lists chemical-specific ARARs for perchlorate and organic compounds detected in any one groundwater sample.
(b) µg/l = micrograms per liter.
(c) MCL = primary maximum contaminant level from Title 22, California Code of Regulations, Sections 64439 and 64444.
(d) PHG = public health goal from the California Office of Environmental Health Hazard Assessment (OEHHA).
(e) AL = action level (health-based advisory concentration for unregulated contaminants in drinking water) from the California Department of Health Services (DHS).
(f) MCL from the federal Safe Drinking Water Act. Title 40, Code of Federal Regulations, Parts 141-143.
(g) MCLGs = maximum contaminant level goals (non-enforceable public health goals based upon public health, which do not account for economic or technology limitations) from the Safe Drinking Water Act.
(h) National Pollutant Discharge Elimination System (NPDES) criteria, which apply to discharge of pollutants to surface waters, as specified in California Regional Water Quality Control Board, Los Angeles Region Order Number R4-2002-0107 Waste Discharge Requirements for Discharges of Treated Groundwater From Investigation and/or Cleanup of Volatile Organic Compounds Contaminated Sites to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties (General NPDES Permit Number CAG914001).
(i) "–" = no concentration limit established.
(j) The California MCL is 100 µg/l total trihalomethanes (TTHMs), defined as the sum of chloroform, bromoform, bromodichloromethane and dibromochloromethane.
(k) Average monthly effluent limit / maximum daily effluent limit.
(l) Primary MCL / secondary MCL.

Table 6: Potential ARARs and TBCs[a]

ARAR Item	ARAR Source[b]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
Chemical-Specific ARARs					
1	1a	Federal Safe Drinking Water Act MCLs[c] (40 CFR[d] 141-143)	MCLs have been developed to regulate the concentrations of contaminants in public drinking water supplies. MCLs are legally enforceable.	An MCL has not been developed yet for perchlorate, however, MCLs have been developed for other contaminants that are present in Saugus Formation groundwater.	Applicable
2	2a	California Safe Drinking Water Act (California Health and Safety Code 116272 *et. seq*.)	California has developed MCLs that may be more stringent than federal MCLs, and has set MCLs for contaminants not yet regulated by USEPA[e].	If the state MCL is more stringent (lower) than the federal MCL, the state MCL will govern. A state MCL has not yet been developed for perchlorate. The state has identified an advisory "action level" of 6 micrograms per liter of perchlorate in drinking water.	Applicable
3	2b	California State Water Resources Control Board Resolution 88-63 (Sources of Drinking Water Policy)	Designates all groundwater within the state as a potential source of drinking water except where the total dissolved solids concentration in groundwater exceeds 3,000 parts per million or the well yield from a single well is less than 200 gallons per day.	Prior to identification of the perchlorate impact, water was pumped from the four production wells for municipal supply, including drinking water.	Applicable
4	2b	California State Water Resources Control Board Resolution 68-16 (Non-Degradation Policy)	This policy calls for maintaining the existing high quality of the state's water unless it is demonstrated that any change would be consistent with maximum public benefit and not unreasonably affect beneficial uses.		Relevant

Table 6: Potential ARARs and TBCs[(a)]

ARAR Item	ARAR Source[(b)]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
5	2b	Porter Cologne Water Quality Control Act and the Water Quality Control Plan for Los Angeles Region	Porter Cologne authorizes the State Board and the Regional Board to establish water quality control plans for surface and groundwater within the state/region. The portions of the Water Quality Control Plan for the Los Angeles Region that identify designated uses and associated water quality criteria are applicable.	The Water Quality Control Plan specifies that existing beneficial uses of the Saugus Formation groundwater include municipal water supply.	Applicable
Action-Specific ARARs					
1	1a	RCRA[(f)]; 42 USC[(g)] 6901-6987; Subtitle C and California Health and Safety Code			Applies as defined below
2	1a	40 CFR 260	Establishes standards for generators, transporters, and owners/operators of treatment, storage and disposal facilities. Provides definitions and general standards applicable to Parts 260-265, 268.	If wastes are generated as a result of treatment or additional well installation activities that are considered hazardous, requirements of 40 CFR, Parts 260-265, 268 may be ARARs.	Potentially applicable
3	1a	40 CFR 264, Subpart 5	Sets standards for definition and use of corrective action management units (CAMUs) for implementing corrective actions under RCRA.	Onsite disposal not anticipated.	No
4	2c	22 CCR[(h)], Division 4.5, Chapter 11	Establishes/defines procedures and criteria for identification and listing of RCRA and non-RCRA hazardous wastes.	If wastes are generated and are RCRA listed or characteristic hazardous wastes or non-RCRA hazardous wastes, requirements of 22 CCR, Division 4.5, Chapters 12 to 18 may be ARARs.	Potentially applicable

Table 6: Potential ARARs and TBCs[a]

ARAR Item	ARAR Source[b]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
5	2c	22 CCR, Division 4.5, Chapter 12	Establishes standards for generators of hazardous waste. Generators of hazardous waste must comply with standards in 22 CCR 66265 regarding waste analysis; contingency planning, preparedness and prevention; personnel training; management of hazardous waste in containers and tanks; and, decontamination of residues, contaminated containment system components, containment structures and equipment at closure.	Applicable if hazardous wastes are generated as a result of groundwater treatment or additional well installation activities.	Potentially applicable
6	2c	22 CCR, Division 4.5, Chapter 13	Establishes standards that apply to persons transporting hazardous waste within California.	Applicable if hazardous waste must be transported offsite for recycling, treatment, or disposal.	Potentially applicable (if offsite shipment is necessary, waste will be transported by a contracted, licensed hauler).
7	2c	22 CCR, Division 4.5, Chapter 14	Establishes minimum state permitting standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store or dispose of hazardous waste.	Applicable if onsite activities involve methods that meet the definitions of treatment, storage or disposal of hazardous waste.	Potentially applicable
8	2c	22 CCR, Division 4.5, Chapter 16	Establishes requirements that apply to recyclable materials that are reclaimed to recover economically significant amounts of precious metals and waste oil.	Recovery of precious metals or waste oil is not anticipated as part of onsite remedial activities.	No
9	2c	22 CCR, Division 4.5, Chapter 18	Land Disposal Restrictions. Prohibits land disposal of specified untreated RCRA hazardous wastes and non-RCRA hazardous wastes and provides special requirements for handling such wastes.	Applicable if listed or characteristic hazardous wastes, as defined in 22 CCR, Division 4.5, Chapter 11, or restricted non-RCRA wastes are generated and disposed.	Potentially applicable

Table 6: Potential ARARs and TBCs[a]

ARAR Item	ARAR Source[b]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
10	2c	22 CCR, Division 4.5, Chapter 20	Establishes provisions covering basic permitting requirements for onsite hazardous waste treatment, storage, and disposal facilities (TSDFs).	The California Department of Toxic Substances' (DTSC's) general policy is that permits are not required for hazardous waste corrective actions at sites with an approved Remedial Action Plan (RAP). Offsite landfills must have current permits.	No
II. Water Quality					
1	1a	Federal Underground Injection Control Program 40 CFR Parts 144-147	Establishes procedural and permitting standards for underground injection to protect underground sources of drinking water.	Requirements are applicable if reinjection wells are proposed to enhance groundwater restoration.	Potentially applicable
2	1a	Clean Water Act; 33 USC 1251-1376			Applies as defined below.
3	1a	40 CFR Parts 122 and 125	Establishes permitting standards (including numeric criteria) for discharge of pollutants from any point source into waters of the United States based on ambient water quality criteria, i.e. the National Pollutant Discharge Elimination System (NPDES).	Requirements are applicable if discharge of groundwater to storm drain or surface water is implemented.	Potentially applicable
4	1a	40 CFR Part 403	Establishes national pretreatment standards to control pollutants that pass through or interfere with treatment processes in publicly-owned treatment works (POTWs) or that may contaminate sewage sludge.	Requirements are applicable if discharge of groundwater or treatment residuals to sanitary sewer is implemented.	Potentially applicable
5	1a	40 CFR Part 129	Establishes toxic pollutant effluent standards for certain toxic pollutants (i.e., presence of aldrin, dieldrin, dichlorodiphenyltrichloroethane, endrin, toxaphene, benzidine, polychlorinated biphenyls) in effluent.	Discharge of these chemicals is not anticipated.	No

Table 6: Potential ARARs and TBCs[a]

ARAR Item	ARAR Source[b]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
6	1a	40 CFR Parts 230	Controls certain activities that alter the waters of the United States. Establishes permitting procedures for these actions.	Filling or destruction of wetlands is a controlled activity.	Potentially applicable if construction will impacts wetlands.
7	2b	Porter-Cologne Water Quality Act; California Water Code, Division 7 and the Water Quality Control Plan for Los Angeles Region	Prohibits discharge of reportable quantity of hazardous substance or sewage to waters of the state or to locations where probable discharge may occur to any waters of the state and establishes penalties for unauthorized release.	Although it is not intended to be a consequence of water supply restoration actions in Santa Clarita, any unauthorized discharges must be appropriately reported and mitigated. Numerous existing beneficial uses of the Santa Clara River are identified in the Water Quality Plan. Any permitted discharges to the river must accommodate these uses.	Applicable
8	2a	22 CCR, Section 64630	Sets minimum separation requirements for water mains and sewer pipelines.	Requirements apply to sewer and reclaimed water pipelines, any new water distribution piping will be designed to comply with this separation requirement.	Potentially applicable
9	2b	23 CCR, Chapter 15	Activities must maintain beneficial uses of state waters. Sets standards for waste and site classifications and waste management requirements for waste treatment, storage, or disposal in landfills; surface impoundments; waste piles; and land treatment facilities.	Remedial activities must maintain beneficial use of state waters and must meet standards for discharge of wastes to land.	Potentially applicable
10	2d	California Department of Fish and Game (DFG), Chapter 2, Article 1	Impacts from activities that modify the drainage or other features of a stream or river (including wetlands) must be mitigated.		Potentially applicable if treated groundwater will be discharged to surface water or the river bed.
11	2a	22 CCR Sections 64431, 64439, 64441, 64443, 64444, and 64449	Establishes drinking water standards and monitoring requirements for public water supply systems		Applicable
12	2a	Health and Safety Code 116525 *et seq.*, 22 CCR Chapter 14	Sets requirements for technical reports, application review, public hearings and changes to domestic water supply permit		Applicable

Table 6: Potential ARARs and TBCs[(a)]

ARAR Item	ARAR Source[(b)]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
13	2a	California Department of Health Services (DHS) Policy Memo 97-005	Requires source water characterization, alternatives evaluation, risk assessment and submittal of a permit application	Applicable if production wells impacted by perchlorate are returned to service for municipal water supply.	Potentially applicable
III. Air Quality					
1	1a	Clean Air Act; 42 USC, Section 7401-7642			Applies as defined below.
2	1a	40 CFR Part 61	Sets emission standards for pollutants for which no ambient air quality standards exist, i.e. National Emissions Standards for Hazardous Air Pollutants (NESHAP).	Ambient air quality standards are available for onsite chemicals. No NESHAPs applicable.	No
3	2e	California Air Resources Act			Applies as defined below.
4	3a	17 CCR, Part III, Chapter 1, Section 60,000 *et seq.*	Sets standards for emissions from specific sources.	Treatment technologies must comply with emission standards.	Potentially applicable
5	3a	South Coast Air Quality Management District Rules and Regulations	Establishes operating and performance standards for air emissions.	Authority to construct and permit to operate required for regulated sources of air emissions. Rule on new source review of toxic air contaminants may apply.	Potentially applicable
IV. Hazardous Materials Transportation					
1	1c	Hazardous Materials Transportation Act; 44 USC 1801-1813			Applies as defined below.
2	1c	49 CFR Parts 107 and 171-177	Establishes requirements for transportation of hazardous materials (includes hazardous waste).	Applicable if any hazardous wastes are transported offsite.	Potentially applicable

Table 6: Potential ARARs and TBCs[(a)]

ARAR Item	ARAR Source[(b)]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
V. Health and Safety					
1	1d	Occupational Safety and Health Act (OSHA); 29 USC 641-678	Established standards for general industry safety orders.	All onsite activities need to provide adequate level of worker knowledge (i.e., hazard communication) and protection.	Applicable
2	1d	29 CFR 1910.120	Defines health and safety procedures necessary during remedial investigations and cleanup at sites where hazardous waste is/was treated, stored or disposed.	All onsite activities need to provide adequate level of worker protection (e.g., medical monitoring, job safety plans) relative to hazardous waste operational requirements.	Potentially applicable
3	2f	California Occupational Health and Safety Act (Cal-OSHA); California Labor Code, Division 5, Part 1 *et seq.*	Establishes general industry safety orders and requirements for worker health and safety at hazardous waste sites.	All onsite activities need to provide adequate level of worker knowledge (e.g., hazard communication and IIPP) and protection; must comply with requirements for hazardous waste site operations (e.g., medical monitoring, job safety plans).	Potentially applicable
VI. Water Well Standards					
1	2b	California Water Well Standards; Bulletin 74-81 and Supplement 74-90	Sets standards for construction or destruction of water wells in state.	Construction or destruction of water supply wells must follow these requirements.	Potentially applicable
2	3b	Los Angeles County Health and Safety Code Section 11.38.120	A permit to construct, repair, reconstruct, or destroy a water well should be filed.	Permits will be filed for construction or destruction of water supply wells.	Potentially applicable

Table 6: Potential ARARs and TBCs[a]

ARAR Item	ARAR Source[b]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
VII. Other Requirements					
1	3c	Demolition, Building Permit	Demolition and/or removal of aboveground improvements on private property requires a demolition permit. Building permit required for new construction.	City permits required for demolition of any existing improvements or construction of new structures.	Potentially applicable
2	3d	Grading Permit	Grading on private property requires grading permit application with grading plans.	Permit required for any grading/earth moving activities performed during construction.	Potentially applicable
3	3d	Encroachment Permit	Construction of any aboveground or buried improvements in the public right-of-way requires an encroachment permit.	Permit required for installation of any improvements in the City of Santa Clarita public right-of-way.	Potentially applicable
4	2g	Public Resources Code Section 21000 *et seq.*; California Environmental Quality Act (CEQA)	Review of certain construction projects for environmental impacts.	Activities could be subject to the California Environmental Quality Act (CEQA) review (especially if Memo 97-005 from the California Department of Health Services (DHS) is applicable to the project).	Potentially applicable
Location-Specific ARARs					
1	1a	40 CFR Part 6		If groundwater treatment facilities are to be located within the 100-year floodplain, potential adverse effects need to be minimized.	Potentially applicable if groundwater treatment facilities will be located and constructed within the 100-year floodplain.
2	1b	Clean Water Act Section 404	Work within areas below the ordinary high water mark in an area containing a bed and bank (waterway) or areas classified as wetlands require permitting by the Federal government.	If river crossings for new pipelines involve work within wetlands or a waterway, a Federal permit may be required.	Potentially applicable.
3	2b	Clean Water Act Section 401	State agencies must certify that any activity subject to a permit issued by a federal agency meets all state water quality standards.	If river crossings for new pipelines results in fill or physical changes to state waters, 401 Certification will be required.	Potentially applicable.

Table 6: Potential ARARs and TBCs[a]

ARAR Item	ARAR Source[b]	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
4	1a	40 CFR 230	Actions must be taken to avoid adverse effects, minimize potential harm, and preserve and enhance wetlands, to the extent possible.	United States Army Corps of Engineers jurisdictional determination may be required to determine if the remedial action will impact wetlands.	Potentially applicable, if construction of groundwater treatment and/or conveyance facilities within a wetlands is planned.
5	1	Federal Endangered Species Act of 1973 (16 USC Section 1531 and 50 CFR Part 402) and California Endangered Species Act	Requires action to protect endangered or threatened species and their habitat		Potentially applicable if construction of groundwater treatment or conveyance facilities will impact habitat of endangered species.
6	2c	Fish and Wildlife Coordination Act (16 USC Section 661 and 40 CFR Section 6.302) (California Department of Fish and Game Code, Chapter 2, Article 1)	Impacts from activities that modify the drainage or other features of a stream or river (including wetlands) must be mitigated.		Potentially applicable if treated groundwater will be discharged to surface water or the river bed.

To Be Considered

ARAR Item	ARAR Source	Statute, Regulation, Policy or Guidance	Summary of Requirements and Prerequisites	Comments	Applicability
1	1a	USEPA Reference Dose (RfD) for Perchlorate	Used in risk assessment process to estimate acceptable concentrations of substances for specific exposure pathways	USEPA issued a draft reference dose (RfD) for perchlorate in January 2002. USEPA interim guidance provides a range of 0.0001 to 0.0005 milligrams per kilogram per day for perchlorate. In January 2004, a National Academy of Sciences committee recommended a reference dose of 0.0007 milligrams per kilogram per day of perchlorate from all sources of ingestion.	Relevant and appropriate

Table 6: Potential ARARs and TBCs[a]

(a) This table describes applicable or relevant and appropriate requirements (ARARs) and material to be considered (TBCs) for the production wells impacted by perchlorate.
(b) Key for ARAR codes. The following codes indicate the agency with authority to enforce the requirement or responsible for setting the standard:

1. Federal
1a. U.S. Environmental Protection Agency
1b. U.S. Army Corps of Engineers
1c. Department of Transportation
1d. Occupational Safety and Health Administration
2. State
2a. California Department of Health Services
2b. California Regional Water Quality Control Board
2c. California Department of Toxic Substances Control
2d. California Department of Fish and Game
2e. California Air Resources Board
2f. California Department of Industrial Relations, Division of Industrial Safety
2g. California Resources Agency, Office of Planning and Research
3. Local
3a. South Coast Air Quality Management District
3b. Los Angeles County Environmental Health
3c. City of Santa Clarita Building Department
3d. City of Santa Clarita Public Works Department

(c) MCLs = maximum contaminant levels.
(d) CFR = Code of Federal Regulations.
(e) USEPA = United States Environmental Protection Agency.
(f) RCRA = Resource Conservation and Recovery Act.
(g) USC = United States Code.
(h) CCR = California Code of Regulations.

Table 7: Evaluation of Alternative 1

Alternative: No Action

Description: Installation of two monitoring wells and long-term monitoring

Evaluation Criteria		Comments
Threshold Criteria	Overall protectiveness	Provides no protection for water system users. Existing and continued further impacts to groundwater are not addressed by Alternative 1. No containment of contaminant plume. Currently unaffected downgradient wells may be impacted by contaminant plume in the future.
	Compliance with applicable or relevant and appropriate requirements (ARARs)	Alternative 1 is inconsistent with the California State Water Resources Control Board (SWRCB) Resolution 88-63 (Sources of Drinking Water Policy), SWRCB Resolution 68-16 (Non-Degradation Policy), Porter Cologne Water Quality Act, and the Water Quality Control Plan for the Los Angeles Region.
Balancing Criteria	Long-term effectiveness and permanence	The controls provided in Alternative 1 are not adequate to achieve the remedial action objectives for the reasonably foreseeable future. The residual risk that would be present as a result of implementing Alternative 1 would preclude utilization of the affected water supply.
	Reduction of mobility, toxicity, or volume through treatment	No chemical mass is removed from groundwater. No reduction of toxicity, mobility, and volume through treatment is provided with Alternative 1. No containment of contaminant plume. Currently unaffected downgradient wells may be impacted by contaminant plume in the future.
	Short-term effectiveness	Will not be effective against remedial action objectives (RAOs) upon implementation. Similar to the long-term effectiveness, the short-term controls provided in Alternative 1 are not adequate to achieve the RAOs for the near future.
	Implementability	Alternative 1 is implementable within 1 year. In addition, Alternative 1 provides the flexibility to undertake remedial actions in the future.
	Cost	Estimated 30-year present-worth cost for Alternative 1 is $1.71 M. This cost is the lowest among the alternatives discussed in this Interim Remedial Action Plan (IRAP).
Modifying Criteria	State acceptance	Although State acceptance is unknown at this time, it is considered unlikely because this alternative provides no mitigation for the perchlorate-impacted groundwater. This criterion can be further addressed and evaluated when comments are received on this IRAP.
	Community acceptance	Community acceptance is unknown at this time. However, based on the water purveyors' sense of the public water system user needs, the community would be unlikely to accept an inadequate water production capacity. This criterion can be further addressed and evaluated when comments are received on this IRAP.

Table 8: Evaluation of Alternative 2

Alternative: Ex-Situ Treatment with Ion Exchange

Description: Utilize existing water distribution infrastructure (with some modifications), construct ion exchange treatment facility, install two monitoring wells, and conduct long-term monitoring.

Evaluation Criteria		Comments
Threshold Criteria	Overall protectiveness	California Department of Health Services (DHS)-approved technology as well as the monitoring components will provide adequate protection for the water system users. Blending of treated groundwater with imported water provides additional reliability and protection of human health. Existing and continued further impacts to groundwater are reduced with Alternative 2.
	Compliance with applicable or relevant and appropriate requirements (ARARs)	Compliance with identified chemical-specific, location-specific and action-specific ARARs can be achieved with Alternative 2. DHS Policy Memo 97-005 may be applicable.
Balancing Criteria	Long-term effectiveness and permanence	Technology is proven to be effective over the long-term with proper operation. This alternative will partially remedy and mitigate the loss of the water supply. Reduces the potential for additional future water supply loss. Residual risk will be reduced. Spent resin is incinerated thus avoiding the potential for perchlorate to be transferred from one water source to another. Rio Vista Water Treatment Plant capacity for treatment of imported water not affected.
	Reduction of mobility, toxicity, or volume through treatment	Chemical mass is removed on a "demand" basis through the ion-exchange treatment process. Unknown quantities of perchlorate are expected to remain in the Saugus Formation as well as in upgradient impacted areas. Contaminant mobility reduced through hydraulic containment.
	Short-term effectiveness	Alternative 2 can be implemented in a relative short time (1-2 years) and will be effective against the remedial action objectives immediately upon implementation. The ion exchange process is already a DHS-approved technology for drinking water applications.
	Implementability	Can be implemented in 1-2 years. Construction and operation of the system is well understood. The process is reliable and can be monitored. Agency approvals are obtainable. The treatment system is available from an experienced vendor.
	Cost	Alternative 2 has high estimated 30-year present value ($51.84 M) relative to Alternative 1 and Alternative 3. Alternative 2 has a significantly lower present value than Alternative 4.
Modifying Criteria	State acceptance	Although state acceptance is unknown at this time, based upon prior state approval of ion exchange treatment for other water supplies impacted by perchlorate, it is considered likely. This criterion can be further addressed and evaluated when comments are received on this Interim Remedial Action Plan (IRAP).
	Community acceptance	Community acceptance is unknown at this time. The community is likely to accept ion exchange treatment to restore the water supply capacity. This criterion can be further addressed and evaluated when comments are received on this IRAP.

Table 9: Evaluation of Alternative 3

Alternative: Ex-Situ Treatment with Cometabolic Bioreactor

Description: Utilize existing water distribution infrastructure (with some modifications), construct cometabolic biological reactor treatment facility, install two monitoring wells, and conduct long-term monitoring.

	Evaluation Criteria	Comments
Threshold Criteria	Overall protectiveness	Biological treatment technology using a fixed bed biological reactor (FXB) system has been shown to consistently remove perchlorate to concentrations below the analytical detection limit. Thus, biological treatment as well as the monitoring components, will provide adequate protection to the water system users. Existing and continued further impacts to groundwater are reduced with Alternative 3 through hydraulic containment and mass removal. May achieve some removal of other contaminants of interest, such as TCE and PCE, by biological consumption and volatilization.
	Compliance with applicable or relevant and appropriate requirements (ARARs)	Compliance with identified chemical-specific, location-specific and action-specific ARARs can be achieved with Alternative 3. California Department of Health Services (DHS) Policy Memo 97-005 may be applicable.
Balancing Criteria	Long-term effectiveness and permanence	Technology has not operated over long terms for perchlorate but is expected to be effective over the long term with proper operation. This alternative will partially remedy and mitigate the loss of the water supply. Reduces the potential for additional future water supply loss. Residual risk will be reduced. Treated groundwater will be pumped into an existing 102-inch raw water pipeline to obtain additional treatment. Imported water at the Rio Vista Water Treatment Plant will be displaced. Treatment system may be unavailable during recovery period following process upset.
	Reduction of mobility, toxicity, or volume through treatment	Chemical mass is removed on a "demand" basis through the treatment process. Unknown quantities of perchlorate are expected to remain in the Saugus Formation as well as in upgradient impacted areas. Contaminant mobility will be reduced through hydraulic containment.
	Short-term effectiveness	Alternative 3 can be implemented in a relative short time (2-4 years) and will be effective against the remedial action objectives immediately upon implementation. The biological treatment technology is not currently a DHS-approved technology for drinking water applications.
	Implementability	Alternative 3 can be implemented in 2-4 years. The biological treatment process is considered less reliable than ion exchange but can be monitored. Agency approvals are believed to be obtainable.
	Cost	Alternative 3 has a high estimated 30-year present value ($45.13 M) relative to Alternative 1. Alternative 3 has a lower present value than Alternative 2 and a much lower present value than Alternative 4.
Modifying Criteria	State acceptance	DHS has given a conditional approval of a fluidized bed biological reactor (FBR) system. This criterion can be further addressed and evaluated when comments are received on this Interim Remedial Action Plan (IRAP).
	Community acceptance	Community acceptance is unknown at this time. The community may be resistant to use of the biological treatment component for drinking water. This criterion can be further addressed and evaluated when comments are received on this IRAP.

Table 10: Evaluation of Alternative 4

Alternative: Ex-Situ Treatment with Membrane Filtration

Description: Utilize existing water distribution infrastructure (with some modifications), construct membrane filtration treatment facility, install two monitoring wells, and conduct long-term monitoring.

	Evaluation Criteria	Comments
Threshold Criteria	Overall protectiveness	Membrane filtration treatment technology as well as the monitoring components will provide adequate protection to the water system users. Existing and continued further impacts to groundwater are reduced with Alternative 4.
	Compliance with applicable or relevant and appropriate requirements (ARARs)	Compliance with identified chemical-specific, location-specific and action-specific ARARs can be achieved with Alternative 4. California Department of Health Services (DHS) Policy Memo 97-005 may be applicable.
Balancing Criteria	Long-term effectiveness and permanence	Treatment technology is likely to be effective over the long term with proper operation. This alternative will partially remedy and mitigate the loss of the water supply. Reduces the potential for additional future water supply loss. Residual risk will be reduced. Treated groundwater will be pumped into an existing 84-inch water distribution pipeline. Rio Vista Water Treatment Plant capacity for treatment of imported water not affected. Treatment and disposal of the brine is required.
	Reduction of mobility, toxicity, or volume through treatment	Chemical mass is removed on a "demand" basis through the treatment process. Unknown quantities of perchlorate are expected to remain in the Saugus Formation as well as in upgradient impacted areas. Contaminant mobility reduced through hydraulic containment.
	Short-term effectiveness	Alternative 4 can be implemented in a relative short time (2-4 years) and will be effective, subject to the limits previously discussed, against the remedial action objectives immediately upon implementation. Membrane filtration is a DHS-approved technology for drinking water applications for other chemicals.
	Implementability	Alternative 4 can be implemented in 2-4 years. Construction and operation of the system is well understood. The process is reliable and can be monitored to ensure that the system is effective. Agency approvals are believed to be obtainable. Required equipment is available.
	Cost	Alternative 4 has the highest estimated present value ($73.08 M) relative to the other alternatives.
Modifying Criteria	State acceptance	State acceptance is unknown at this time. This criterion can be further addressed and evaluated when comments are received on this Interim Remedial Action Plan (IRAP).
	Community acceptance	Community acceptance is unknown at this time. The community is likely to accept membrane filtration treatment to restore the water supply capacity. This criterion can be further addressed and evaluated when comments are received on this IRAP.

Table 11: Comparison of Total Cost of Remedial Alternatives

Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	No Action	**Containment and Ex-Situ Treatment with Ion Exchange**	**Containment and Ex-Situ Treatment with Bioreactor**	**Containment and Ex-Situ Treatment with Membrane Filtration**
Total Project Duration (Years)	30	30	30	30
Undiscounted Capital Cost	$0.97	$7.15	$15.09	$19.70
Undiscounted Annual O&M Cost Odd Year/Even Year	$0.03/$0.04	$2.42/$2.44	$1.63/$1.64	$2.90/$2.91
Total Present Value of Alternative (Real Discount Rate of 3.5%)	$1.71	$51.84	$45.13	$73.08

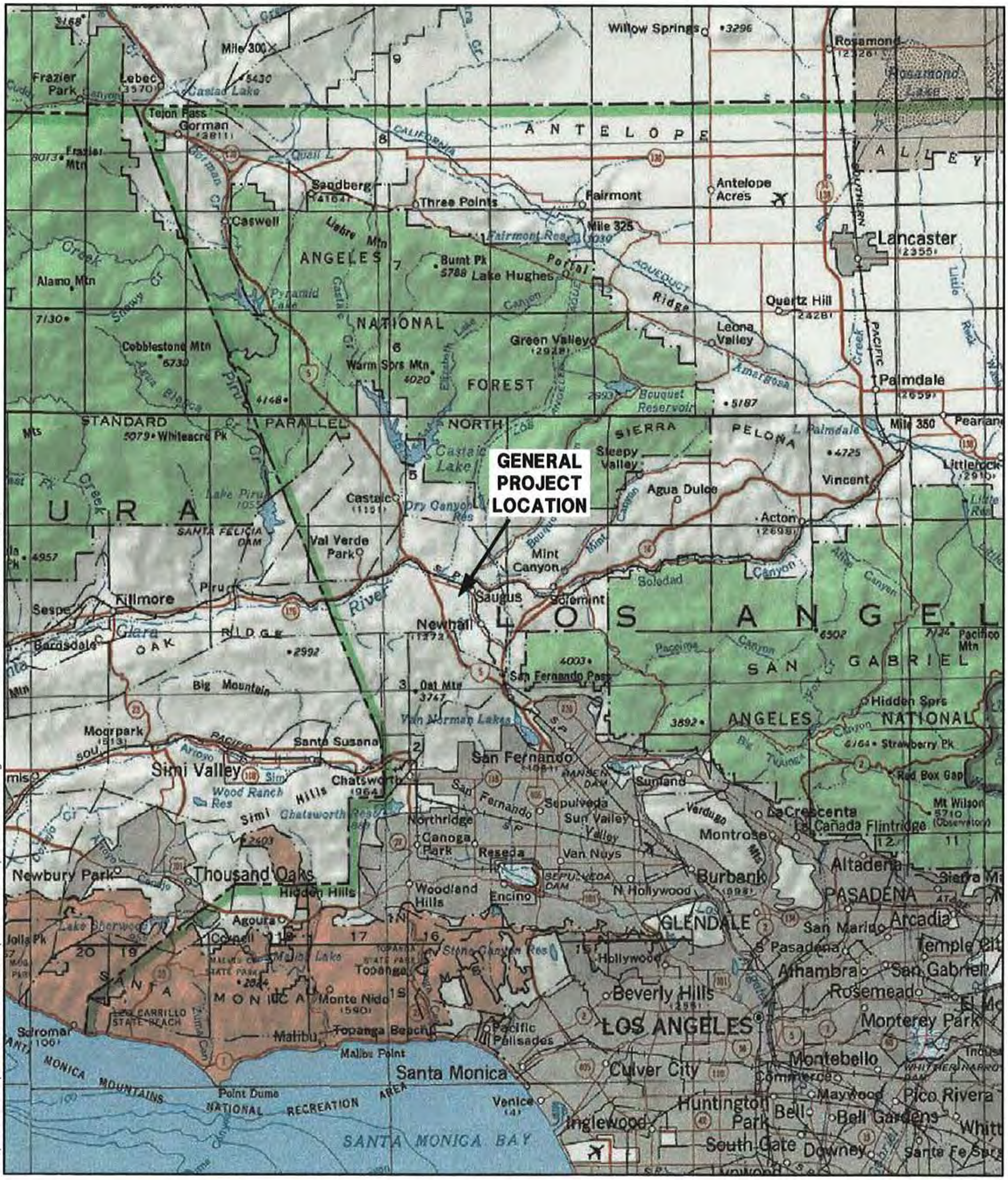
(a) Costs are in millions of dollars.
(b) Base year for opinion of costs is 2004.
(c) Quantities and costs are not based on an engineered design, but rather reflect a concept-level assessment of system components and are based on experience at the Site and with similar projects. This opinion of costs is estimated to range from -30% to +50% accuracy.

Table 12: Comparative Assessment of Alternatives with Respect to the Nine Evaluation Criteria[a]

		Alternatives			
	Evaluation Criteria	**1-No Action**	**2-Ion Exchange**	**3-Cometabolic Bio-Reactor**	**4-Membrane Filtration**
Threshold Criteria	Overall protectiveness	Does not meet criteria	Meets criteria	Meets criteria	Meets criteria
	Compliance with applicable or relevant and appropriate requirements (ARARs)	Does not meet criteria	Meets criteria	Meets criteria	Meets criteria
Balancing Criteria	Long-term effectiveness and permanence	4	1	1	3
	Reduction of mobility, toxicity, or volume through treatment	4	1	1	1
	Short-term effectiveness	4	1	2	2
	Implementability	1	2	4	2
	Cost	1	3	2	4
	Sum of Rankings:	**14**	**8**	**10**	**12**
Modifying Criteria	State acceptance	Unknown, but likely unfavorable	Unknown, but likely favorable	Unknown, but potentially unfavorable	Unknown, but likely favorable
	Community acceptance	Unknown, but likely unfavorable	Unknown, but likely favorable	Unknown, but likely unfavorable	Unknown, but likely favorable

(a) Alternatives were ranked, with "1" considered the best and "4" the worst. Ties were assigned the lowest common value.

Figures



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Kennedy/Jenks Consultants

Castaic Lake Water Agency
Santa Clarita, California

Project Location Map

K/J 034803.00
December 2005

Figure 1

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LEGEND

(E) Production Well Impacted by Perchlorate

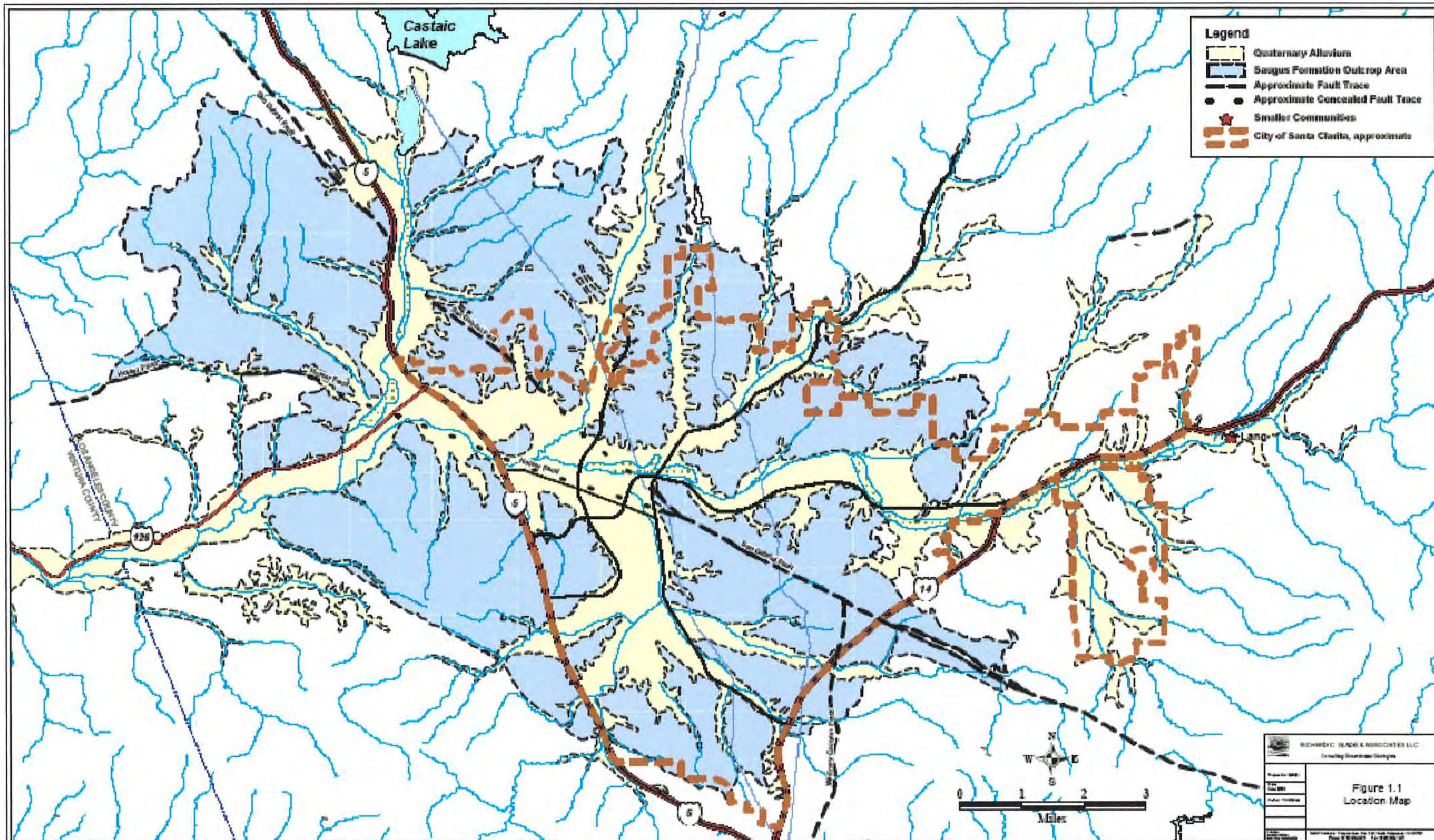
Kennedy/Jenks Consultants

Castaic Lake Water Agency
Santa Clarita, California

Perchlorate-Impacted Production Well Location Map

K/J 34803.00
December 2005

Figure 2



SOURCE

RCS 2002

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Castaic Lake Water Agency
Santa Clarita, California

Aerial Extent of Saugus Formation

K/J 034803.00
December 2005

Figure 3

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GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS
No Action	None	None	No remedial action taken. No operation of production wells.	National Contingency Plan requires consideration of this alternative.
Institutional Action	Proprietary Controls	Land purchase	Purchase of land to construct facilities, prevent use, or control selected remedy.	Potentially applicable in conjunction with other process options.
		Deed restrictions	Legally enforceable land use restrictions on current and future property owners.	Potentially applicable in conjunction with other process options.
		Deed notices	Public land record document providing information about the property. Non-enforceable.	Potentially applicable in conjunction with other process options.
		Easements	Limited property rights conveyed to a party by the landowner(s).	Potentially applicable in conjunction with other process options.
		Covenants	Legal agreements between landowners concerning land use.	Potentially applicable in conjunction with other process options.
	Governmental Controls	Land use restrictions	Restrictions on the use of land issued by a governmental jurisdiction.	Potentially applicable for well siting restrictions in conjunction with other process options.
		Groundwater use restrictions	Includes California Department of Health Services (DHS) oversight of public water systems.	Likely to be applicable for the scope of this Interim Remedial Action Plan (IRAP).
		Advisories	Risk communication regarding use of groundwater via public notices.	Potentially applicable in conjunction with other process options.
Monitoring	Monitoring	Groundwater monitoring	Monitoring of groundwater on a short-term and long-term basis to assess migration rates and contaminant levels.	Likely to be applicable in conjunction with other process options.
		Public water system	Monitoring of the public water system to assess exposure risk.	Likely to be applicable for the scope of this IRAP.
Alternative/Replacement Water Supply	Alternative/Replacement Water Supply	New water supply well	New non-impacted production wells supplement and/or replace existing wells.	Potentially applicable.
		New water supply	New non-impacted water supply source supplement and/or replace existing wells. Includes imported water, water trades, new surface water supply, direct and indirect reuse.	Potentially applicable.
Monitored Natural Attenuation	Monitoring/Verification	Groundwater monitoring	Natural attenuation by biodegradation, dispersion, dilution, and adsorption. Involves long-term monitoring and contingencies.	Potentially applicable in conjunction with other process options.

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

Kennedy/Jenks Consultants

CASTAIC LAKE WATER AGENCY
SANTA CLARITA, CALIFORNIA

INITIAL TECHNICAL IMPLEMENTABILITY SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS

DECEMBER 2005
K/J 034803.00
Figure 4

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GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS
Containment	Hydraulic Barriers	Vertical extraction wells	Existing water supply wells and/or new extraction wells provide a hydraulic barrier to reduce or prevent chemical migration in groundwater.	Potentially applicable for hydraulic control and for water supply in conjunction with other process options.
		Horizontal extraction wells	Horizontal extraction wells provide a hydraulic barrier to reduce or prevent migration of chemicals in groundwater.	Not feasible due to depth and thickness of the aquifer.
		Extraction and recharge wells	Treated groundwater is recharged to create a hydraulic barrier and increase flow to extraction wells.	Potentially applicable for hydraulic control in conjunction with other process options.
		Interceptor trenches	Deep trenches with porous media to intercept and collect groundwater.	Not feasible due to depth to the impacted zone.
	Vertical Barriers	Slurry wall	Deep trench through or around chemically impacted zones is backfilled with low permeability soil or bentonite slurry.	Not feasible due to depth to the impacted zone.
		HDPE curtain wall	High Density Polyethylene (HDPE) installed in a deep trench to provide an impermeable wall.	Not feasible due to depth to the impacted zone.
		Reactive metals wall	Reactive metals, such as iron filings, installed in a deep trench. May involve a funnel/gate strategy.	Not feasible due to depth to the impacted zone.
		Phytoremediation	Enhancement of attenuation in and near rhizosphere with vegetation.	Not feasible due to depth to the impacted zone.
Collection	Groundwater Extraction	Vertical groundwater extraction wells	Groundwater is extracted by pumping vertical wells thereby removing chemicals with groundwater.	Potentially applicable in conjunction with other process options.
		Horizontal groundwater extraction wells	Groundwater is extracted by pumping horizontal wells thereby removing chemicals with groundwater.	Not feasible due to depth to the impacted zone.
		Recharge wells	Treated groundwater is recharged to increase the flow to extraction wells.	Potentially applicable for increasing flow and water supply storage in conjunction with other process options.
In Situ Treatment	Stripping	Air sparging	Air is introduced to the saturated zone under pressure. Contaminants are transferred from liquid to gas phase.	Not applicable for perchlorate.
		In-well aeration/stripping	Air is introduced within the well casing. Chemicals are transferred from liquid to gas phase.	Not applicable for perchlorate.
	Physical Treatment	Electrokinetics	Electrode attracts ions that are subsequently removed.	Not implementable due to dense well spacing relative to lateral extent and energy requirements.
	Biological Treatment	Enhanced biological reduction	Indigenous microbes, which break down chemicals, are stimulated with nutrients and a carbon source.	Potentially applicable for perchlorate in conjunction with other process options. Full-scale systems have been implemented as a remedial action at other sites in the state.

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

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CASTAIC LAKE WATER AGENCY
SANTA CLARITA, CALIFORNIA

INITIAL TECHNICAL IMPLEMENTABILITY SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS

DECEMBER 2005
K/J 034803.00
Figure 4

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS
Ex Situ Treatment	Ex Situ Physical Treatment	LPGAC	Liquid-phase granular activated carbon (LPGAC) used as adsorbent media to adsorb chemicals from liquid phase stream.	Approved by the DHS for short-term, site-specific use for perchlorate. Potentially applicable for short-term sampling events. It is unlikely to be approved for long-term use.
		Air Stripping	Mass transfer from liquid to vapor phase usually using countercurrent air through a packed tower.	Not applicable for perchlorate.
		Filtration	Single or multi-media filters remove particulates from liquid phase stream.	Potentially applicable in conjunction with other treatment process options.
		Membrane separation	Chemicals are separated from water as the water is passed through semi-permeable membranes. Examples include reverse osmosis, nanofiltration, ultra filtration, and electrodialysis.	Potentially applicable for perchlorate. Pilot-scale testing is underway.
	Ex Situ Chemical Treatment	Ion exchange	Ions are exchanged in solution as water is passed through a bed of resin. Regeneration or disposal of loaded resin is required.	Potentially applicable for perchlorate. Process has been tested full scale and is a DHS-approved technology for drinking water.
		Ultraviolet irradiation/ chemical oxidation	Oxidation of chemicals is promoted through the use of ultraviolet light. May include introduction of hydrogen peroxide.	Not applicable for perchlorate.
		Pre-loaded GAC	Use of granular activated carbon (GAC) preloaded with metal complexes for removal of perchlorate. Requires regeneration.	Approved by the DHS for short-term, site-specific use for perchlorate. Potentially applicable for short-term sampling events. Recent research indicates potential for long-term use. However, it is unlikely to be approved for long-term use within time frame of this project.
		Electrochemical processes	Oxidation state of ions is changed in solution by application of an electrical current.	Not applicable for perchlorate.
		Aeration of metals	Chemical oxidation and hydroxide formation are promoted by aeration.	Not applicable for perchlorate.
		Reactive metals aboveground reactor	COPCs destroyed in an aboveground reactor as water is passed through a bed of reactive metal media.	Not applicable for perchlorate.
		pH adjustment	pH is adjusted through the introduction of acid or caustic. Usually in conjunction with another process.	Potentially applicable in conjunction with other treatment process options.
	Ex Situ Biological Treatment	Aerobic bioreactors	Fixed or fluidized bed reactors contain aerobic microorganisms whereby organics are biologically assimilated and transformed.	Potentially applicable but not a DHS-approved technology for drinking water.
		Cometabolic anaerobic bioreactors (biological reduction)	Organic substrates such as ethanol and nutrients are used as an amendment to perchlorate-impacted water that is passed through a GAC/fluidized bed reactor.	Potentially applicable for perchlorate but is not a DHS-approved technology for drinking water.
		Anaerobic bioreactors	Reactor contains anaerobic microorganisms whereby organics and perchlorate are biologically assimilated and transformed.	Not applicable for perchlorate in absence of organic substrate.

LEGEND

Technology and/or Process Option screened out on the basis of technical implementability.

Process Option considered innovative.

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INITIAL TECHNICAL IMPLEMENTABILITY SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS

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Figure 4

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GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	DESCRIPTION	SCREENING COMMENTS
Management/Reuse of Groundwater	Treated Groundwater Management	Direct potable water supply	Water purveyors provide treated water directly to the distribution system.	Potentially applicable.
		Indirect potable water supply	Treated water is discharged to surface water.	Potentially applicable.
		Non-potable water reuse	Treated water used for irrigation and/or industrial use.	Potentially applicable.
		Streamflow augmentation	Treated water discharged directly or indirectly to surface water.	Potentially applicable.
		Discharge to publicly owned treatment works (POTW)	Treated water discharged to sanitary sewer.	Potentially applicable.
		Groundwater recharge	Treated water recharged to the aquifer.	Potentially applicable.
		Deep well injection	Treated water injected into a deep aquifer	Potentially applicable.
	Untreated Groundwater Management	Discharge to POTW	Untreated water discharged to sanitary sewer.	Potentially applicable.
		Deep well injection	Untreated water injected into a deep aquifer	Potentially applicable.
		Streamflow augmentation	Untreated water discharged directly or indirectly to surface water.	Potentially applicable.

LEGEND

- (hatched) Technology and/or Process Option screened out on the basis of technical implementability.
- (shaded) Process Option considered innovative.

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SANTA CLARITA, CALIFORNIA

INITIAL TECHNICAL IMPLEMENTABILITY SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS

DECEMBER 2005
K/J 034803.00
Figure 4

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	EFFECTIVENESS	IMPLEMENTABILITY	COST
No Action	None	None	Will not achieve Remedial Action Objectives (RAOs).	Potentially implementable.	No implementation cost. Potential uncertain cost impacts to local economy based on expected water shortages.
Institutional Controls	Proprietary Controls	Land purchase	Will not achieve RAOs alone. Not effective for restoration of water supply except as siting for treatment facilities.	Land purchase requires negotiation with current landowners.	High cost associated with land valuations in area.
		Deed restrictions	Will not achieve RAOs. Not effective for restoration of water supply.	Potentially implementable.	Low costs.
		Deed notices	Will not achieve RAOs. Not effective for restoration of water supply.	Potentially implementable.	Low costs.
		Easements	Will not achieve RAOs. Not effective for restoration of water supply except as siting for treatment facilities.	Procuring easement requires negotiation with current landowners or government agency.	Low to moderate costs depending on scope of easement negotiation.
		Covenants	Will not achieve RAOs. Not effective for restoration of water supply.	Potentially implementable.	Low costs.
	Governmental Controls	Land use restrictions	Will not achieve RAOs. Not effective for restoration of water supply except as siting for treatment facilities.	Potentially implementable. May involve difficult negotiations.	Low to high costs depends on scope of restrictions.
		Groundwater use restrictions	Will not achieve RAOs. Not effective for restoration of water supply.	Potentially implementable.	Low costs.
		Advisories	Will not achieve RAOs. Not effective for restoration of water supply.	Potentially implementable.	Low costs.
Monitoring	Monitoring	Groundwater monitoring	Will not achieve RAOs alone. Not effective for restoration of water supply. Effective in tracking presence and movement of chemicals in groundwater.	Potentially implementable.	Low to moderate costs.
		Public water system	Will not achieve RAOs alone. Not effective for restoration of water supply. Effective in establishing the presence of chemicals in groundwater.	Potentially implementable.	Low to moderate costs.
Alternative/Replacement Water Supply	Alternative/Replacement Water Supply	New water supply wells	Effective for restoration of water supply and preventing exposures over a relative short term. Proper well siting is important in long-term effectiveness. May be some influence on plume migration.	Potentially implementable. Well sites must be identified. May involve possible land purchase and/or easements.	Moderate to high capital costs.
		New water supply: • Inter-ties • Direct reuse of treated groundwater • Indirect reuse of treated groundwater • New surface water supply	Limited effectiveness for restoration of water supply and preventing exposures over a relative short term. Particularly limited during drought conditions when back-up supply is needed.	Potentially implementable on a limited basis. Source of water must be identified. New surface water supply will involve long-term surface water entitlements and possibly a new water treatment facility.	Moderate to high costs.

LEGEND

- Potentially effective, implementable, and cost-effective Technology or Process Option. (white box)
- Technology and/or Process Option screened out on the basis of effectiveness, implementability, and/or costs. (hatched box)
- Process Option considered innovative. (shaded box)

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EVALUATION OF TECHNOLOGIES AND PROCESS OPTIONS

DECEMBER 2005
K/J 034803.00
Figure 5

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	EFFECTIVENESS	IMPLEMENTABILITY	COST
Monitored Natural Attenuation	Monitoring/Verification	Groundwater monitoring	Will not achieve RAOs alone. Not effective for restoration of water supply in short term. Potential limited long-term effectiveness. Will not protect downgradient water resources.	Potentially implementable.	Low to moderate cost.
Containment	Hydraulic Barriers	Vertical extraction wells	Will not achieve RAOs alone. Effective, proven technology for containing plume migration. Proper well siting is important in long-term effectiveness.	Potentially implementable. Well sites must be identified. May involve possible land purchase and/or easements.	Moderate to high costs.
		Extraction and recharge wells	Will not achieve RAOs alone. Effective, proven technology for containing plume migration and providing hydraulic control. Proper extraction and recharge siting is important in long-term effectiveness. Not effective for restoration of water supply in the short-term.	Potentially implementable. Extraction and recharge sites must be identified. May involve possible land purchase and/or easements.	High costs.
Collection	Groundwater Extraction	Vertical groundwater extraction wells	Will not achieve RAOs alone. Effective, proven technology for groundwater extraction. Proper well siting is important in long-term effectiveness.	Potentially implementable. Well sites must be identified. May involve possible land purchase and/or easements.	Moderate to high costs.
		Recharge wells	Will not achieve RAOs alone. Effective, proven technology for flushing and improved flow. Proper recharge siting is important in long-term effectiveness. Not effective for restoration of water supply in the short-term.	Potentially implementable. Recharge sites must be identified. May Involve possible land purchase and/or easements.	High costs.
In Situ Treatment	Biological Treatment	Enhanced biological reduction	Will not achieve RAOs alone. Effectiveness has not been confirmed. Pilot testing in progress at an unrelated site.	Potentially implementable. Nutrient introduction locations must be identified. May involve possible land purchase and/or easements. Not currently a California Department of Health Services (DHS) approved technology for drinking water.	Moderate costs.

LEGEND

- Potentially effective, implementable, and cost-effective Technology or Process Option.
- Technology and/or Process Option screened out on the basis of effectiveness, implementability, and/or costs.
- Process Option considered innovative.

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SANTA CLARITA, CALIFORNIA

EVALUATION OF TECHNOLOGIES AND PROCESS OPTIONS

DECEMBER 2005
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Figure 5

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GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	EFFECTIVENESS	IMPLEMENTABILITY	COST
Liquid Phase Treatment	Ex Situ Physical/Chemical Treatment	Filtration	Effective for removal of particulates as part of a treatment train designed to remove perchlorate. Must be implemented in conjunction with a containment/collection process.	Potentially implementable.	Low to moderate cost.
		Membrane separation	Effective for removal of perchlorate. Must be implemented in conjunction with a containment/collection process.	Implementable. Process is currently being tested experimentally.	High capital and O&M costs.
		Ion exchange	Effective for removal of perchlorate. Must be implemented in conjunction with a containment/collection process.	Implementable. Process has been tested full-scale, is operating at several locations, and is currently the only DHS-approved technology for drinking water.	Moderate to high capital and O&M costs.
		pH adjustment	Effective for pH adjustment as part of a treatment train designed to remove perchlorate. Must be implemented in conjunction with a containment/collection process.	Potentially implementable.	Low costs.
	Ex Situ Biological Treatment	Aerobic bioreactor	Not effective for removal of perchlorate. Must be implemented in conjunction with a containment/collection process.	Difficult to implement.	Moderate to high capital and O&M costs.
		Cometabolic anaerobic bioreactor (biological reduction)	Effective for removal of perchlorate. Must be implemented in conjunction with a containment/collection process.	Difficult to implement. Not a DHS-approved technology for drinking water.	Moderate to high capital and O&M costs.

LEGEND

Potentially effective, implementable, and cost-effective Technology or Process Option.

Technology and/or Process Option screened out on the basis of effectiveness, implementability, and/or costs.

Process Option considered innovative.

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EVALUATION OF TECHNOLOGIES AND PROCESS OPTIONS

DECEMBER 2005
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Figure 5

GROUNDWATER GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS OPTIONS	EFFECTIVENESS	IMPLEMENTABILITY	COST
Management/Reuse of Groundwater	Treated Groundwater Management	Direct potable supply	May potentially achieve RAOs alone. Effective when treated water meets drinking water standards.	Potentially implementable. DHS-approval required.	Low cost assuming no further treatment.
		Indirect potable supply	Will not achieve RAOs alone. Effective when treated water meets discharge standards.	Potentially implementable. National Pollutant Discharge Elimination System (NPDES) permit may be required.	Low to moderate cost assuming no further treatment.
		Non-potable water reuse	Will not achieve RAOs alone. May be relevant to management of groundwater not needed for water supply. Effective when treated water meets beneficial reuse standards.	Potentially implementable. Demand may fluctuate.	Low to moderate cost assuming no further treatment.
		Stream flow augmentation	Will not achieve RAOs alone. Effective when treated water meets discharge standards. Not effective for restoration of lost production capacity.	Potentially implementable. NPDES permit may be required.	Low to moderate cost assuming no further treatment.
		Discharge to publicly owned treatment works (POTW)	Will not achieve RAOs alone. May be relevant to management of groundwater not needed for water supply.	Potentially implementable. Connection permit may be required.	Low to moderate cost assuming no further treatment.
		Groundwater recharge	Will not achieve RAOs alone. Not effective for restoration of lost production capacity.	Potentially implementable. Discharge permit may be required.	Low to moderate cost assuming no further treatment.
		Deep well injection	Will not achieve RAOs alone. Not effective for restoration of lost production capacity.	Potentially implementable. Discharge permit may be required.	Moderate cost assuming no further treatment.
	Untreated Groundwater Management	Discharge to POTW	Will not achieve RAOs alone. Relevant for management of untreated groundwater not needed for water supply.	Unlikely to be approved and permitted for implementation.	Low to moderate cost assuming no further treatment.
		Deep well injection	Will not achieve RAOs.	Difficult to implement.	Moderate cost.
		Streamflow augmentation	Will not achieve RAOs alone. Relevant for management of untreated groundwater not needed for water supply	Unlikely to be approved and permitted for implementation.	Low to moderate cost assuming no further treatment.

LEGEND

Potentially effective, implementable, and cost-effective Technology or Process Option.

Technology and/or Process Option screened out on the basis of effectiveness, implementability, and/or costs.

Process Option considered innovative.

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EVALUATION OF TECHNOLOGIES AND PROCESS OPTIONS

DECEMBER 2005
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Figure 5

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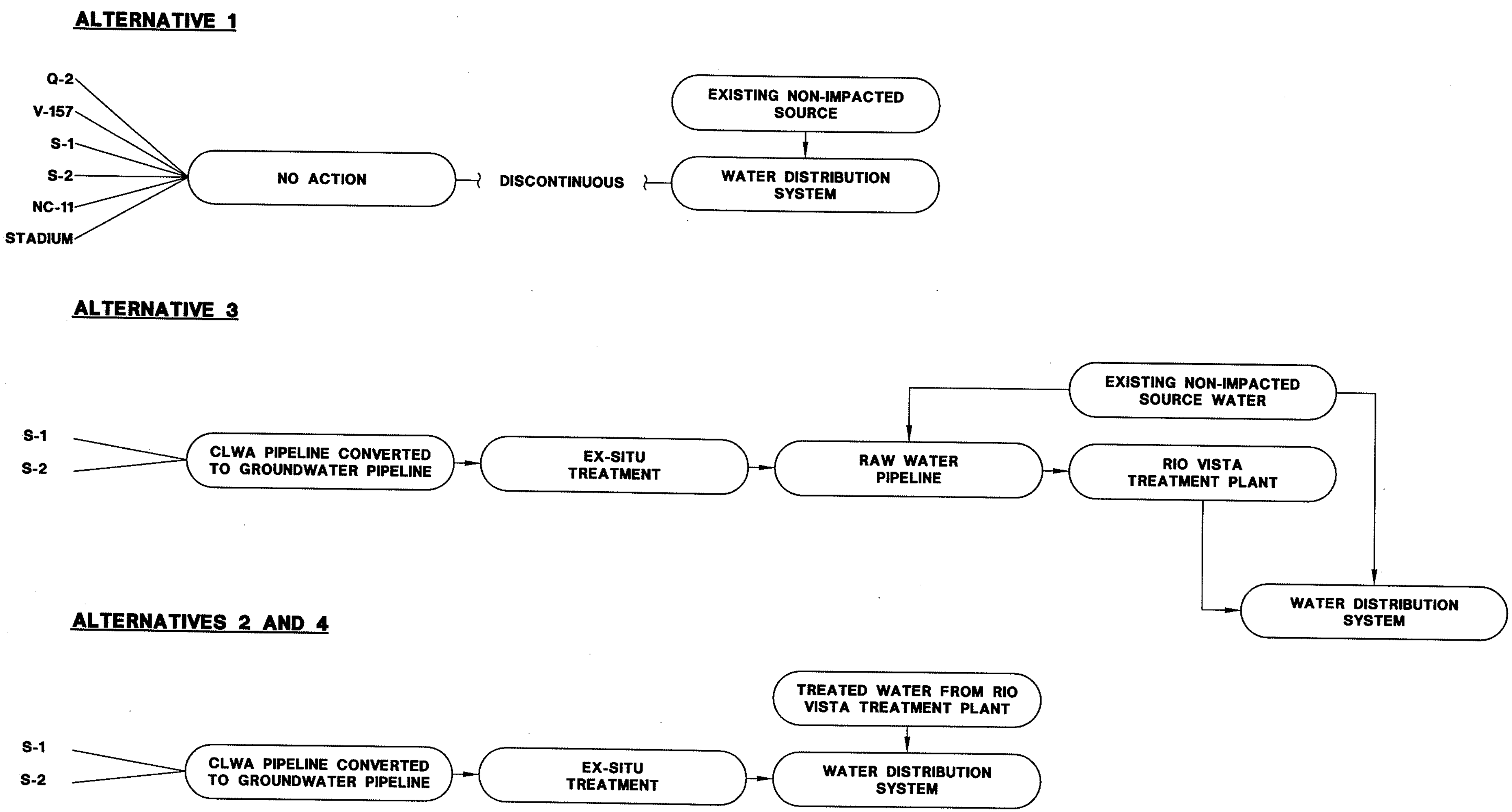

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Santa Clarita, California

Conceptualization of Alternatives

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Figure 6

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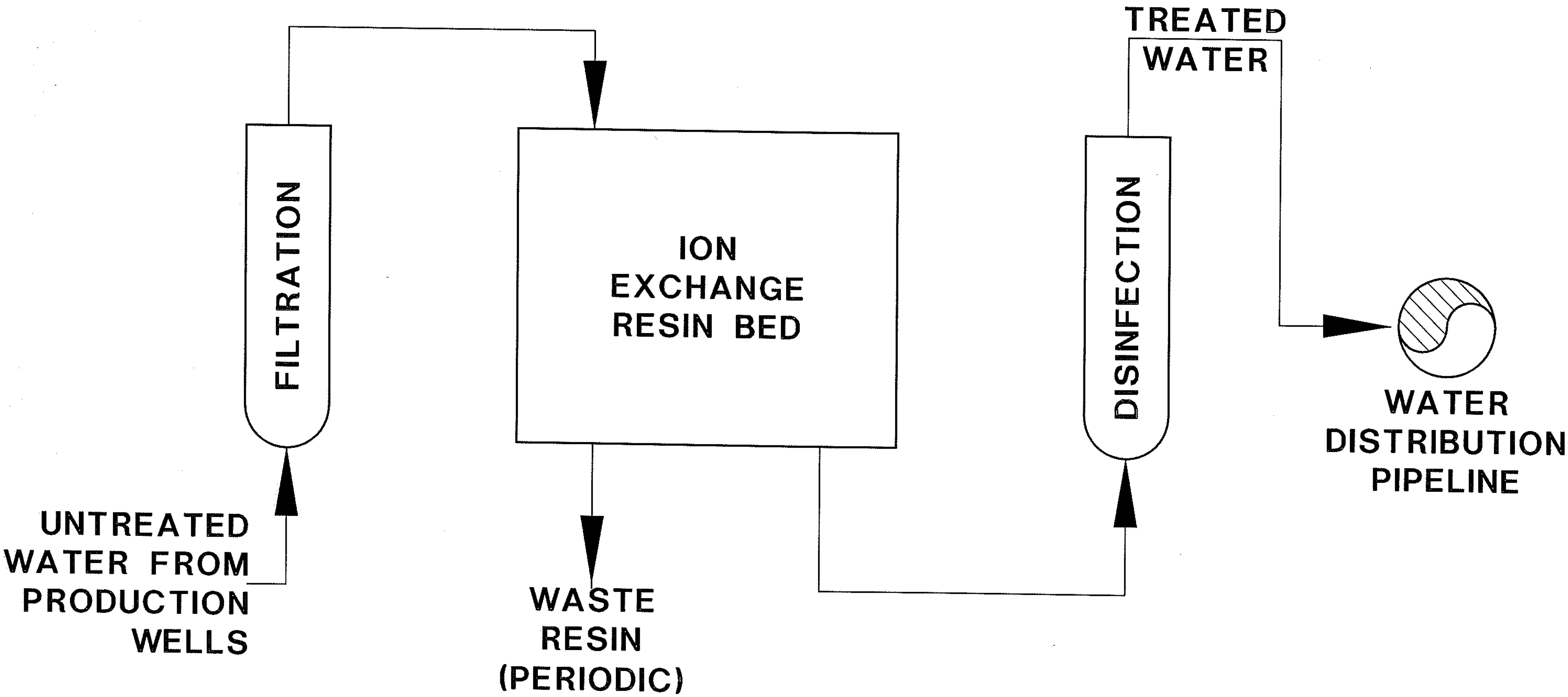

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Santa Clarita, California

Generalized Process Flow
Alternative 2: Ion Exchange

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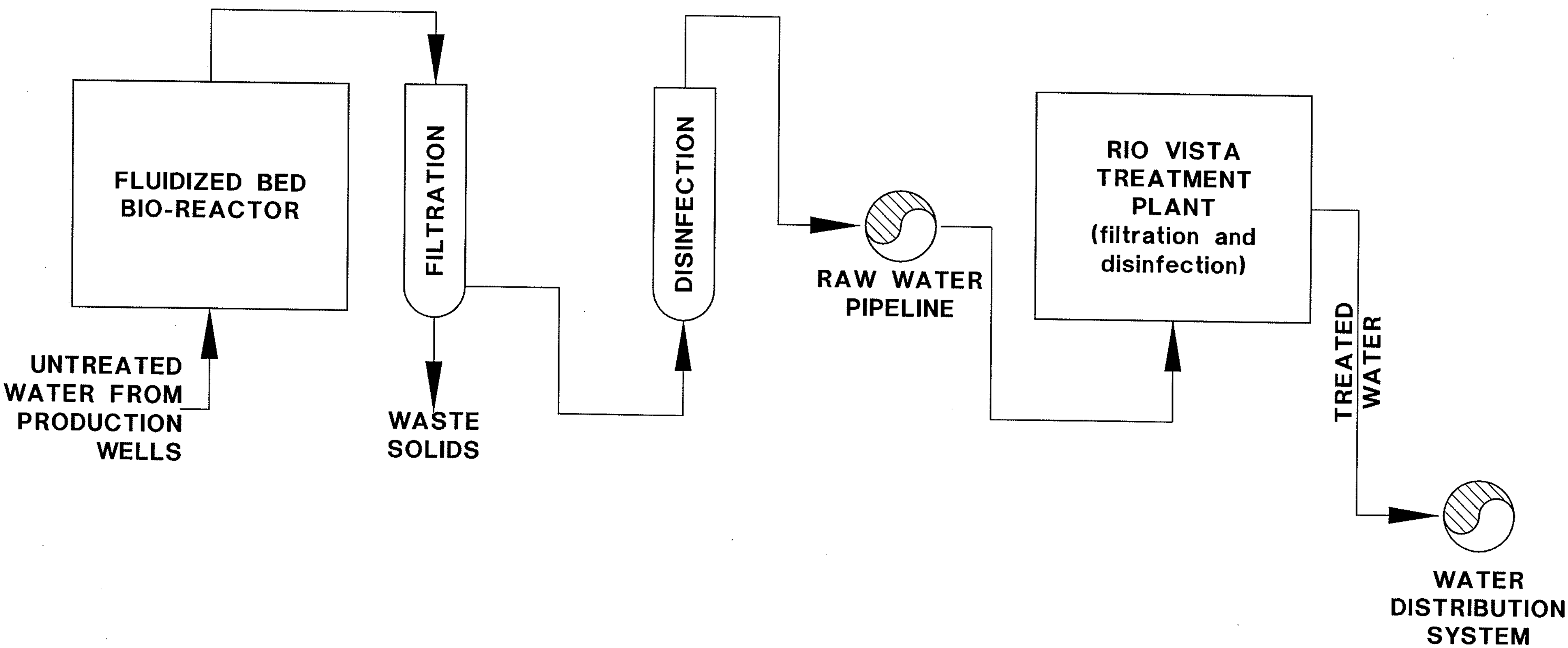
December 2005

Figure 7



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Santa Clarita, California

Generalized Process Flow
Alternative 3: Bio-Reactor

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December 2005

Figure 8

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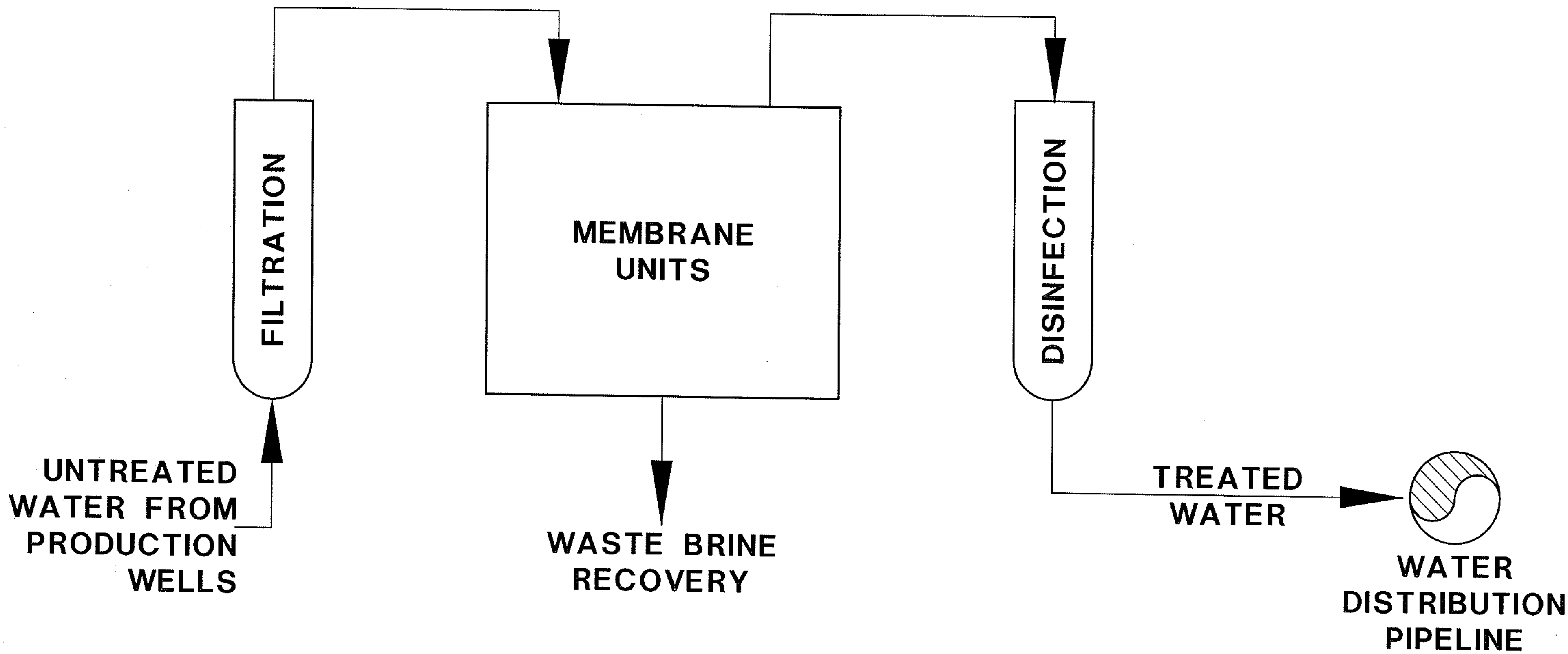

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Santa Clarita, California

Generalized Process Flow
Alternative 4: Membrane Filtration

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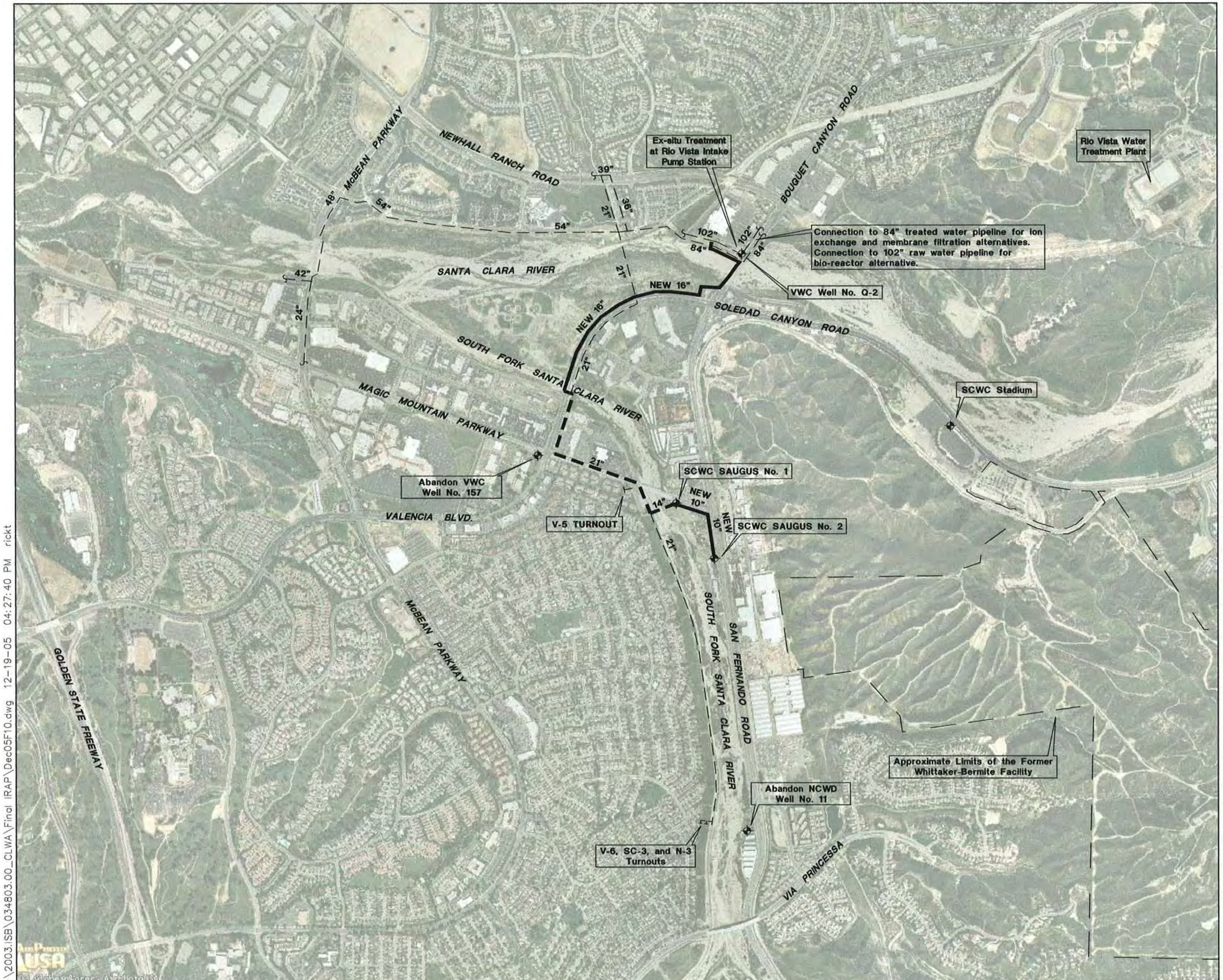
December 2005

Figure 9



N

NO SCALE

LEGEND

(E) CLWA Treated Water Delivery Pipeline

(E) CLWA Water Delivery Pipeline Converted To Contaminated Groundwater Pipeline

(N) Contaminated Groundwater Pipeline

(E) Production Well Impacted by Perchlorate

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Santa Clarita, California

Proposed Conceptual Modifications To Existing Water Distribution System

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December 2005

Figure 10

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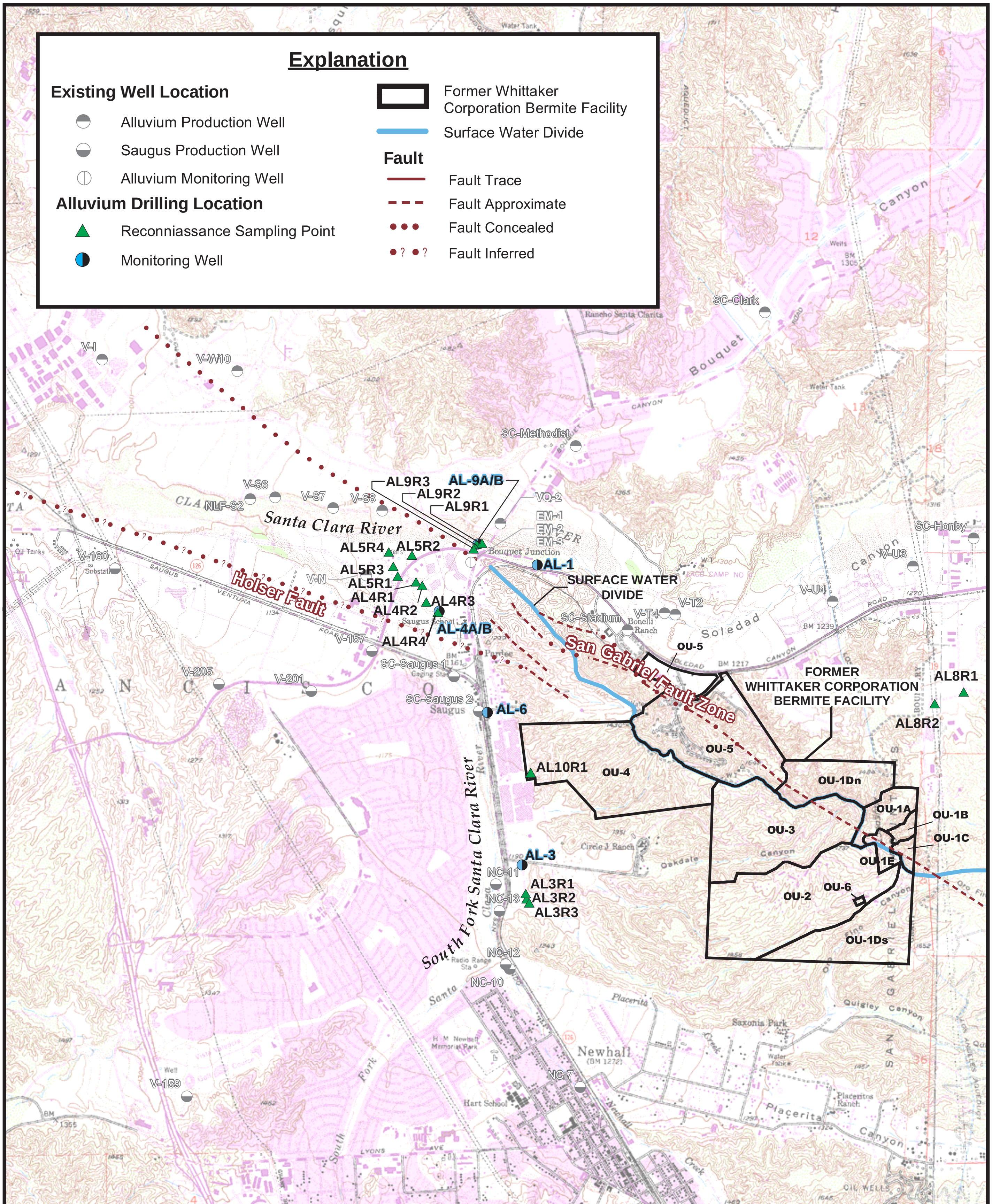
Appendix A

Tables and Figures Reproduced from the Report Entitled
Eastern Santa Clara Subbasin Groundwater Study, Santa Clarita, California – Conceptual Hydrogeology Technical Memorandum
Dated January 2005 by CH2MHILL



0 3,500 7,000 Feet

CH2MHILL

Figure 2-1
Alluvium Reconnaissance Sampling
and Monitoring Well Locations
Santa Clarita, California

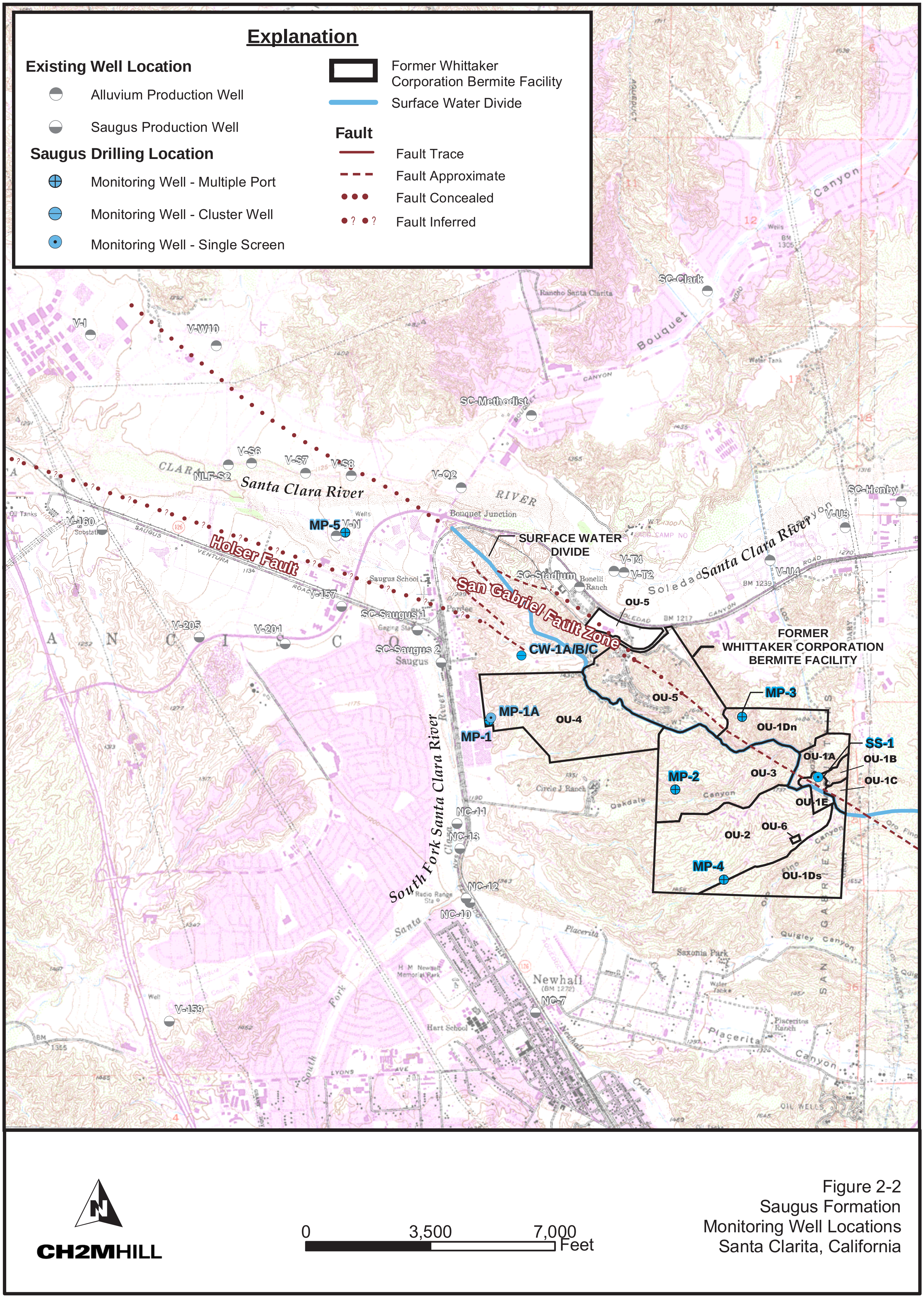


Figure 2-2
Saugus Formation
Monitoring Well Locations
Santa Clarita, California

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels						Parameter Detection Frequency	Analytical Results							
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL		AL-1 10/09/2003 Primary Sample	AL-1 01/12/2004 Primary Sample	AL-1 04/20/2004 Primary Sample	AL-3 10/08/2003 Primary Sample	AL-3 10/08/2003 USACE QA Sample	AL-3 01/12/2004 Primary Sample	AL-3 04/20/2004 Primary Sample	AL-4A 10/08/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	0.1 U	NT	NT	0.087 J	NT	NT	NT	0.1 U
Perchlorate					6	6	111 / 149	23.4	20.9	36.8	26.2	22.2	16.3	24.8	8.0
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	NT	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	1 UJ	NT	NT	1 UJ	NT	NT	NT	1 UJ
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	2.4	2.4	3.6 J	0.5 U	NT	0.5 U	0.5 U	0.33 J
Toluene	150	1,000			150		21 / 140	2.3	0.5 U	0.5 U	2.5 U	NT	0.5 U	0.5 U	1.1 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	4.1	4.1	2.4 J	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	0.5 U	0.02 U	NT	0.5 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	NT	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	10 U	NT	NT	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	1.0 U	NT	NT	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.000575 J	NT	NT	0.002 U	NT	NT	NT	0.002 U
n-Nitrosodiphenylamine							42 / 48	0.0139	NT	NT	0.00857	NT	NT	NT	0.00595

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

	Regulatory Action Levels							Analytical Results							
Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	AL-4A 10/08/2003 Field Duplicate	AL-4A 01/12/2004 Primary Sample	AL-4A 01/12/2004 USACE QA Sample	AL-4A 04/20/2004 Primary Sample	AL-4A 04/20/2004 USACE QA Sample	AL-4B 10/08/2003 Primary Sample	AL-4B 01/12/2004 Primary Sample	AL-4B 04/20/2004 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	0.179	NT	NT	NT	NT	0.1 U	NT	NT
Perchlorate					6	6	111 / 149	8.6	9.0	8.4	6.0	6.4	9.1	18.0	17.1 J
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	NT	1 U	NT	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	NT	0.38 UJ	NT	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	1 UJ	NT	NT	NT	NT	1 UJ	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.33 J	0.33 J	NT	0.31 J	NT	0.5 U	0.57	0.75
Toluene	150	1,000			150		21 / 140	0.86 U	0.5 U	NT	0.5 U	NT	0.76 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	NT	0.5 U	NT	0.02 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	NT	0.5 U	NT	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	NT	NT	10 U	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	NT	NT	1.0 U	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.002 U	NT	NT	NT	NT	0.000496 J	NT	NT
n-Nitrosodiphenylamine							42 / 48	0.00492 J	NT	NT	NT	NT	0.0573	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: AL-6 10/08/2003 Primary Sample	AL-6 01/13/2004 Primary Sample	AL-6 04/20/2004 Primary Sample	AL-9A 10/09/2003 Primary Sample	AL-9A 10/09/2003 Field Duplicate	AL-9A 01/12/2004 Primary Sample	AL-9A 04/20/2004 Primary Sample	AL-9A 04/20/2004 Field Duplicate
Oxidizers															
Chlorate						800	7 / 48	0.1 U	NT	NT	0.082 J	0.078 J	NT	NT	NT
Perchlorate					6	6	111 / 149	5.8	5.9	7.7 J	41.4	41.4	30.9	19.5	20.9
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.28 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	1.8	1.6	1.1	0.5	0.43 J
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	2.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	1 UJ	NT	NT	1 UJ	1 UJ	NT	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.26 UJ	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	4.5	4.1	2.5	1.2	1.1
Toluene	150	1,000			150		21 / 140	4.3	0.5 U	0.5 U	0.54	0.62	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.94	0.85	0.69	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	3.9	2.5	2.3	1.2	0.57	0.55
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	0.5 U	0.02 U	0.02 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	15 U	NT	NT	10 U	10 U	NT	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	1.0 U	1.0 U	NT	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.00136 J	NT	NT	0.002 U	0.002 U	NT	NT	NT
n-Nitrosodiphenylamine							42 / 48	0.146	NT	NT	0.00472 J	0.00167 J	NT	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
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USACE = U.S. Army Corps of Engineers
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: AL-9B 10/09/2003 Primary Sample	AL-9B 01/12/2004 Primary Sample	AL-9B 01/12/2004 Field Duplicate	AL-9B 04/20/2004 Primary Sample	CW-1A 09/29/2003 Primary Sample	CW-1A 01/13/2004 Primary Sample	CW-1A 04/20/2004 Primary Sample	CW-1B 09/30/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	0.075 J	NT	NT	NT	0.1 U	NT	NT	0.1 U
Perchlorate					6	6	111 / 149	33.3	23.6	24.4	18.4	2.7 J	2.5 J	2.3 J	1.2 J
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.71	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	1.3	0.79	0.74	0.41 J	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	1 UJ	NT	NT	NT	1 U	NT	NT	1 U
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	1	0.5 U	0.5 U	0.35 J	1.8	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	2.8	1.7	1.8	1.1	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	150	1,000			150		21 / 140	2.5	0.5 U	0.5 U	0.88	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.68	0.47 J	0.45 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	1.7	0.89	0.84	0.58	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	NT	10 U	NT	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	0.42 J	NT	NT	NT	1.0 U	NT	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.002 U	NT	NT	NT	0.002 U	NT	NT	0.002 U
n-Nitrosodiphenylamine							42 / 48	0.00272 J	NT	NT	NT	0.005 U	NT	NT	0.108

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: CW-1B 01/13/2004 Primary Sample	CW-1B 04/20/2004 Primary Sample	CW-1C 09/30/2003 Primary Sample	CW-1C 01/13/2004 Primary Sample	CW-1C 04/20/2004 Primary Sample	EM-1 11/18/2002 Primary Sample	EM-1 07/10/2003 Primary Sample	EM-2 11/18/2002 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	NT	NT	0.1 U	NT	NT	0.1 U	NT	0.1 U
Perchlorate					6	6	111 / 149	1.2 J	3 U	0.74 J	5.4	6.5	3 U	3 U	23
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.8	2.1	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 [1]	80 [2]					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.2 U
Chloroform	100 [1]	80 [2]					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.78	0.39 J	0.5 U
Dibromochloromethane	100 [1]	80 [2]					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	NT	NT	1 U	NT	NT	1 U	NT	1 U
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.74	1	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	22	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.2 U
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.57	0.5 U	0.5 U	5.8	4.9	0.43 J
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.2 U
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U	0.02 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.32 J	1.9	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	3	8.1	0.5 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	NT	10 U	NT	NT	10 U	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	NT	1.0 U	NT	NT	1.0 U	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	NT	0.002 U	NT	NT	0.00613	NT	0.002 U
n-Nitrosodiphenylamine							42 / 48	NT	NT	0.0262	NT	NT	NT	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

(2) USEPA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:

J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	EM-2 07/10/2003 Primary Sample	EM-3 07/10/2003 Primary Sample	MP-1A 09/29/2003 Primary Sample	MP-1A 01/13/2004 Primary Sample	MP-1A 04/20/2004 Primary Sample	MP-1_01 01/16/2003 Primary Sample	MP-1_01 07/09/2003 Primary Sample	MP-1_01 01/15/2004 Primary Sample
	Regulatory Action Levels							Analytical Results							
Oxidizers															
Chlorate						800	7 / 48	NT	NT	0.1 U	NT	NT	0.1 U	NT	NT
Perchlorate					6	6	111 / 149	19.2 J	63.9 J	19.3	20.3	21.0 J	20.9	23.7	25.0
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	1.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.76 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	NT	NT	1 U	NT	NT	1 U	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.96	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	2.8 J	2.5	3.1	3.1	0.5 U	0.26 J	0.5 U
Toluene	150	1,000			150		21 / 140	4.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	2.4 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	2.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	7.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	NT	10 U	NT	NT	10 U	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	NT	1.0 U	NT	NT	1.0 U	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	NT	0.002 U	NT	NT	0.002 U	NT	NT
n-Nitrosodiphenylamine							42 / 48	NT	NT	0.005 U	NT	NT	0.005 UJ	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-1_01 04/22/2004 Primary Sample	MP-1_02 01/16/2003 Primary Sample	MP-1_02 01/16/2003 Field Duplicate	MP-1_02 07/09/2003 Primary Sample	MP-1_02 07/09/2003 Field Duplicate	MP-1_02 01/15/2004 Primary Sample	MP-1_02 04/22/2004 Primary Sample	MP-1_02 04/22/2004 Field Duplicate
Oxidizers															
Chlorate						800	7 / 48	NT	0.1 U	0.1 U	NT	NT	NT	NT	NT
Perchlorate					6	6	111 / 149	21.8	9.1	9.7	114	113	102	97.5	98.2
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.65	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,4-Dioxane						3	4 / 48	NT	1 U	1 U	NT	NT	NT	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.43 J	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.3 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Toluene	150	1,000			150		21 / 140	0.65	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.02 U	0.02 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	10 U	10 U	NT	NT	NT	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	1.0 U	1.0 U	NT	NT	NT	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	0.002 U	0.00324 U	NT	NT	NT	NT	NT
n-Nitrosodiphenylamine							42 / 48	NT	0.00257 J	0.005 UJ	NT	NT	NT	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
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QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-1_03 01/16/2003 Primary Sample	MP-1_03 07/09/2003 Primary Sample	MP-1_03 01/15/2004 Primary Sample	MP-1_03 01/15/2004 Field Duplicate	MP-1_03 04/21/2004 Primary Sample	MP-1_04 01/16/2003 Primary Sample	MP-1_04 07/08/2003 Primary Sample	MP-1_04 01/15/2004 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	0.1 U	NT	NT	NT	NT	0.1 U	NT	NT
Perchlorate					6	6	111 / 149	14.9	29.9	29.4	29.4	27.9	2 J	3 U	0.85 UJ
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	1 U	NT	NT	NT	NT	1 U	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	0.5 U	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	NT	NT	10 U	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	NT	NT	1.0 U	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.002 U	NT	NT	NT	NT	0.002 U	NT	NT
n-Nitrosodiphenylamine							42 / 48	0.00291 J	NT	NT	NT	NT	0.00267 J	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-1_04 04/21/2004 Primary Sample	MP-1_05 01/15/2003 Primary Sample	MP-1_05 07/08/2003 Primary Sample	MP-1_06 01/15/2003 Primary Sample	MP-1_06 07/08/2003 Primary Sample	MP-1_07 01/14/2003 Primary Sample	MP-1_07 07/08/2003 Primary Sample	MP-1_08 01/14/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	NT	0.1 U	NT	0.1 U	NT	0.1 U	NT	0.1 U
Perchlorate					6	6	111 / 149	3 U	2.5 J	3 U	1.8 J	3 U	3 U	3 U	3.7 J
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	NT	1 U	NT	1 U	NT	1 U	NT	1 U
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	0.94 U	0.5 U	0.62 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.02 U	0.5 U	0.02 U	0.5 U	0.02 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	10 U	NT	10 U	NT	10 U	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	1.0 U	NT	1.0 U	NT	1.0 U	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	0.002 U	NT	0.002 U	NT	0.002 U	NT	0.002 U
n-Nitrosodiphenylamine							42 / 48	NT	0.00303 J	NT	0.00581 J	NT	0.00255 J	NT	0.0117 J

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested

OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

(2) USEPA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:

J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-1_08 07/08/2003 Primary Sample	MP-1_09 01/13/2003 Primary Sample	MP-1_09 07/08/2003 Primary Sample	MP-1_10 01/13/2003 Primary Sample	MP-1_10 07/08/2003 Primary Sample	MP-2_01 01/28/2003 Primary Sample	MP-2_01 07/10/2003 Primary Sample	MP-2_01 01/14/2004 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	NT	0.1 U	NT	0.1 U	NT	0.1 U	NT	NT
Perchlorate					6	6	111 / 149	2 J	6.6	3 U	3 U	3 U	58200	64500 J	56000
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 UJ	1 U	1 UJ	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.26 J	0.47 J	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.88	1.1	0.83 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.95	1.6	0.97
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	2.1	2.4	1.6
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	NT	1 U	NT	1 U	NT	1.7 J	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 UJ	0.5 U	0.27 J	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.66 UJ	0.5 U	0.74 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	6	10	6.3
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 UJ	0.5 U	0.28 J	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.56	0.47 J
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	1800	2000 J	1800
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.02 U	0.5 U	0.02 U	0.5 U	0.02 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	10 U	NT	10 U	NT	10 U	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	1.0 U	NT	1.0 U	NT	1.0 U	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	0.002 U	NT	0.00453 U	NT	0.002 U	NT	NT
n-Nitrosodiphenylamine							42 / 48	NT	0.0083 J	NT	0.273 J	NT	0.0028 J	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-2_02 01/29/2003 Primary Sample	MP-2_02 01/29/2003 USACE QA Sample	MP-2_02 07/10/2003 Primary Sample	MP-2_02 01/13/2004 Primary Sample	MP-2_03 01/28/2003 Primary Sample	MP-2_03 07/10/2003 Primary Sample	MP-2_03 01/13/2004 Primary Sample	MP-2_03 01/13/2004 Field Duplicate
Oxidizers															
Chlorate						800	7 / 48	0.1 U	NT	NT	NT	0.1 U	NT	NT	NT
Perchlorate					6	6	111 / 149	53700	44600	13200 J	341	21400	72.2 J	1.7 J	1.4 J
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	NT	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.98	NT	0.37 J	0.5 U	0.41 J	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.90	NT	0.5 J	0.5 U	0.42 J	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	1.9	NT	0.75	0.5 U	0.99	0.5 U	0.5	0.42 J
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	1 U	NT	NT	NT	0.9 J	NT	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 UJ	NT	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	6.1	NT	3.4	0.5 U	2.6	0.5 U	0.5 U	0.5 U
Toluene	150	1,000			150		21 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.45 J	NT	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	1700	NT	540 J	27	770	36 J	14	13
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	NT	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	NT	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	NT	10 U	NT	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	NT	1.0 U	NT	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.002 U	NT	NT	NT	0.002 U	NT	NT	NT
n-Nitrosodiphenylamine							42 / 48	0.00438 J	NT	NT	NT	0.00704	NT	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
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QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
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U = Analyte not detected above quantitation limit.
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels						Parameter Detection Frequency	Analytical Results							
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL		MP-2_04 01/28/2003 Primary Sample	MP-2_04 07/10/2003 Primary Sample	MP-2_04 07/10/2003 Field Duplicate	MP-2_04 01/13/2004 Primary Sample	MP-2_05 01/27/2003 Primary Sample	MP-2_05 07/10/2003 Primary Sample	MP-2_05 01/13/2004 Primary Sample	MP-2_06 01/27/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	0.1 U	NT	NT	NT	0.1 U	NT	NT	0.1 U
Perchlorate					6	6	111 / 149	99.6	3 U	1.06 J	2.3 J	3 U	4.5 J	2.3 J	267
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	14
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	1	0.5 U	0.5 U	0.28 J	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.49 J
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.84
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	1.4	0.5 U	0.5 U	0.5 U	4.8
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.39 J
1,4-Dioxane						3	4 / 48	1 UJ	NT	NT	NT	1 U	NT	NT	1.2
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1900
Styrene	0.1	0.1					2 / 140	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.4
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.59	0.5 U	0.5 U	0.5 U	4.5
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 UJ
Trichloroethene (TCE)	5	5			0.8		47 / 140	37	2.7 U	1.9 U	33	5.2	2.5 U	1.3	770
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.56	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	NT	10 U	NT	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	NT	1.0 U	NT	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.00205 U	NT	NT	NT	0.002 U	NT	NT	0.0032 U
n-Nitrosodiphenylamine							42 / 48	0.0211	NT	NT	NT	0.0295	NT	NT	0.407

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

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(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-2_06 07/10/2003 Primary Sample	MP-2_06 07/10/2003 USACE QA Sample	MP-2_06 01/13/2004 Primary Sample	MP-3_01 02/06/2003 Primary Sample	MP-3_01 07/10/2003 Primary Sample	MP-3_01 01/14/2004 Primary Sample	MP-3_01 04/21/2004 Primary Sample	MP-3_02 02/06/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	NT	NT	NT	0.1 U	NT	NT	NT	0.1 U
Perchlorate					6	6	111 / 149	33400 J	23800	17300 J	3 U	3 U	7.7	3 U	7.8
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	NT	1 U	1 U	1 U	1 U	0.5 U	0.75 J
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.29 J	0.26 J	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.57	NT	0.43 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.97	NT	0.61	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	2.1	NT	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	NT	NT	NT	1 U	NT	NT	NT	1 U
Ethylbenzene	300	700			300		4 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.73 U	NT	0.5 U	400	0.5 U	1.7 U	0.5 U	2200
Styrene	0.1	0.1					2 / 140	0.5 UJ	NT	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	4.2	NT	2.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	150	1,000			150		21 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	NT	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ
Trichloroethene (TCE)	5	5			0.8		47 / 140	1100	NT	760	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	NT	0.5 U	0.02 U	0.5 U	0.5 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	NT	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	NT	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	NT	NT	10 U	NT	NT	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	NT	NT	1.0 UJ	NT	NT	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	NT	NT	0.002 U	NT	NT	NT	0.002 U
n-Nitrosodiphenylamine							42 / 48	NT	NT	NT	0.0553	NT	NT	NT	0.0493

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-3_02 07/10/2003 Primary Sample	MP-3_02 01/14/2004 Primary Sample	MP-3_02 04/21/2004 Primary Sample	MP-3_03 02/06/2003 Primary Sample	MP-3_03 02/06/2003 Field Duplicate	MP-3_03 07/09/2003 Primary Sample	MP-3_03 01/14/2004 Primary Sample	MP-3_03 04/21/2004 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	NT	NT	NT	0.1 U	0.1 U	NT	NT	NT
Perchlorate					6	6	111 / 149	3 U	18.5	3 U	18.7	23.6	3 U	31.3	3 U
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Bromochloromethane							5 / 140	1 U	1 U	0.5 U	4.9	1 U	1 U	1 U	1 UJ
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Carbon disulfide						160	16 / 140	0.39 J	0.39 J	0.42 J	0.5 U	0.5 U	0.33 J	0.3 J	0.26 J
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,4-Dioxane						3	4 / 48	NT	NT	NT	1 U	1 U	NT	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Methylene Chloride	5	5			4		14 / 140	0.5 U	3.7 U	0.5 U	19000	35	0.5 U	0.88 U	0.5 UJ
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 UJ
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.27 J	0.5 U	0.28 J
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 UJ
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.5 U	0.5 U	0.02 U	0.02 J	0.5 U	0.5 U	0.5 UJ
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	NT	NT	10 U	10 U	NT	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	NT	NT	1.0 U	1.0 U	NT	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	NT	NT	0.002 U	0.002 U	NT	NT	NT
n-Nitrosodiphenylamine							42 / 48	NT	NT	NT	0.0465	0.0504	NT	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.

Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:

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U = Analyte not detected above quantitation limit.
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-3_04 02/06/2003 Primary Sample	MP-3_04 07/09/2003 Primary Sample	MP-3_04 07/09/2003 USACE QA Sample	MP-3_04 01/14/2004 Primary Sample	MP-3_04 04/20/2004 Primary Sample	MP-4_01 02/05/2003 Primary Sample	MP-4_01 02/05/2003 USACE QA Sample	MP-4_01 07/09/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	0.1 U	NT	NT	NT	NT	0.1 U	NT	NT
Perchlorate					6	6	111 / 149	18.5	3 U	4 U	29	3 U	3.5	2 U	3 U
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Bromochloromethane							5 / 140	26.7	1 U	NT	1 U	1 U	1 U	NT	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.71	NT	0.44 J	0.43 J	0.5 U	NT	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.39 J	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
1,4-Dioxane						3	4 / 48	1 U	NT	NT	NT	NT	1 U	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.27 J	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Methylene Chloride	5	5			4		14 / 140	30000	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 UJ	0.5 U	NT	0.5 U	0.33 J	0.5 UJ	NT	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Toluene	150	1,000			150		21 / 140	0.27 J	0.5 U	NT	0.5 U	0.5 U	0.80	NT	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 UJ	0.5 U	NT	0.5 U	0.5 U	0.5 UJ	NT	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	NT	0.34 J	0.5 U	0.5 U	NT	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	NT	0.5 U	0.5 U	0.02 U	NT	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	NT	0.5 U	0.5 U	0.5 U	NT	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	NT	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	NT	NT	10 U	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	NT	NT	1.0 U	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.002 U	NT	NT	NT	NT	0.002 U	NT	NT
n-Nitrosodiphenylamine							42 / 48	0.0576	NT	NT	NT	NT	1.05	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
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OEHHA = Office of Environmental Health Hazard Assessment
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-4_01 07/09/2003 Field Duplicate	MP-4_01 01/15/2004 Primary Sample	MP-4_02 02/03/2003 Primary Sample	MP-4_02 07/09/2003 Primary Sample	MP-4_02 01/15/2004 Primary Sample	MP-4_03 02/03/2003 Primary Sample	MP-4_03 07/09/2003 Primary Sample	MP-4_04 02/03/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	NT	NT	0.1 U	NT	NT	0.1 U	NT	0.1 U
Perchlorate					6	6	111 / 149	3 U	3 U	3 U	3 U	0.78 UJ	3 U	3 U	3 U
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.6	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	NT	NT	1 U	NT	NT	1 U	NT	1 U
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.5 U	0.02 U	0.5 U	0.5 U	0.02 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	NT	10 U	NT	NT	10 U	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	NT	1.0 U	NT	NT	1.0 U	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	NT	0.002 U	NT	NT	0.002 U	NT	0.002 U
n-Nitrosodiphenylamine							42 / 48	NT	NT	0.00366 J	NT	NT	0.0496	NT	0.00369 J

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

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TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-4_04 07/09/2003 Primary Sample	MP-4_05 02/03/2003 Primary Sample	MP-4_05 07/09/2003 Primary Sample	MP-5_01 10/02/2003 Primary Sample	MP-5_01 01/16/2004 Primary Sample	MP-5_01 04/22/2004 Primary Sample	MP-5_01 04/22/2004 Field Duplicate	MP-5_02 10/02/2003 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	NT	0.1 U	NT	0.079 J	NT	NT	NT	0.1 U
Perchlorate					6	6	111 / 149	3 U	3 U	3 U	4.7	4.9	4.2	4.2	2.6 J
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.27 J	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Chloroform	100 (1)	80 (2)					20 / 140	0.5 U	0.5 U	0.5 U	0.49 UJ	0.52	0.44 UJ	0.44 UJ	1.3 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,4-Dioxane						3	4 / 48	NT	1 U	NT	1 U	NT	NT	NT	1 U
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	4.6 U	2.5	0.31 UJ	0.5 U	0.39 UJ
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.32 J	0.38 J	0.37 J	0.5 U
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	0.5 U	0.5 U	0.5 U	1.2	1.6	1.6 J	1.6	2.2
1,2,3-Trichloropropane						0.005	2 / 140	0.5 U	0.02 U	0.5 U	0.02 U	0.5 U	0.5 UJ	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	NT	10 U	NT	10 U	NT	NT	NT	10 U
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	NT	1.0 U	NT	1.0 U	NT	NT	NT	1.0 U
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	NT	0.002 U	NT	0.002 U	NT	NT	NT	0.000629 J
n-Nitrosodiphenylamine							42 / 48	NT	0.0058	NT	0.00142 J	NT	NT	NT	0.00264 J

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-5_02 10/02/2003 Field Duplicate	MP-5_02 01/16/2004 Primary Sample	MP-5_02 04/22/2004 Primary Sample	MP-5_03 10/01/2003 Primary Sample	MP-5_03 10/02/2003 USACE QA Sample	MP-5_03 01/16/2004 Primary Sample	MP-5_03 01/16/2004 USACE QA Sample	MP-5_03 04/22/2004 Primary Sample
Oxidizers															
Chlorate						800	7 / 48	0.1 U	NT	NT	0.1 U	NT	NT	NT	NT
Perchlorate					6	6	111 / 149	2.9 J	2.7 J	2.4 J	7.6	6.2	9.1	8.7	8.9
Volatile Organic Compounds															
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	NT	1 U	NT	1 U
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.31 J	0.5 U	NT	0.5 U	NT	0.5 U
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.33 J
Chloroform	100 (1)	80 (2)					20 / 140	1.2 U	1.5	1.4 U	1	NT	1.1	NT	1.1 U
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
1,4-Dioxane						3	4 / 48	1 U	NT	NT	1 U	NT	NT	NT	NT
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Methylene Chloride	5	5			4		14 / 140	0.5 U	0.5 U	0.5 U	19 U	NT	2.2	NT	0.5 U
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.27 J	NT	0.5 U	NT	0.5 U
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Trichloroethene (TCE)	5	5			0.8		47 / 140	2.1	2.4	2.5	5.2	NT	13	NT	14
1,2,3-Trichloropropane						0.005	2 / 140	0.02 U	0.5 U	0.5 U	0.02 U	NT	0.5 U	NT	0.5 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	NT	0.5 U	NT	0.5 U
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	NT	1 U	NT	1 U
Semivolatile Organic Compounds															
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	10 U	NT	NT	NT	NT
Nitroaromatics and Nitroamines															
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	1.0 U	NT	NT	NT	NT
Nitrosamines															
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.000431 J	NT	NT	0.000553 J	NT	NT	NT	NT
n-Nitrosodiphenylamine							42 / 48	0.00783	NT	NT	0.11	NT	NT	NT	NT

NOTES:

Units in **micrograms per liter (µg/L)**, unless otherwise noted.
Analytes listed in this table have one or more samples with concentrations reported above their quantitation limits.

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CA = California
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MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-8

Analytical Results for Oxidizers (including Perchlorate), Organics, Nitroaromatics and Nitroamines, and Nitrosamines

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Parameter Detection Frequency	Analytical Results: MP-5_04 10/01/2003 Primary Sample	MP-5_04 01/16/2004 Primary Sample	MP-5_04 01/16/2004 Field Duplicate	MP-5_04 04/22/2004 Primary Sample	SS-1 02/11/2003 Primary Sample
Oxidizers												
Chlorate						800	7 / 48	0.1 U	NT	NT	NT	0.1 U
Perchlorate					6	6	111 / 149	11.8	11.9	11.8	11.7	42.3
Volatile Organic Compounds												
Benzene	1	5			0.15		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Bromochloromethane							5 / 140	1 U	1 U	1 U	1 U	1 R
Bromodichloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Carbon disulfide						160	16 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Carbon Tetrachloride	0.5	5			0.1		8 / 140	0.26 J	0.28 J	0.28 J	0.73	0.5 R
Chloroform	100 (1)	80 (2)					20 / 140	0.7	0.79	0.8	0.9 U	0.32 J
Dibromochloromethane	100 (1)	80 (2)					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
1,1-Dichloroethene	6	7			10		20 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
1,2-Dichloroethene, cis-	6	70					14 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.82 J
1,2-Dichloroethene, trans-	10	100					3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
1,4-Dioxane						3	4 / 48	1 U	NT	NT	NT	0.54 J
Ethylbenzene	300	700			300		4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Methyl Tert-Butyl Ether (MTBE)	13		5		13		3 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.93 J
Methylene Chloride	5	5			4		14 / 140	4.7 U	0.5 U	0.5 U	0.5 U	0.5 R
Styrene	0.1	0.1					2 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Tetrachloroethene (PCE)	5	5			0.06		37 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Toluene	150	1,000			150		21 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
1,1,1-Trichloroethane	200	200					7 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
1,1,2-Trichloroethane	5	5					4 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Trichloroethene (TCE)	5	5			0.8		47 / 140	8.5	12	12	15	0.68 J
1,2,3-Trichloropropane						0.005	2 / 140	0.02 J	0.5 U	0.02 U	0.5 U	0.02 U
1,2,4-Trimethylbenzene						330	5 / 140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Xylenes, Total	1,750	10,000			1,800		3 / 140	1 U	1 U	1 U	1 U	1 R
Semivolatile Organic Compounds												
Bis(2-ethylhexyl)phthalate	4	6			12		1 / 48	10 U	NT	NT	NT	17
Nitroaromatics and Nitroamines												
1,3-Dinitrobenzene							1 / 48	1.0 U	NT	NT	NT	1.0 U
Nitrosamines												
n-Nitrosodimethylamine (NDMA)						0.01	9 / 48	0.00107 J	NT	NT	NT	0.00386
n-Nitrosodiphenylamine							42 / 48	0.00892	NT	NT	NT	0.119

NOTES:

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(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
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U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-9

Alluvium Reconnaissance Sampling Analytical Results for Perchlorate and Volatile Organic Compounds

Parameter	Regulatory Action Levels						Analytical Results							
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	AL-4R1 56 ft bgs Primary Sample		AL-4R1 66 ft bgs Primary Sample		AL-4R2 56 ft bgs Primary Sample		AL-4R2 81 ft bgs Primary Sample	
Oxidizers														
Perchlorate					6	6	3.6		2.7	J	6.9		2.0	J
Volatile Organic Compounds														
Acetone							10	U	10	U	10	U	9.9	J
Benzene	1	5			0.15		0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide						160	0.5	U	0.5	U	0.5	U	0.46	J
Chloroform	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	6	7			10		0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	300	700			300		0.36	J	0.5	U	0.29	J	0.5	U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		0.31	J	0.33	J	0.26	J	0.38	J
Methylene Chloride	5	5			4		0.5	U	0.5	U	0.5	U	0.45	BJ
Tetrachloroethene (PCE)	5	5			0.06		0.5	U	0.5	U	0.5	U	0.5	U
Toluene	150	1,000			150		0.33	J	0.5	U	0.29	J	0.5	U
1,1,1-Trichloroethane	200	200					0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	5	5			0.8		0.5	U	0.5	U	0.5	U	0.5	U

NOTES:

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USEPA = U.S. Environmental Protection Agency

(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

(2) USEPA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:

B = Analyte detected in trip blank sample.

BJ = Estimated value; compound is found in the associated blank as well as in the sample.

J = Analyte positively identified; the reported concentration is approximate.

U = Analyte not detected above quantitation limit.

TABLE 3-9

Alluvium Reconnaissance Sampling Analytical Results for Perchlorate and Volatile Organic Compounds

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: AL-4R3 56 ft bgs Primary Sample		AL-4R3 66 ft bgs Primary Sample		AL-4R3 66 ft bgs Duplicate Sample		AL-4R4 56 ft bgs Primary Sample		AL-4R4 77 ft bgs Primary Sample	
Oxidizers																
Perchlorate					6	6	8.8		4.9		4.6		12.9		2.6	J
Volatile Organic Compounds																
Acetone							10	U	6.0	J	5.5	J	23		28	
Benzene	1	5			0.15		0.5	U	0.5	U	0.5	U	0.31	J	0.5	U
Carbon Disulfide						160	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	100 (1)	80 (2)					1.4		1.7		1.7		0.5	U	0.5	U
Dibromochloromethane	100 (1)	80 (2)					0.5	U	0.31	J	0.5	U	0.36	J	0.5	U
1,1-Dichloroethene	6	7			10		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	300	700			300		0.25	J	0.5	U	0.5	U	0.35	J	0.5	U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methylene Chloride	5	5			4		0.35	J	0.38	J	0.35	J	0.81		0.27	J
Tetrachloroethene (PCE)	5	5			0.06		0.30	J	0.28	J	0.26	J	0.31	J	0.5	U
Toluene	150	1,000			150		0.31	J	0.5	U	0.5	U	0.74		0.5	U
1,1,1-Trichloroethane	200	200					0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	5	5			0.8		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

NOTES:

Units in **micrograms per liter (µg/L)**.

Analytes listed on this table have 1 or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
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DHS = Department of Health Services
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(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

(2) USEPA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
B = Analyte detected in trip blank sample.
BJ = Estimated value; compound is found in the associated blank as well as in the sample.
J = Analyte positively identified; the reported concentration is approximate.
U = Analyte not detected above quantitation limit.

TABLE 3-9
Alluvium Reconnaissance Sampling Analytical Results for Perchlorate and Volatile Organic Compounds

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: AL-5R1 46 ft bgs Primary Sample		AL-5R1 56 ft bgs Primary Sample		AL-5R2 46 ft bgs Primary Sample		AL-5R2 46 ft bgs Duplicate Sample		AL-5R2 56 ft bgs Primary Sample		AL-5R2 76 ft bgs Primary Sample	
Oxidizers																		
Perchlorate					6	6	2.9	J	2.0	J	3.0	U	3.0	U	3.0	U	3.0	U
Volatile Organic Compounds																		
Acetone							10	U	10	U	10	U	10	U	10	U	10	U
Benzene	1	5			0.15		0.5	U	0.5	U	0.25	J	0.26	J	0.5	U	0.5	U
Carbon Disulfide						160	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	6	7			10		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	300	700			300		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		0.5	U	0.45	J	0.42	J	0.40	J	0.38	J	0.54	
Methylene Chloride	5	5			4		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene (PCE)	5	5			0.06		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	150	1,000			150		0.29	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	200	200					0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	5	5			0.8		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

NOTES:

Units in **micrograms per liter (µg/L)**.
Analytes listed on this table have 1 or more samples with concentrations reported above their quantitation limits.

AL = Action Level (for toxicity)
CA = California
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MCL = Maximum Contaminant Level
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(1) CA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).
(2) USEPA Primary MCL for total trihalomethanes
(bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

Data Qualifiers:
B = Analyte detected in trip blank sample.
BJ = Estimated value; compound is found in the associated blank as well as in the sample.
J = Analyte positively identified; the reported concentration is approximate.
U = Analyte not detected above quantitation limit.

TABLE 3-9

Alluvium Reconnaissance Sampling Analytical Results for Perchlorate and Volatile Organic Compounds

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	AL-5R3 46 ft bgs Primary Sample		AL-5R3 56 ft bgs Primary Sample		AL-5R4 46 ft bgs Primary Sample		AL-5R4 56 ft bgs Primary Sample	
	Regulatory Action Levels						Analytical Results							
Oxidizers														
Perchlorate					6	6	3.0	U	3.0	U	3.0	U	3.0	U
Volatile Organic Compounds														
Acetone							10	U	10	U	10	U	10	U
Benzene	1	5			0.15		0.5	U	0.5	U	0.5	U	0.5	U
Carbon Disulfide						160	1.9		0.5	U	0.5	U	0.5	U
Chloroform	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	6	7			10		0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	300	700			300		0.5	U	0.5	U	0.5	U	0.5	U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		0.40	J	0.37	J	0.5	U	0.36	J
Methylene Chloride	5	5			4		4.4		0.5	U	0.68	B	0.66	
Tetrachloroethene (PCE)	5	5			0.06		0.5	U	0.5	U	0.5	U	0.5	U
Toluene	150	1,000			150		0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	200	200					0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene (TCE)	5	5			0.8		0.5	U	0.5	U	0.5	U	0.5	U

NOTES:

Units in **micrograms per liter (µg/L)**.

Analytes listed on this table have 1 or more samples with concentrations reported above their quantitation limits.

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(1) CA Primary MCL for total trihalomethanes (bromodichloromethane, bromoform, dibromochloromethane, and chloroform).

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Data Qualifiers:

B = Analyte detected in trip blank sample.

BJ = Estimated value; compound is found in the associated blank as well as in the sample.

J = Analyte positively identified; the reported concentration is approximate.

U = Analyte not detected above quantitation limit.

TABLE 3-9
Alluvium Reconnaissance Sampling Analytical Results for Perchlorate and Volatile Organic Compounds

Parameter	Regulatory Action Levels						Analytical Results									
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	AL-9R1 40 ft bgs Primary Sample		AL-9R1 47 ft bgs Primary Sample		AL-9R2 41 ft bgs Primary Sample		AL-9R2 41 ft bgs Duplicate Sample		AL-9R2 51 ft bgs Primary Sample	
Oxidizers																
Perchlorate					6	6	30.3		38.9		17.6		18.0		31.2	
Volatile Organic Compounds																
Acetone							10	U	10	U	10	U	10	U	10	U
Benzene	1	5			0.15		0.30	J	0.5	U	0.26	J	0.29	J	0.5	U
Carbon Disulfide						160	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	100 (1)	80 (2)					0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	6	7			10		0.90		1.2		0.5	U	0.5	U	0.79	
Ethylbenzene	300	700			300		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl Tert-Butyl Ether (MTBE)	13		5		13		0.26	J	0.28	J	0.5	U	0.5	U	0.33	J
Methylene Chloride	5	5			4		0.5	U	0.5	U	0.29	J	0.42	J	0.31	J
Tetrachloroethene (PCE)	5	5			0.06		3.4		4.6		1.1		1.1		2.9	
Toluene	150	1,000			150		0.5	U	0.5	U	0.5	U	0.27	J	0.5	U
1,1,1-Trichloroethane	200	200					0.55		0.67		0.5	U	0.5	U	0.40	J
Trichloroethene (TCE)	5	5			0.8		1.8		2.5		0.52		0.6		1.9	

NOTES:

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Analytes listed on this table have 1 or more samples with concentrations reported above their quantitation limits.

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Data Qualifiers:
B = Analyte detected in trip blank sample.
BJ = Estimated value; compound is found in the associated blank as well as in the sample.
J = Analyte positively identified; the reported concentration is approximate.
U = Analyte not detected above quantitation limit.

TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels						Analytical Results						
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	AL-1 10/09/2003 Primary Sample	AL-1 04/20/2004 Primary Sample	AL-3 10/08/2003 Primary Sample	AL-3 10/08/2003 USACE QA Sample	AL-3 04/20/2004 Primary Sample	AL-4A 10/08/2003 Primary Sample	AL-4A 10/08/2003 Field Duplicate
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		200 U	NT	200 U	50 U	NT	200 U	200 U
Antimony	6	6			20		60 U	NT	60 U	0.5 U	NT	60 U	60 U
Arsenic	50	10 (2)			0.004		10 U	NT	10 U	NT	NT	7.2 J	10 U
Barium	1,000	2,000			2,000		47.2 J	NT	32.3 J	34.8	NT	46.5 J	47.2 J
Beryllium	4	4			1		5 U	NT	5 U	0.2 U	NT	5 U	5 U
Boron						1,000	1140	NT	398	NT	NT	989	991
Cadmium	5	5			0.07		5 U	NT	5 U	0.2 U	NT	5 U	5 U
Calcium							236000	186000	147000	153000	130000	155000	153000
Chromium (total)	50	100					10 U	NT	10 U	2.1	NT	10 U	10 U
Chromium (VI)	(1)						0.824 U	NT	1.05 U	NT	NT	0.912 U	0.889 U
Cobalt							50 U	NT	50 U	0.4	NT	50 U	50 U
Copper			1,000	1,000	170	1,300	25 U	NT	11 J	3.5	NT	25 U	23.4 J
Iron			300	300			100 U	NT	100 U	25 U	NT	100 U	100 U
Lead					2	15	3 U	NT	3 U	0.2 U	NT	3 U	3 U
Magnesium							59500	46400	48100	43100	40800	40700	40400
Manganese			50	50		500	23	NT	54.3	57.3	NT	4.3 J	4.5 J
Mercury	2	2			1.2		0.2 U	NT	0.2 U	0.2 U	NT	0.2 U	0.2 U
Molybdenum							50 U	NT	15.7 J	17.1	NT	50 U	50 U
Nickel	100				12		40 U	NT	40 U	12.8	NT	40 U	40 U
Potassium							7560 J	4470 J	3220 J	2680	2390 J	5020 J	5100 J
Selenium	50	50					6.8	NT	5 U	4.3	NT	5 U	5 U
Silica							19.6	NT	21.4	NT	NT	20.9	23.7
Silicon							NT	NT	NT	11600	NT	NT	NT
Silver			100	100			10 U	NT	10 U	0.2 U	NT	10 U	10 U
Sodium							154000	154000	74500	84600	74000	85900	87000
Thallium	2	2			0.1		6.5 U	NT	10 U	0.2 U	NT	5.5 U	5 U
Uranium	20 pCi/L	30			0.5		200 U	NT	200 U	22.3	NT	200 U	200 U
Vanadium						50	50 U	NT	50 U	2.8	NT	50 U	50 U
Zinc			5,000	5,000			18.7 U	NT	16.8 U	50 U	NT	20 U	23.5 U
Cyanide	150	200			150		10 U	NT	10 U	NT	NT	10 U	10 U

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) Chromium (VI) is currently regulated under the MCL for total chromium.
(2) The USEPA Primary MCL of 10 µg/L is effective on January 23, 2006.

Data Qualifiers:
B = Analyte was found in associated method blank as well as in sample above QC level.
E = Result is above the maximum calibration range.
J = Analyte positively identified; the reported concentration is approximate.
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U = Analyte not detected above quantitation limit.
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TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: AL-4A 04/20/2004 Primary Sample	AL-4A 04/20/2004 USACE QA Sample	AL-4B 10/08/2003 Primary Sample	AL-4B 04/20/2004 Primary Sample	AL-6 10/08/2003 Primary Sample	AL-6 04/20/2004 Primary Sample	AL-9A 10/09/2003 Primary Sample
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		NT	NT	200 U	NT	57 J	NT	200 U
Antimony	6	6			20		NT	NT	60 U	NT	60 U	NT	60 U
Arsenic	50	10 (2)			0.004		NT	NT	5.8 J	NT	10 U	NT	10 U
Barium	1,000	2,000			2,000		NT	NT	28.2 J	NT	29.1 J	NT	76.9 J
Beryllium	4	4			1		NT	NT	5 U	NT	5 U	NT	5 U
Boron						1,000	NT	NT	706	NT	639	NT	1080
Cadmium	5	5			0.07		NT	NT	5 U	NT	5 U	NT	5 U
Calcium							173000	145000	214000	136000	187000	209000	170000
Chromium (total)	50	100					NT	NT	10 U	NT	10 U	NT	10 U
Chromium (VI)	(1)						NT	NT	0.787 U	NT	0.172 UJ	NT	2.06
Cobalt							NT	NT	50 U	NT	50 U	NT	50 U
Copper			1,000	1,000	170	1,300	NT	NT	25 U	NT	25 U	NT	25 U
Iron			300	300			NT	NT	100 U	NT	99.3 J	NT	100 U
Lead					2	15	NT	NT	3 U	NT	3 U	NT	3 U
Magnesium							44400	35200	52900	33900	71600	77300	44200
Manganese			50	50		500	NT	NT	96	NT	89.4	NT	15 U
Mercury	2	2			1.2		NT	NT	0.2 U	NT	0.2 U	NT	0.2 U
Molybdenum							NT	NT	50 U	NT	17.6 J	NT	50 U
Nickel	100				12		NT	NT	40 U	NT	40 U	NT	40 U
Potassium							5410	3650	5020 J	4090 J	8480 J	6250	5980 J
Selenium	50	50					NT	NT	5 U	NT	6.5	NT	5 U
Silica							NT	NT	22.3	NT	27.8	NT	20.2
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			NT	NT	10 U	NT	10 UJ	NT	10 UJ
Sodium							93000	77400	105000	83200	101000	113000	102000
Thallium	2	2			0.1		NT	NT	10 U	NT	8 UJ	NT	6.6 UJ
Uranium	20 pCi/L	30			0.5		NT	NT	200 U	NT	200 U	NT	200 U
Vanadium						50	NT	NT	50 U	NT	50 U	NT	50 U
Zinc			5,000	5,000			NT	NT	20 U	NT	26.3 U	NT	20 U
Cyanide	150	200			150		NT	NT	10 U	NT	10 U	NT	10 U

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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USACE = U.S. Army Corps of Engineers
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(1) Chromium (VI) is currently regulated under the MCL for total chromium.
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TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels						Analytical Results						
	CA Primary MCL	**USEPA Primary MCL**	**CA Secondary MCL**	**USEPA Secondary MCL**	**CA OEHHA PHG**	**CA DHS AL**	**AL-9A 10/09/2003 Field Duplicate**	**AL-9A 04/20/2004 Primary Sample**	**AL-9A 04/20/2004 Field Duplicate**	**AL-9B 10/09/2003 Primary Sample**	**AL-9B 04/20/2004 Primary Sample**	**CW-1A 09/29/2003 Primary Sample**	**CW-1A 04/20/2004 Primary Sample**
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		200 U	NT	NT	200 U	NT	200 U	NT
Antimony	6	6			20		60 U	NT	NT	60 U	NT	60 U	NT
Arsenic	50	10 (2)			0.004		5.5 J	NT	NT	10 U	NT	8.4 UJ	NT
Barium	1,000	2,000			2,000		73.4 J	NT	NT	62.7 J	NT	10.6 J	NT
Beryllium	4	4			1		5 U	NT	NT	5 U	NT	5 U	NT
Boron						1,000	1030	NT	NT	1020	NT	32.9 J	NT
Cadmium	5	5			0.07		5 U	NT	NT	5 U	NT	5 U	NT
Calcium							164000	170000	171000	171000	168000	27300	15100
Chromium (total)	50	100					10 U	NT	NT	10 U	NT	10 U	NT
Chromium (VI)	(1)						2.07	NT	NT	1.67	NT	1.83	NT
Cobalt							50 U	NT	NT	50 U	NT	50 U	NT
Copper			1,000	1,000	170	1,300	5.6 J	NT	NT	25 U	NT	25 U	NT
Iron			300	300			100 U	NT	NT	100 U	NT	100 U	NT
Lead					2	15	3 U	NT	NT	3 U	NT	3 U	NT
Magnesium							42400	43300		44200	42000	8980	12000
Manganese			50	50		500	15 U	NT	NT	15.4	NT	5.3 J	NT
Mercury	2	2			1.2		0.2 U	NT	NT	0.2 U	NT	0.2 U	NT
Molybdenum							50 U	NT	NT	50 U	NT	39.3 J	NT
Nickel	100				12		40 U	NT	NT	40 U	NT	40 U	NT
Potassium							5670 J	4520 J	4930 J	5780 J	3340 J	1780 J	1380 J
Selenium	50	50					5 U	NT	NT	5 U	NT	5 U	NT
Silica							23.1	NT	NT	21.5	NT	36.7	NT
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			10 UJ	NT	NT	10 UJ	NT	10 UJ	NT
Sodium							97900	101000	100000	99000	98900	28500	32500
Thallium	2	2			0.1		10 U	NT	NT	6 UJ	NT	10 U	NT
Uranium	20 pCi/L	30			0.5		200 U	NT	NT	200 U	NT	200 U	NT
Vanadium						50	50 U	NT	NT	50 U	NT	7.2 J	NT
Zinc			5,000	5,000			20 U	NT	NT	20 U	NT	20 U	NT
Cyanide	150	200			150		10 U	NT	NT	10 U	NT	10 U	NT

NOTES:

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Results for all metals and cyanide are listed in this table.

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Data Qualifiers:
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TABLE 3-10
Analytical Results for Metals and Cyanide

	Regulatory Action Levels						Analytical Results						
Parameter	**CA Primary MCL**	**USEPA Primary MCL**	**CA Secondary MCL**	**USEPA Secondary MCL**	**CA OEHHA PHG**	**CA DHS AL**	**CW-1B 09/30/2003 Primary Sample**	**CW-1B 04/20/2004 Primary Sample**	**CW-1C 09/30/2003 Primary Sample**	**CW-1C 04/20/2004 Primary Sample**	**EM-1 11/18/2002 Primary Sample**	**EM-2 11/18/2002 Primary Sample**	**MP-1A 09/29/2003 Primary Sample**
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		200 U	NT	200 U	NT	50 U	739	200 U
Antimony	6	6			20		60 U	NT	60 U	NT	13 U	13 U	60 U
Arsenic	50	10 (2)			0.004		9.7 UJ	NT	10 U	NT	7.4 B	6.8 B	5.4 UJ
Barium	1,000	2,000			2,000		34.9 J	NT	25.9 J	NT	9.8 B	49.3 B	55 J
Beryllium	4	4			1		5 U	NT	5 U	NT	1 U	1 U	5 U
Boron						1,000	111 E	NT	23.1 J	NT	988	332	71 J
Cadmium	5	5			0.07		5 U	NT	5 U	NT	2 U	2 U	5 U
Calcium							32800	31500	19800	26400	55000	95200	63500
Chromium (total)	50	100					10 U	NT	10 U	NT	6 U	7.5 B	8.6 J
Chromium (VI)	(1)						0.2 U	NT	0.2 U	NT	0.711	6.51	7.75
Cobalt							50 U	NT	50 U	NT	10 U	10 U	50 U
Copper			1,000	1,000	170	1,300	25 U	NT	25 U	NT	5 U	5 U	25 U
Iron			300	300			278	NT	86.4 J	NT	33.3 B	930	56.3 J
Lead					2	15	3 U	NT	3 U	NT	2 U	2 U	3 U
Magnesium							8600	8540	8750	10200	10800	7910	19900
Manganese			50	50		500	37.5	NT	101	NT	2 U	34.2	9.6 J
Mercury	2	2			1.2		0.2 U	NT	0.2 U	NT	0.1 U	0.1 U	0.2 U
Molybdenum							11.7 J	NT	50 U	NT	10 U	10 U	41.4 J
Nickel	100				12		40 U	NT	40 U	NT	10 U	10 U	40 U
Potassium							1870 J	2620 J	1790 J	1800 J	4090 B	7340	1470 J
Selenium	50	50					5 U	NT	5 U	NT	4 U	25.6	38.8
Silica							35.8	NT	2 U	NT	NT	NT	36.3
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			10 UJ	NT	10 UJ	NT	2 U	2 U	10 UJ
Sodium							42700	34800	37800	35000	216000	676000	30200
Thallium	2	2			0.1		10 U	NT	4.9 UJ	NT	4 U	4 U	10 U
Uranium	20 pCi/L	30			0.5		200 U	NT	200 U	NT	NT	NT	200 U
Vanadium						50	11.7 J	NT	50 U	NT	5 U	5 U	6.5 J
Zinc			5,000	5,000			20 U	NT	20 U	NT	15 U	15 U	20 U
Cyanide	150	200			150		10 U	NT	10 U	NT	10 U	10 U	10 U

NOTES:

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B = Analyte was found in associated method blank as well as in sample above QC level.
E = Result is above the maximum calibration range.
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-1A 04/20/2004 Primary Sample	MP-1_01 01/22/2003 Primary Sample	MP-1_01 01/15/2004 Primary Sample	MP-1_01 04/22/2004 Primary Sample	MP-1_02 01/22/2003 Primary Sample	MP-1_02 01/22/2003 Field Duplicate	MP-1_02 01/15/2004 Primary Sample
	Regulatory Action Levels						Analytical Results						
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		NT	50 U	NT	NT	50 U	50 U	NT
Antimony	6	6			20		NT	13.5 U	NT	NT	18.1 U	13 U	NT
Arsenic	50	10 (2)			0.004		NT	10.3	NT	NT	19.8	8.7 B	NT
Barium	1,000	2,000			2,000		NT	45.5 B	NT	NT	29.7 B	33.1 B	NT
Beryllium	4	4			1		NT	1 U	NT	NT	1 U	1 U	NT
Boron						1,000	NT	57.8 B	NT	NT	104	115	NT
Cadmium	5	5			0.07		NT	2 U	NT	NT	2 U	2 U	NT
Calcium							59200	42500	47800	48900	19300	21400	168000
Chromium (total)	50	100					NT	6 U	NT	NT	6 U	6 U	NT
Chromium (VI)	(1)						NT	2.27	NT	NT	0.2 U	0.2 U	NT
Cobalt							NT	10 U	NT	NT	10 U	10 U	NT
Copper			1,000	1,000	170	1,300	NT	5 U	NT	NT	5 U	5 U	NT
Iron			300	300			NT	25 U	NT	NT	25 U	32.5 B	NT
Lead					2	15	NT	2 U	NT	NT	2 U	2 U	NT
Magnesium							18700	10500	10900	10300	7470	7950	38900
Manganese			50	50		500	NT	6.3 B	NT	NT	2 U	2 U	NT
Mercury	2	2			1.2		NT	0.1 U	NT	NT	0.1 U	0.1 U	NT
Molybdenum							NT	10 U	NT	NT	16.8 B	19.3 B	NT
Nickel	100				12		NT	10 U	NT	NT	10 U	10 U	NT
Potassium							5000 U	1670 B	5000 U	1250 J	3000 B	2870 B	3050 J
Selenium	50	50					NT	4 U	NT	NT	4 U	4 U	NT
Silica							NT	23.8 J	NT	NT	23.1 J	21 J	NT
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			NT	2.1 B	NT	NT	3.7 B	2 U	NT
Sodium							27600	26500	23800	20400	67900	70400	74700
Thallium	2	2			0.1		NT	6.9 U	NT	NT	10.1 U	10.9 U	NT
Uranium	20 pCi/L	30			0.5		NT	50 U	NT	NT	50 U	50 U	NT
Vanadium						50	NT	6.5 B	NT	NT	6.8 B	7.9 B	NT
Zinc			5,000	5,000			NT	19.3 B	NT	NT	15 U	15 U	NT
Cyanide	150	200			150		NT	10 U	NT	NT	10 U	10 U	NT

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
PHG = Public Health Goal (for Drinking Water)
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) Chromium (VI) is currently regulated under the MCL for total chromium.
(2) The USEPA Primary MCL of 10 µg/L is effective on January 23, 2006.

Data Qualifiers:
B = Analyte was found in associated method blank as well as in sample above QC level.
E = Result is above the maximum calibration range.
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: MP-1_02 04/22/2004 Primary Sample	MP-1_02 04/22/2004 Field Duplicate	MP-1_03 01/22/2003 Primary Sample	MP-1_03 01/15/2004 Primary Sample	MP-1_03 01/15/2004 Field Duplicate	MP-1_03 04/21/2004 Primary Sample	MP-1_04 01/22/2003 Primary Sample
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		NT	NT	50 U	NT	NT	NT	50 U
Antimony	6	6			20		NT	NT	13 U	NT	NT	NT	13 U
Arsenic	50	10 (2)			0.004		NT	NT	5 U	NT	NT	NT	5 U
Barium	1,000	2,000			2,000		NT	NT	50.4 B	NT	NT	NT	26.8 B
Beryllium	4	4			1		NT	NT	1 U	NT	NT	NT	1 U
Boron						1,000	NT	NT	139	NT	NT	NT	180
Cadmium	5	5			0.07		NT	NT	2 U	NT	NT	NT	2 U
Calcium							176000	183000	46100	74700	70000	71900	37700
Chromium (total)	50	100					NT	NT	6 U	NT	NT	NT	6 U
Chromium (VI)	(1)						NT	NT	0.896	NT	NT	NT	0.2 U
Cobalt							NT	NT	10 U	NT	NT	NT	10 U
Copper			1,000	1,000	170	1,300	NT	NT	5 U	NT	NT	NT	5 U
Iron			300	300			NT	NT	25 U	NT	NT	NT	25 U
Lead					2	15	NT	NT	2 U	NT	NT	NT	2 U
Magnesium							39400	40100	13200	16500	15900	15600	15800
Manganese			50	50		500	NT	NT	6.3 B	NT	NT	NT	2.3 B
Mercury	2	2			1.2		NT	NT	0.1 U	NT	NT	NT	0.1 U
Molybdenum							NT	NT	10 U	NT	NT	NT	10 U
Nickel	100				12		NT	NT	10 U	NT	NT	NT	10 U
Potassium							2900 J	4000 J	2030 B	2550 J	2250 J	2760 J	3290 B
Selenium	50	50					NT	NT	4 U	NT	NT	NT	4 U
Silica							NT	NT	24.4 J	NT	NT	NT	22.6 J
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			NT	NT	2 U	NT	NT	NT	2 U
Sodium							64400	65000	41300	47700	45400	38300	55500
Thallium	2	2			0.1		NT	NT	5.3 U	NT	NT	NT	9.5 U
Uranium	20 pCi/L	30			0.5		NT	NT	50 U	NT	NT	NT	50 U
Vanadium						50	NT	NT	7.3 B	NT	NT	NT	5 U
Zinc			5,000	5,000			NT	NT	15 U	NT	NT	NT	15 U
Cyanide	150	200			150		NT	NT	10 U	NT	NT	NT	10 U

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) Chromium (VI) is currently regulated under the MCL for total chromium.
(2) The USEPA Primary MCL of 10 µg/L is effective on January 23, 2006.

Data Qualifiers:
B = Analyte was found in associated method blank as well as in sample above QC level.
E = Result is above the maximum calibration range.
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-1_04 01/15/2004 Primary Sample	MP-1_04 04/21/2004 Primary Sample	MP-1_05 01/22/2003 Primary Sample	MP-1_06 01/21/2003 Primary Sample	MP-1_07 01/21/2003 Primary Sample	MP-1_08 01/20/2003 Primary Sample	MP-1_09 01/20/2003 Primary Sample
	Regulatory Action Levels						Analytical Results						
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		NT	NT	50 U	50 U	50 U	50 U	50 U
Antimony	6	6			20		NT	NT	19.3 U	13 U	13 U	13 U	13 U
Arsenic	50	10 (2)			0.004		NT	NT	10.1	5.4 B	5.9 B	5 U	5 U
Barium	1,000	2,000			2,000		NT	NT	32.1 B	43.4 B	33.8 B	43.6 B	37.6 B
Beryllium	4	4			1		NT	NT	1 U	1 U	1 U	1 U	1 U
Boron						1,000	NT	NT	156	334	300	215	165
Cadmium	5	5			0.07		NT	NT	2 U	2 U	2 U	2 U	2 U
Calcium							59900	66800	35200	62900	60900	50800	47200
Chromium (total)	50	100					NT	NT	6 U	6 U	6 U	6 U	6 U
Chromium (VI)	(1)						NT	NT	0.2 U	0.195 J	0.227	0.2 U	0.12 J
Cobalt							NT	NT	10 U	10 U	10 U	10 U	10 U
Copper			1,000	1,000	170	1,300	NT	NT	5 U	5 U	5 U	5 U	5 U
Iron			300	300			NT	NT	25 U	25 U	25 U	42.3 U	25 U
Lead					2	15	NT	NT	2 U	2 U	2 U	2 U	2 U
Magnesium							17500	17600	11700	18800	11700	13500	11900
Manganese			50	50		500	NT	NT	2.9 B	2 U	4.5 B	34.6	3.6 B
Mercury	2	2			1.2		NT	NT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Molybdenum							NT	NT	16.2 B	10 U	10 U	10 U	10 U
Nickel	100				12		NT	NT	10 U	10 U	10 U	10 U	10 U
Potassium							2760 J	2650 J	2990 B	3190 B	2380 B	2030 B	2090 B
Selenium	50	50					NT	NT	4 U	4 U	4 U	4 U	4 U
Silica							NT	NT	19.4 J	16.7 J	17.1 J	22.3 J	23.5 J
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			NT	NT	2.5 B	2 U	2 U	2 U	2 U
Sodium							44100	40400	57800	51200	61400	37000	38900
Thallium	2	2			0.1		NT	NT	9.9 U	5.8 B	4 U	4 U	6.5 B
Uranium	20 pCi/L	30			0.5		NT	NT	50 U	50 U	50 U	50 U	50 U
Vanadium						50	NT	NT	5 U	5 U	5 U	5 U	6.9 B
Zinc			5,000	5,000			NT	NT	15 U	15 U	15 U	15 U	15 U
Cyanide	150	200			150		NT	NT	10 U	10 U	10 U	10 U	10 U

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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USACE = U.S. Army Corps of Engineers
USEPA = U.S. Environmental Protection Agency

(1) Chromium (VI) is currently regulated under the MCL for total chromium.
(2) The USEPA Primary MCL of 10 µg/L is effective on January 23, 2006.

Data Qualifiers:
B = Analyte was found in associated method blank as well as in sample above QC level.
E = Result is above the maximum calibration range.
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-10

Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels						Analytical Results						
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-1_10 01/20/2003 Primary Sample	MP-2_01 01/29/2003 Primary Sample	MP-2_01 01/14/2004 Primary Sample	MP-2_02 01/29/2003 Primary Sample	MP-2_02 01/29/2003 USACE QA Sample	MP-2_02 01/13/2004 Primary Sample	MP-2_03 01/29/2003 Primary Sample
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		50 U	50 U	NT	50 U	50 U	NT	50 U
Antimony	6	6			20		13 U	13 U	NT	13 U	1.1	NT	13 U
Arsenic	50	10 (2)			0.004		5 U	12.2 U	NT	10.8 U	NT	NT	14 U
Barium	1,000	2,000			2,000		24.8 B	59.1 B	NT	28.6 B	28.1	NT	36.3 B
Beryllium	4	4			1		1 U	1 U	NT	1 U	0.2 U	NT	1 U
Boron						1,000	246	62.2 B	NT	132	104	NT	189
Cadmium	5	5			0.07		2 U	2 U	NT	2 U	0.2 U	NT	2 U
Calcium							16500	32200	49900	19500	17900	44400	26700
Chromium (total)	50	100					6 U	6 U	NT	6 U	1.9	NT	6 U
Chromium (VI)	(1)						0.2 U	1.97	NT	0.2 U	NT	NT	0.2 U
Cobalt							10 U	10 U	NT	10 U	0.2 U	NT	10 U
Copper			1,000	1,000	170	1,300	5 U	5 U	NT	5 U	1.6	NT	5 U
Iron			300	300			147 U	25 U	NT	28.4 B	25 U	NT	25 U
Lead					2	15	2 U	2 U	NT	2 U	0.2 U	NT	2 U
Magnesium							3140 B	12100	13500	9270	8040	13400	11000
Manganese			50	50		500	49	2 U	NT	2 U	1.5	NT	2 U
Mercury	2	2			1.2		0.1 U	0.1 U	NT	0.1 U	0.2 U	NT	0.1 U
Molybdenum							26.5 B	10 U	NT	30.1 B	30.1	NT	83.5
Nickel	100				12		10 U	10 U	NT	10 U	0.8	NT	10 U
Potassium							2320 B	3390 B	1480 J	4680 B	3770	2920 J	4400 B
Selenium	50	50					4 U	4 U	NT	4 U	1.9	NT	4 U
Silica							15.5 J	21.3 J	NT	19.3 J	NT	NT	19.9 J
Silicon							NT	NT	NT	NT	12400	NT	NT
Silver			100	100			2 U	2 U	NT	2 U	0.2 U	NT	2 U
Sodium							90000	83600	49500	112000	113000	54300	113000
Thallium	2	2			0.1		6 B	8.4 U	NT	7.1 U	0.2 U	NT	10.1 U
Uranium	20 pCi/L	30			0.5		57.4 U	50 U	NT	50 U	4.3	NT	50 U
Vanadium						50	5 U	11.7 B	NT	11.7 B	11	NT	5 U
Zinc			5,000	5,000			15 U	15 U	NT	15 U	50 U	NT	15 U
Cyanide	150	200			150		10 U	10 U	NT	10 U	NT	NT	10 U

NOTES:

Units in **micrograms per liter (µg/L).**

Results for all metals and cyanide are listed in this table.

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(1) Chromium (VI) is currently regulated under the MCL for total chromium.
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Data Qualifiers:
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J = Analyte positively identified; the reported concentration is approximate.
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UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels						Analytical Results						
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-2_03 01/13/2004 Primary Sample	MP-2_03 01/13/2004 Field Duplicate	MP-2_04 01/28/2003 Primary Sample	MP-2_04 01/13/2004 Primary Sample	MP-2_05 01/28/2003 Primary Sample	MP-2_05 01/13/2004 Primary Sample	MP-2_06 01/28/2003 Primary Sample
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		NT	NT	50 U	NT	50 U	NT	50 U
Antimony	6	6			20		NT	NT	13 U	NT	13 U	NT	13 U
Arsenic	50	10 (2)			0.004		NT	NT	7.6 U	NT	10.1 U	NT	11.7 U
Barium	1,000	2,000			2,000		NT	NT	40 B	NT	11.1 B	NT	58.5 B
Beryllium	4	4			1		NT	NT	1 U	NT	1 U	NT	1 U
Boron						1,000	NT	NT	255	NT	148	NT	166
Cadmium	5	5			0.07		NT	NT	2 U	NT	2 U	NT	2 U
Calcium							37600	38000	38500	49200	15600	19800	47500
Chromium (total)	50	100					NT	NT	6 U	NT	6 U	NT	6 U
Chromium (VI)	(1)						NT	NT	0.2 UJ	NT	0.2 UJ	NT	0.2 R
Cobalt							NT	NT	10 U	NT	10 U	NT	10 U
Copper			1,000	1,000	170	1,300	NT	NT	5 U	NT	5 U	NT	5 U
Iron			300	300			NT	NT	27.4 B	NT	25 U	NT	25 U
Lead					2	15	NT	NT	2 U	NT	2 U	NT	2 U
Magnesium							13100	13300	10500	10100	2240 B	1630 J	10500
Manganese			50	50		500	NT	NT	11.7 B	NT	10 B	NT	77.1
Mercury	2	2			1.2		NT	NT	0.1 U	NT	0.1 U	NT	0.1 U
Molybdenum							NT	NT	35 B	NT	12 B	NT	29.9 B
Nickel	100				12		NT	NT	10 U	NT	10 U	NT	10 U
Potassium							3100 J	3420 J	3180 B	1700 J	2380 B	1460 J	3000 B
Selenium	50	50					NT	NT	4 U	NT	4 U	NT	4 U
Silica							NT	NT	24.3 J	NT	9.2 J	NT	9.12 J
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			NT	NT	2 U	NT	2 U	NT	2 U
Sodium							71600	71000	94200	70400	77600	89800	64100
Thallium	2	2			0.1		NT	NT	6.7 U	NT	10.1 U	NT	5 U
Uranium	20 pCi/L	30			0.5		NT	NT	50 U	NT	50 U	NT	50 U
Vanadium						50	NT	NT	5 U	NT	5 U	NT	5 U
Zinc			5,000	5,000			NT	NT	15 U	NT	15 U	NT	15 U
Cyanide	150	200			150		NT	NT	10 U	NT	10 U	NT	10 U

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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USEPA = U.S. Environmental Protection Agency

(1) Chromium (VI) is currently regulated under the MCL for total chromium.
(2) The USEPA Primary MCL of 10 µg/L is effective on January 23, 2006.

Data Qualifiers:
B = Analyte was found in associated method blank as well as in sample above QC level.
E = Result is above the maximum calibration range.
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
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TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-2_06 01/13/2004 Primary Sample	MP-3_01 02/11/2003 Primary Sample	MP-3_01 01/14/2004 Primary Sample	MP-3_01 04/21/2004 Primary Sample	MP-3_02 02/10/2003 Primary Sample	MP-3_02 01/14/2004 Primary Sample	MP-3_02 04/21/2004 Primary Sample
	Regulatory Action Levels						Analytical Results						
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		NT	1010	NT	NT	136 B	NT	NT
Antimony	6	6			20		NT	13 U	NT	NT	13 U	NT	NT
Arsenic	50	10 (2)			0.004		NT	5 U	NT	NT	5.5 B	NT	NT
Barium	1,000	2,000			2,000		NT	15.5 B	NT	NT	15.4 B	NT	NT
Beryllium	4	4			1		NT	1 U	NT	NT	1 U	NT	NT
Boron						1,000	NT	416	NT	NT	598	NT	NT
Cadmium	5	5			0.07		NT	2 U	NT	NT	2 U	NT	NT
Calcium							34200	5400	6970	6210	11600	6070	6430
Chromium (total)	50	100					NT	6 U	NT	NT	6 U	NT	NT
Chromium (VI)	(1)						NT	0.2 U	NT	NT	0.2 U	NT	NT
Cobalt							NT	10 U	NT	NT	10 U	NT	NT
Copper			1,000	1,000	170	1,300	NT	5 U	NT	NT	5 U	NT	NT
Iron			300	300			NT	922	NT	NT	93.4 B	NT	NT
Lead					2	15	NT	2 U	NT	NT	2 U	NT	NT
Magnesium							10000	813 B	715 J	358 J	1860 B	266 J	172 J
Manganese			50	50		500	NT	14.3 B	NT	NT	9.7 B	NT	NT
Mercury	2	2			1.2		NT	0.1 U	NT	NT	0.1 U	NT	NT
Molybdenum							NT	42.7 B	NT	NT	89	NT	NT
Nickel	100				12		NT	10 U	NT	NT	10 U	NT	NT
Potassium							3860 J	3190 B	2070 J	1810 J	5360	1580 J	1780 J
Selenium	50	50					NT	4 U	NT	NT	4 U	NT	NT
Silica							NT	6.43 J	NT	NT	8.18 J	NT	NT
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			NT	2 U	NT	NT	2 U	NT	NT
Sodium							94000	121000	171000	167000	173000	270000	261000
Thallium	2	2			0.1		NT	6.6 B	NT	NT	7.4 B	NT	NT
Uranium	20 pCi/L	30			0.5		NT	50 U	NT	NT	50 U	NT	NT
Vanadium						50	NT	5 U	NT	NT	5 U	NT	NT
Zinc			5,000	5,000			NT	16.9 B	NT	NT	15 U	NT	NT
Cyanide	150	200			150		NT	10 U	NT	NT	10 U	NT	NT

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
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(1) Chromium (VI) is currently regulated under the MCL for total chromium.
(2) The USEPA Primary MCL of 10 µg/L is effective on January 23, 2006.

Data Qualifiers:
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E = Result is above the maximum calibration range.
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-3_03 02/10/2003 Primary Sample	MP-3_03 02/10/2003 Field Duplicate	MP-3_03 01/14/2004 Primary Sample	MP-3_03 04/21/2004 Primary Sample	MP-3_04 02/10/2003 Primary Sample	MP-3_04 01/14/2004 Primary Sample	MP-3_04 04/20/2004 Primary Sample
	Regulatory Action Levels						Analytical Results						
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		50 U	50 U	NT	NT	50 U	NT	NT
Antimony	6	6			20		13 U	13 U	NT	NT	13 U	NT	NT
Arsenic	50	10 (2)			0.004		5 U	5 U	NT	NT	6 B	NT	NT
Barium	1,000	2,000			2,000		13.8 B	12.5 B	NT	NT	8.8 B	NT	NT
Beryllium	4	4			1		1 U	1 U	NT	NT	1 U	NT	NT
Boron						1,000	598	582	NT	NT	659	NT	NT
Cadmium	5	5			0.07		2 U	2 U	NT	NT	2 U	NT	NT
Calcium							20000	19300	8110	7480	17100	12100	11600
Chromium (total)	50	100					6 U	6 U	NT	NT	6 U	NT	NT
Chromium (VI)	(1)						0.2 U	0.2 U	NT	NT	0.2 U	NT	NT
Cobalt							10 U	10 U	NT	NT	10 U	NT	NT
Copper			1,000	1,000	170	1,300	5 U	5 U	NT	NT	5 U	NT	NT
Iron			300	300			64 B	50.4 B	NT	NT	60.4 B	NT	NT
Lead					2	15	2 U	2 U	NT	NT	2 U	NT	NT
Magnesium							2590 B	2490 B	633 J	334 J	2340 B	791 J	432 J
Manganese			50	50		500	10.2 B	9.4 B	NT	NT	12.7 B	NT	NT
Mercury	2	2			1.2		0.1 U	0.1 U	NT	NT	0.1 U	NT	NT
Molybdenum							156	149	NT	NT	160	NT	NT
Nickel	100				12		10 U	10 U	NT	NT	10 U	NT	NT
Potassium							7130	6820	2780 J	2840 J	7410	1850 J	2830 J
Selenium	50	50					4 U	4 U	NT	NT	4 U	NT	NT
Silica							5.5 J	6.39 J	NT	NT	7.98 J	NT	NT
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			2 U	2 U	NT	NT	2 U	NT	NT
Sodium							267000	258000	354000	300000	257000	293000	295000
Thallium	2	2			0.1		10.2	11	NT	NT	9.9 B	NT	NT
Uranium	20 pCi/L	30			0.5		50 U	50 U	NT	NT	50 U	NT	NT
Vanadium						50	5 U	5 U	NT	NT	5 U	NT	NT
Zinc			5,000	5,000			15 U	15 U	NT	NT	15 U	NT	NT
Cyanide	150	200			150		10 U	10 U	NT	NT	10 U	NT	NT

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
MCL = Maximum Contaminant Level
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QA = Quality Assurance
USACE = U.S. Army Corps of Engineers
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(1) Chromium (VI) is currently regulated under the MCL for total chromium.
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Data Qualifiers:
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TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: MP-4_01 02/05/2003 Primary Sample	MP-4_01 02/05/2003 USACE QA Sample	MP-4_01 01/15/2004 Primary Sample	MP-4_02 02/04/2003 Primary Sample	MP-4_02 01/15/2004 Primary Sample	MP-4_03 02/04/2003 Primary Sample	MP-4_04 02/04/2003 Primary Sample
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		60.6 U	50 U	NT	61.5 U	NT	116 U	59 U
Antimony	6	6			20		13 U	0.9	NT	13 U	NT	13 U	13 U
Arsenic	50	10 (2)			0.004		5 U	NT	NT	5.7 B	NT	6.8 B	5 U
Barium	1,000	2,000			2,000		29.1 B	31.7	NT	41.7 B	NT	25.9 B	34.6 B
Beryllium	4	4			1		1 U	0.2 U	NT	1 U	NT	1 U	1 U
Boron						1,000	383	336	NT	332	NT	422	303
Cadmium	5	5			0.07		2 U	0.2 U	NT	2 U	NT	2 U	2 U
Calcium							29300	29500	48300	98300	102000	16200	14300
Chromium (total)	50	100					6 U	3	NT	6 U	NT	6 U	6 U
Chromium (VI)	(1)						0.2 U	NT	NT	0.619	NT	0.2 U	0.2 U
Cobalt							10 U	0.2 U	NT	10 U	NT	10 U	10 U
Copper			1,000	1,000	170	1,300	5 U	2.4	NT	5 U	NT	5 U	5 U
Iron			300	300			216	295	NT	25 U	NT	47.6 B	29.4 B
Lead					2	15	2 U	0.2	NT	2 U	NT	2 U	2 U
Magnesium							8060	7630	21000	21500	22000	3290 B	3640 B
Manganese			50	50		500	73.3	71	NT	4.9 B	NT	35.6	64.3
Mercury	2	2			1.2		0.1 U	0.2 U	NT	0.1 U	NT	0.1 U	0.1 U
Molybdenum							40.6 B	43.4	NT	10 U	NT	31.7 B	10 U
Nickel	100				12		10 U	1.3	NT	10 U	NT	10 U	10 U
Potassium							5130	4360	3570 J	2330 B	2730 J	2480 B	2450 B
Selenium	50	50					4 U	2.3	NT	4 U	NT	4 U	4 U
Silica							8.71 J	NT	NT	19 J	NT	11.8 J	18.4 J
Silicon							NT	6030	NT	NT	NT	NT	NT
Silver			100	100			2 U	0.2 U	NT	2 U	NT	2 U	2 U
Sodium							144000	174000	53400	42400	45500	134000	165000
Thallium	2	2			0.1		8.9 B	0.2 U	NT	8.2 U	NT	7.4 U	5.2 U
Uranium	20 pCi/L	30			0.5		50 U	1 U	NT	50 U	NT	50 U	50 U
Vanadium						50	5 U	0.6	NT	5 U	NT	5 U	5 U
Zinc			5,000	5,000			15 U	50 U	NT	15 U	NT	15 U	15 U
Cyanide	150	200			150		10 U	NT	NT	10 U	NT	10 U	10 U

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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(1) Chromium (VI) is currently regulated under the MCL for total chromium.
(2) The USEPA Primary MCL of 10 µg/L is effective on January 23, 2006.

Data Qualifiers:
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J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.
UJ = Analyte not detected above the quantitation limit, but the reported quantitation limit is approximate.

TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels						Analytical Results						
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-4_05 02/04/2003 Primary Sample	MP-5_01 10/03/2003 Primary Sample	MP-5_01 04/22/2004 Primary Sample	MP-5_01 04/21/2004 Field Duplicate	MP-5_02 10/03/2003 Primary Sample	MP-5_02 10/03/2003 Field Duplicate	MP-5_02 04/22/2004 Primary Sample
Metals and Cyanide													
Aluminum	1,000		200	50 to 200	600		90.9 U	200 U	NT	NT	200 U	200 U	NT
Antimony	6	6			20		13 U	60 U	NT	NT	60 U	60 U	NT
Arsenic	50	10 (2)			0.004		10.3	5.8 UJ	NT	NT	11.7 U	13.1 U	NT
Barium	1,000	2,000			2,000		17 B	53.4 J	NT	NT	22.8 J	23.8 J	NT
Beryllium	4	4			1		1 U	5 U	NT	NT	5 U	5 U	NT
Boron						1,000	364	283 E	NT	NT	218 E	227 E	NT
Cadmium	5	5			0.07		2 U	5 U	NT	NT	5 U	5 U	NT
Calcium							9430	75500	93000	90300	31600	35600	55700
Chromium (total)	50	100					6 U	10 U	NT	NT	10 U	10 U	NT
Chromium (VI)	(1)						0.2 U	0.321	NT	NT	0.886	1.1	NT
Cobalt							10 U	50 U	NT	NT	50 U	50 U	NT
Copper			1,000	1,000	170	1,300	5 U	25 U	NT	NT	25 U	25 U	NT
Iron			300	300			25 U	100 U	NT	NT	100 U	100 U	NT
Lead					2	15	2 U	3 U	NT	NT	3 U	3 U	NT
Magnesium							2170 B	18900	21700	21100	8990	9720	12700
Manganese			50	50		500	27.1	6.1 J	NT	NT	2.7 J	3.3 J	NT
Mercury	2	2			1.2		0.1 U	0.2 U	NT	NT	0.2 U	0.2 U	NT
Molybdenum							10 U	24 J	NT	NT	44.6 J	43 J	NT
Nickel	100				12		10 U	40 U	NT	NT	40 U	40 U	NT
Potassium							1630 B	3490 J	2960 J	3270 J	3720 J	3930 J	2280 J
Selenium	50	50					4 U	5 U	NT	NT	5 U	5 U	NT
Silica							15.7 J	25.9	NT	NT	26.3	25.6	NT
Silicon							NT	NT	NT	NT	NT	NT	NT
Silver			100	100			2 U	10 UJ	NT	NT	10 UJ	10 UJ	NT
Sodium							128000	72500	63500	61600	95700	97700	63800
Thallium	2	2			0.1		6.2 U	10 U	NT	NT	10 U	10 U	NT
Uranium	20 pCi/L	30			0.5		50 U	200 U	NT	NT	200 U	200 U	NT
Vanadium						50	5 U	50 U	NT	NT	7 J	6.7 J	NT
Zinc			5,000	5,000			15 U	20 U	NT	NT	20 U	20 U	NT
Cyanide	150	200			150		10 U	10 U	NT	NT	10 U	10 U	NT

NOTES:

Units in **micrograms per liter (µg/L).**
Results for all metals and cyanide are listed in this table.

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(1) Chromium (VI) is currently regulated under the MCL for total chromium.
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TABLE 3-10
Analytical Results for Metals and Cyanide

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: MP-5_03 10/02/2003 Primary Sample	MP-5_03 10/02/2003 USACE QA Sample	MP-5_03 04/22/2004 Primary Sample	MP-5_04 10/02/2003 Primary Sample	MP-5_04 04/22/2004 Primary Sample	SS-1 02/11/2003 Primary Sample
Metals and Cyanide												
Aluminum	1,000		200	50 to 200	600		200 U	50 U	NT	200 U	NT	50 U
Antimony	6	6			20		14.2 J	0.9	NT	60 U	NT	13 U
Arsenic	50	10 (2)			0.004		6.4 UJ	NT	NT	5.5 UJ	NT	12.8
Barium	1,000	2,000			2,000		41.5 J	42.8	NT	53.5 J	NT	19.7 B
Beryllium	4	4			1		5 U	0.2 U	NT	5 U	NT	1 U
Boron						1,000	239 E	NT	NT	279 E	NT	897
Cadmium	5	5			0.07		5 U	0.2 U	NT	5 U	NT	2 U
Calcium							72900	72700	101000	103000	119000	26400
Chromium (total)	50	100					10 U	0.8	NT	10 U	NT	6 U
Chromium (VI)	(1)						0.2 U	NT	NT	0.302	NT	0.2 U
Cobalt							50 U	0.3	NT	50 U	NT	10 U
Copper			1,000	1,000	170	1,300	25 U	1.3	NT	25 U	NT	5 U
Iron			300	300			100 U	25 U	NT	100 U	NT	854
Lead					2	15	3 U	0.2 U	NT	3 U	NT	2 U
Magnesium							18100	16200	23300	24000	24000	6830
Manganese			50	50		500	39.9	40.2	NT	66.7	NT	18
Mercury	2	2			1.2		0.2 U	0.2 U	NT	0.2 U	NT	0.1 U
Molybdenum							43.8 J	9.6	NT	42.1 J	NT	72
Nickel	100				12		40 U	6.1	NT	40 U	NT	10 U
Potassium							3590 J	3250	2480 J	3660 J	4080 J	10500
Selenium	50	50					5 U	1.9	NT	5 U	NT	4 U
Silica							21.4	NT	NT	22.2	NT	10300 J
Silicon							NT	10700	NT	NT	NT	NT
Silver			100	100			10 UJ	0.2 U	NT	10 UJ	NT	2 U
Sodium							74300	82900	60700	75200	84700	302000
Thallium	2	2			0.1		10 U	0.2 U	NT	10 U	NT	10.3
Uranium	20 pCi/L	30			0.5		200 U	4.6	NT	200 U	NT	50 U
Vanadium						50	50 U	3.6	NT	50 U	NT	5 U
Zinc			5,000	5,000			27.3	50 U	NT	50.5	NT	15 U
Cyanide	150	200			150		10 U	NT	NT	10 U	NT	10 U

NOTES:

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Results for all metals and cyanide are listed in this table.

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TABLE 3-11
Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	AL-1 10/09/2003 Primary Sample	AL-1 04/20/2004 Primary Sample	AL-3 10/08/2003 Primary Sample	AL-3 04/20/2004 Primary Sample	AL-4A 10/08/2003 Primary Sample	AL-4A 10/08/2003 Field Duplicate
Other Inorganics												
Anions **:**												
Bromide							0.573 J	4.1	0.328 J	0.241 J	0.374 J	0.385 J
Chloride			250 to 500	250			96.2	77.9	66	51.3	89.3	92.5
Fluoride	2	4		2	1		1.85	0.1 U	1.37	0.593	1.23	1.24
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.233 J	0.5 U	0.5 U
Sulfate			250 to 500	250			473	395	234	220	215	221
Nitrogen :												
Ammonia							0.1 U	NT	0.1 U	NT	0.1 U	0.1 U
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		20.6	15.8	5.83	4.49	6.57	6.56
Total Kjeldahl Nitrogen (TKN)							0.904	NT	0.1	NT	0.1 U	0.305
General Parameters												
Bicarbonate Alkalinity							402	416	355	361	315	315
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							5.38 U	NT	7.24	NT	1 U	1.26 U
Chemical Oxygen Demand (COD)							11.9	NT	11.9	NT	14.2	10 U
Total Dissolved Solids (TDS)			500 to 1,000	500			1480	1220	943	804	915	920
Total Organic Carbon (TOC)							1.22 J	NT	2.02 J	NT	5 U	5 U
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					4.02±2.32	NT	15.3±3.42	NT	3.27±1.94	2.48±1.64
Gross Beta	50 pCi/L	4 mrem/yr					7.71±3.28	NT	3.84±1.61	NT	3.11±1.29	2.71±1.21

NOTES:

Units in **milligrams per liter (mg/L)**, unless otherwise noted.
Results for all inorganics other than metals, general parameters, and gross alpha/gross beta are listed in this table.

AL = Action Level (for toxicity)
CA = California
DHS = Department of Health Services
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mrem/yr = millirem per year
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
pCi/L = picocurie per liter
PHG = Public Health Goal (for Drinking Water)
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J = Analyte positively identified; the reported concentration is approximate.
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TABLE 3-11
Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	AL-4A 04/20/2004 Primary Sample	AL-4B 10/08/2003 Primary Sample	AL-4B 04/20/2004 Primary Sample	AL-6 10/08/2003 Primary Sample	AL-6 04/20/2004 Primary Sample	AL-9A 10/09/2003 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							0.5 U	0.519	0.5 U	0.41 J	9.14	0.376 J
Chloride			250 to 500	250			82.4	88.3	64.1	63.8	51.7	71.3
Fluoride	2	4		2	1		0.1 U	1.47	0.378	1.92	0.1 U	1.21
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			235	345	243	378	371	248
Nitrogen :												
Ammonia							NT	0.1 U	NT	0.1 U	NT	0.1 U
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		6.12	8.81	7.99	15.2	16.8	7.61
Total Kjeldahl Nitrogen (TKN)							NT	0.326	NT	0.545	NT	0.398
General Parameters												
Bicarbonate Alkalinity							411	340	349	452	490	296
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							NT	1.54 U	NT	6.08	NT	1 U
Chemical Oxygen Demand (COD)							NT	10 U	NT	68.7	NT	10 U
Total Dissolved Solids (TDS)			500 to 1,000	500			936	1170	838	1240	1260	937
Total Organic Carbon (TOC)							NT	1.21 J	NT	3.02 J	NT	5 U
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					NT	6.43±2.39	NT	8.44±2.72	NT	4.67±2.42
Gross Beta	50 pCi/L	4 mrem/yr					NT	6.7±1.62	NT	6.03±1.63	NT	1.3±1.18

NOTES:

Units in **milligrams per liter (mg/L)**, unless otherwise noted.
Results for all inorganics other than metals, general parameters, and gross alpha/gross beta are listed in this table.

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PHG = Public Health Goal (for Drinking Water)
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Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.

TABLE 3-11
Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	AL-9A 10/09/2003 Field Duplicate	AL-9A 04/20/2004 Primary Sample	AL-9A 04/20/2004 Field Duplicate	AL-9B 10/09/2003 Primary Sample	AL-9B 04/20/2004 Primary Sample	CW-1A 09/29/2003 Primary Sample
	Regulatory Action Levels						Analytical Results					
Other Inorganics												
Anions **:**												
Bromide							0.399 J	0.5 U	0.5 U	0.382 J	0.5 U	0.5 U
Chloride			250 to 500	250			75.9	72.4	74.6	75.2	74.6	45
Fluoride	2	4		2	1		1.23	0.1 U	0.1 U	1.27	0.1 U	0.634
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.237 J
Sulfate			250 to 500	250			265	336	349	278	350	9.33
Nitrogen :												
Ammonia							0.1 U	NT	NT	0.1 U	NT	0.1 U
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		6.73	7.52	7.52	7.51	7.61	1.75
Total Kjeldahl Nitrogen (TKN)							0.341	NT	NT	0.357	NT	0.409 U
General Parameters												
Bicarbonate Alkalinity							298	309	332	301	334	98.1
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							7.86	NT	NT	1.23 U	NT	1 U
Chemical Oxygen Demand (COD)							14.2	NT	NT	10 U	NT	10 U
Total Dissolved Solids (TDS)			500 to 1,000	500			930	1040	1020	1000	1050	215
Total Organic Carbon (TOC)							5 U	NT	NT	5 U	NT	5 U
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					4.25+2.02	NT	NT	3.79±2.30	NT	1.38±0.848
Gross Beta	50 pCi/L	4 mrem/yr					2.71±1.27	NT	NT	5.94±3.22	NT	1.6±0.843

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TABLE 3-11

Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	CW-1A 04/20/2004 Primary Sample	CW-1B 09/30/2003 Primary Sample	CW-1B 04/20/2004 Primary Sample	CW-1C 09/30/2003 Primary Sample	CW-1C 04/20/2004 Primary Sample	EM-1 11/18/2002 Primary Sample
Other Inorganics												
Anions:												
Bromide							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.432 J
Chloride			250 to 500	250			30	35.3	27.4	41	29.4	85.4
Fluoride	2	4		2	1		0.275	0.71	0.347	0.504	0.295	0.764
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			8.6	14	7.03	7.05	5.47	169
Nitrogen:												
Ammonia							NT	0.129 U	NT	1.07	NT	0.1 U
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		1.64	0.759	0.963	0.1 U	1.3	0.82
Total Kjeldahl Nitrogen (TKN)							NT	0.467 U	NT	1.49 U	NT	0.605
General Parameters												
Bicarbonate Alkalinity							81.2	138	138	111	139	340
Carbonate Alkalinity							24.8	5 U	9.9	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							NT	11	NT	8.48	NT	4.06
Chemical Oxygen Demand (COD)							NT	20.5	NT	17.5	NT	11.7
Total Dissolved Solids (TDS)			500 to 1,000	500			206	254	232	165	226	739
Total Organic Carbon (TOC)							NT	6.13	NT	5 U	NT	1.34
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					NT	1.96±1.15	NT	0±0.766	NT	NT
Gross Beta	50 pCi/L	4 mrem/yr					NT	1.58±1.06	NT	5.48±1.32	NT	NT

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Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	EM-2 11/18/2002 Primary Sample	MP-1A 09/29/2003 Primary Sample	MP-1A 04/20/2004 Primary Sample	MP-1_01 01/22/2003 Primary Sample	MP-1_01 01/15/2004 Primary Sample	MP-1_01 04/22/2004 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							3.44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloride			250 to 500	250			996	25.4	23.9	15.6	16.9	15.8
Fluoride	2	4		2	1		2.62	0.278	0.153	0.143	0.1 U	0.1 U
Phosphorus (Orthophosphate)							0.5 U	0.272 J	0.5 U	0.241 J	0.253 J	0.233 J
Sulfate			250 to 500	250			215	99.1	94	33	36	33.8
Nitrogen :												
Ammonia							0.1 U	0.1 U	NT	0.1 U	NT	NT
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		3.43	8.19	8.61	3.49	3.7	3.64
Total Kjeldahl Nitrogen (TKN)							0.682	0.472 U	NT	0.344	NT	NT
General Parameters												
Bicarbonate Alkalinity							284	123	136	136	129	138
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							11.5	7	NT	15.9 J	NT	NT
Chemical Oxygen Demand (COD)							26.3	11.7	NT	27.6	NT	NT
Total Dissolved Solids (TDS)			500 to 1,000	500			2300	469	386	212	228	246
Total Organic Carbon (TOC)							1.37	5 U	NT	5 U	NT	NT
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					NT	0.791±1.22	NT	1.61±1.03	NT	NT
Gross Beta	50 pCi/L	4 mrem/yr					NT	2.03±3.13	NT	1.43±0.965	NT	NT

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Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-1_02 01/22/2003 Primary Sample	MP-1_02 01/22/2003 Field Duplicate	MP-1_02 01/15/2004 Primary Sample	MP-1_02 04/22/2004 Primary Sample	MP-1_02 04/22/2004 Field Duplicate	MP-1_03 01/22/2003 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloride			250 to 500	250			19.4	19.6	35.9	27.1	28.1	15.7
Fluoride	2	4		2	1		0.176	0.198	0.271	0.1 U	0.1 U	0.267
Phosphorus (Orthophosphate)							0.5 U	0.299 J	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			40.2	41.3	424	401	408	45.8
Nitrogen :												
Ammonia							0.992	0.248	NT	NT	NT	0.1 U
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		1.05	1.09	3.8	3.92	3.97	2.01
Total Kjeldahl Nitrogen (TKN)							0.268	0.339	NT	NT	NT	0.344
General Parameters												
Bicarbonate Alkalinity							161	159	205	227	232	166
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							40.5 J	14.6 J	NT	NT	NT	7.97 J
Chemical Oxygen Demand (COD)							77.4	22.1	NT	NT	NT	13.8
Total Dissolved Solids (TDS)			500 to 1,000	500			265	260	778	976	956	296
Total Organic Carbon (TOC)							5 U	5 U	NT	NT	NT	5 U
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					2.71±1.35	2.20±1.20	NT	NT	NT	1.79±1.14
Gross Beta	50 pCi/L	4 mrem/yr					2.01±1.09	1.97±1.05	NT	NT	NT	1.54±0.997

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Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-1_03 01/15/2004 Primary Sample	MP-1_03 01/15/2004 Field Duplicate	MP-1_03 04/21/2004 Primary Sample	MP-1_04 01/22/2003 Primary Sample	MP-1_04 01/15/2004 Primary Sample	MP-1_04 04/21/2004 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloride			250 to 500	250			15.4	14.8	15.6	21.8	17.5	17.2
Fluoride	2	4		2	1		0.195	0.21	0.286	0.293	0.152	0.221
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			88	91.1	87.7	57.6	81.9	81.4
Nitrogen :												
Ammonia							NT	NT	NT	0.429	NT	NT
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		2.03	1.94	1.84	0.329	0.874	1.04
Total Kjeldahl Nitrogen (TKN)							NT	NT	NT	0.339	NT	NT
General Parameters												
Bicarbonate Alkalinity							223	215	245	171	193	215
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							NT	NT	NT	8.75 J	NT	NT
Chemical Oxygen Demand (COD)							NT	NT	NT	16.6	NT	NT
Total Dissolved Solids (TDS)			500 to 1,000	500			332	366	400	309	328	370
Total Organic Carbon (TOC)							NT	NT	NT	1.55 J	NT	NT
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					NT	NT	NT	3.65±1.48	NT	NT
Gross Beta	50 pCi/L	4 mrem/yr					NT	NT	NT	3.20±1.23	NT	NT

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Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-1_05 01/22/2003 Primary Sample		MP-1_06 01/21/2003 Primary Sample		MP-1_07 01/21/2003 Primary Sample		MP-1_08 01/20/2003 Primary Sample		MP-1_09 01/20/2003 Primary Sample		MP-1_10 01/20/2003 Primary Sample	
Other Inorganics																		
Anions **:**																		
Bromide							0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.339	J
Chloride			250 to 500	250			24.1		31.3		30.6		23.6		20.3		40.3	
Fluoride	2	4		2	1		0.321		0.272		0.209		0.314		0.285		0.536	
Phosphorus (Orthophosphate)							0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.232	J
Sulfate			250 to 500	250			42.1		87.6		106		48.5		42.1		47.5	
Nitrogen :																		
Ammonia							0.124		0.114		0.1	U	0.124		0.1	U	0.191	
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		0.201		0.358		0.435		0.139		1.4		0.1	U
Total Kjeldahl Nitrogen (TKN)							0.268		0.328		0.503		0.59		0.399		0.322	
General Parameters																		
Bicarbonate Alkalinity							169		202		166		166		161		149	
Carbonate Alkalinity							5	U	5	U	5	U	5	U	5	U	5	U
Hydroxide Alkalinity							5	U	5	U	5	U	5	U	5	U	5	U
Biochemical Oxygen Demand (BOD)							17.3	J	4.83	J	6.07	J	6.75	J	18.5	J	11.6	J
Chemical Oxygen Demand (COD)							19.3		11.1		11.1		13.8		19.3		24.9	
Total Dissolved Solids (TDS)			500 to 1,000	500			270		410		400		283		282		360	
Total Organic Carbon (TOC)							2.03	J	5	U	5	U	5	U	1.31	J	6.39	
Radioactivity (in pCi/L)																		
Gross Alpha	15 pCi/L	15 pCi/L					3.60±1.42		4.59±1.64		3.38±1.50		1.07±0.946		1.98±1.13		1.52±1.12	
Gross Beta	50 pCi/L	4 mrem/yr					2.90±1.19		2.52±1.00		1.61±1.07		1.12±0.91		0.928±0.933		1.23±0.956	

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Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-2_01 01/29/2003 Primary Sample	MP-2_01 01/14/2004 Primary Sample	MP-2_02 01/29/2003 Primary Sample	MP-2_02 01/13/2004 Primary Sample	MP-2_03 01/29/2003 Primary Sample	MP-2_03 01/13/2004 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							0.358 J	0.5 U	0.349 J	0.5 U	0.384 J	0.477 J
Chloride			250 to 500	250			44.3	44	45.7	76.5	77.9	71.8
Fluoride	2	4		2	1		0.404	0.219	0.383	0.163	0.451	0.209
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			23.4	20.8	29.2	30.2	54.8	29.5
Nitrogen :												
Ammonia							0.102	NT	0.236	NT	0.635	NT
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		5.94	6.25	1.85	0.505	0.116	0.213
Total Kjeldahl Nitrogen (TKN)							0.44	NT	0.389	NT	0.308	NT
General Parameters												
Bicarbonate Alkalinity							159	153	182	113	156	131
Carbonate Alkalinity							5 U	5 U	5 U	4.94 J	5 U	4.94 J
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							8.37 J	NT	6.41 J	NT	16.4 J	NT
Chemical Oxygen Demand (COD)							17.8	NT	20.8	NT	119	NT
Total Dissolved Solids (TDS)			500 to 1,000	500			415	419	435	362	465	376
Total Organic Carbon (TOC)							5 U	NT	3.39 J	NT	10.5	NT
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					3.42±1.31	NT	6.90±2.01	NT	3.43±1.53	NT
Gross Beta	50 pCi/L	4 mrem/yr					2.14±1.11	NT	4.14±3.34	NT	5.25±3.25	NT

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Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-2_03 01/13/2004 Field Duplicate	MP-2_04 01/28/2003 Primary Sample	MP-2_04 01/13/2004 Primary Sample	MP-2_05 01/28/2003 Primary Sample	MP-2_05 01/13/2004 Primary Sample	MP-2_06 01/28/2003 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							0.449 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloride			250 to 500	250			70.6	30.4	35.8	26.4	25.8	48.5
Fluoride	2	4		2	1		0.179	0.369	0.211	0.254	0.157	0.5
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			28.9	79	49.6	106	108	28.6
Nitrogen :												
Ammonia							NT	0.277	NT	0.123	NT	0.292
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		0.197	0.1 U	0.282	0.1 U	0.1 U	0.1 U
Total Kjeldahl Nitrogen (TKN)							NT	0.222	NT	0.131	NT	0.121
General Parameters												
Bicarbonate Alkalinity							123	171	121	55.4	41.4	176
Carbonate Alkalinity							14.8	5 U	14.8	5 U	9.87	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							NT	1 R	NT	9.18 J	NT	7.92 J
Chemical Oxygen Demand (COD)							NT	14.9	NT	20.8	NT	23.8
Total Dissolved Solids (TDS)			500 to 1,000	500			380	362	344	315	333	350
Total Organic Carbon (TOC)							NT	1.66 J	NT	1.94 J	NT	3.52 J
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					NT	0.739±0.961	NT	0.708±1.06	NT	0.000±0.930
Gross Beta	50 pCi/L	4 mrem/yr					NT	1.16±0.951	NT	5.50±3.29	NT	1.68±0.958

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Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: MP-2_06 01/13/2004 Primary Sample		MP-3_01 02/11/2003 Primary Sample		MP-3_01 01/14/2004 Primary Sample		MP-3_01 04/21/2004 Primary Sample		MP-3_02 02/10/2003 Primary Sample		MP-3_02 01/14/2004 Primary Sample	
Other Inorganics																		
Anions **:**																		
Bromide							0.5	U	0.383	J	0.5	U	0.5	U	0.447	J	0.455	J
Chloride			250 to 500	250			34.9		77.8		76.9		73.3		120		105	
Fluoride	2	4		2	1		0.229		4.67		3.29		3.39		3.7		2.68	
Phosphorus (Orthophosphate)							0.5	U	0.5	U	0.356	J	0.493	J	0.5	U	0.305	J
Sulfate			250 to 500	250			126		55.3		63.8		52.7		168		124	
Nitrogen :																		
Ammonia							NT		0.212		NT		NT		0.228		NT	
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		0.108		0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
Total Kjeldahl Nitrogen (TKN)							NT		0.429		NT		NT		0.54		NT	
General Parameters																		
Bicarbonate Alkalinity							160		91.5		96.2		81.6		139		27	
Carbonate Alkalinity							5	U	40.7		88.8		148		30		217	
Hydroxide Alkalinity							5	U	5	U	5	U	5	U	5	U	5	U
Biochemical Oxygen Demand (BOD)							NT		8.06	J	NT		NT		34	J	NT	
Chemical Oxygen Demand (COD)							NT		40		NT		NT		65.6		NT	
Total Dissolved Solids (TDS)			500 to 1,000	500			417		642		501		490		440		715	
Total Organic Carbon (TOC)							NT		5.38		NT		NT		22.8		NT	
Radioactivity (in pCi/L)																		
Gross Alpha	15 pCi/L	15 pCi/L					NT		$3.34\underline{+}2.32$		NT		NT		$6.40\underline{+}1.91$		NT	
Gross Beta	50 pCi/L	4 mrem/yr					NT		$5.81\underline{+}3.31$		NT		NT		$5.34\underline{+}3.44$		NT	

NOTES:

Units in **milligrams per liter (mg/L)**, unless otherwise noted.
Results for all inorganics other than metals, general parameters, and gross alpha/gross beta are listed in this table.

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MCL = Maximum Contaminant Level
mrem/yr = millirem per year
NT = Not tested
OEHHA = Office of Environmental Health Hazard Assessment
pCi/L = picocurie per liter
PHG = Public Health Goal (for Drinking Water)
USEPA = U.S. Environmental Protection Agency

Data Qualifiers:
J = Analyte positively identified; the reported concentration is approximate.
R = Rejected due to deficiencies in the ability to analyze the sample and/or meet quality control criteria.
U = Analyte not detected above quantitation limit.

TABLE 3-11
Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels						Analytical Results					
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-3_02 04/21/2004 Primary Sample	MP-3_03 02/10/2003 Primary Sample	MP-3_03 02/10/2003 Field Duplicate	MP-3_03 01/14/2004 Primary Sample	MP-3_03 04/21/2004 Primary Sample	MP-3_04 02/10/2003 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							0.31 J	0.569	0.573	0.531	0.389 J	0.562
Chloride			250 to 500	250			103	172	175	142	141	172
Fluoride	2	4		2	1		2.8	3.83	3.88	3.39	3.56	4.47
Phosphorus (Orthophosphate)							0.557	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			120	364	372	326	321	325
Nitrogen :												
Ammonia							NT	0.56	0.549	NT	NT	0.389
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Kjeldahl Nitrogen (TKN)							NT	0.834	0.824	NT	NT	0.786
General Parameters												
Bicarbonate Alkalinity							15	93	104	35	29.4	134
Carbonate Alkalinity							272	30	30	113	134	35
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							NT	28.9 J	30.8 J	NT	NT	38.6 J
Chemical Oxygen Demand (COD)							NT	48.5	48.5	NT	NT	82.8
Total Dissolved Solids (TDS)			500 to 1,000	500			726	938	1020	946	886	923
Total Organic Carbon (TOC)							NT	25.3	24.3	NT	NT	33.6
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					NT	0.869±4.84	1.52±1.51	NT	NT	0.000±1.40
Gross Beta	50 pCi/L	4 mrem/yr					NT	4.84±3.17	0.163±0.854	NT	NT	4.65±3.14

NOTES:

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Results for all inorganics other than metals, general parameters, and gross alpha/gross beta are listed in this table.

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U = Analyte not detected above quantitation limit.

TABLE 3-11
Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-3_04 01/14/2004 Primary Sample		MP-3_04 04/21/2004 Primary Sample		MP-4_01 02/05/2003 Primary Sample		MP-4_01 01/15/2004 Primary Sample		MP-4_02 02/04/2003 Primary Sample		MP-4_02 01/15/2004 Primary Sample	
	Regulatory Action Levels						Analytical Results											
Other Inorganics																		
Anions **:**																		
Bromide							0.518		0.324	J	0.714		0.5	U	0.5	U	0.5	U
Chloride			250 to 500	250			132		120		119		78.6		29.9		29	
Fluoride	2	4		2	1		4.12		4.35		0.425		0.143		0.366		0.289	
Phosphorus (Orthophosphate)							0.581		0.821		0.5	U	0.5	U	0.5	U	0.5	U
Sulfate			250 to 500	250			267		240		49.5		30.1		116		122	
Nitrogen :																		
Ammonia							NT		NT		0.187		NT		0.125		NT	
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		0.1	U	0.1	U	0.292		0.1	U	0.875		1.02	
Total Kjeldahl Nitrogen (TKN)							NT		NT		0.33		NT		0.27	U	NT	
General Parameters																		
Bicarbonate Alkalinity							71		81.4		232		171		260		240	
Carbonate Alkalinity							104		139		5	U	5	U	5	U	5	U
Hydroxide Alkalinity							5	U	5	U	5	U	5	U	5	U	5	U
Biochemical Oxygen Demand (BOD)							NT		NT		29.6	J	NT		10.7	J	NT	
Chemical Oxygen Demand (COD)							NT		NT		53.5		NT		20.8		NT	
Total Dissolved Solids (TDS)			500 to 1,000	500			909		946		578		200		485		412	
Total Organic Carbon (TOC)							NT		NT		13.4		NT		5	U	NT	
Radioactivity (in pCi/L)																		
Gross Alpha	15 pCi/L	15 pCi/L					NT		NT		0.238±0.956		NT		4.43±2.16		NT	
Gross Beta	50 pCi/L	4 mrem/yr					NT		NT		4.31±1.23		NT		31.3±3.84		NT	

NOTES:

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Results for all inorganics other than metals, general parameters, and gross alpha/gross beta are listed in this table.

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U = Analyte not detected above quantitation limit.

TABLE 3-11
Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: MP-4_03 02/04/2003 Primary Sample	MP-4_04 02/04/2003 Primary Sample	MP-4_05 02/04/2003 Primary Sample	MP-5_01 10/03/2003 Primary Sample	MP-5_01 04/22/2004 Primary Sample	MP-5_01 04/22/2004 Field Duplicate
Other Inorganics												
Anions **:**												
Bromide							0.548	1.81	0.473 J	0.5 U	0.5 U	0.5 U
Chloride			250 to 500	250			67.4	208	55.8	43.5	36.9	38.5
Fluoride	2	4		2	1		0.632	0.424	0.603	0.653	0.416	0.413
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			110	3.76	115	137	119	124
Nitrogen :												
Ammonia							0.135	0.114	0.156	0.149 U	NT	NT
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		0.1 U	0.1 U	0.1 U	5.27	5.19	5.18
Total Kjeldahl Nitrogen (TKN)							0.29 U	0.32 U	0.21 U	0.865 U	NT	NT
General Parameters												
Bicarbonate Alkalinity							179	174	166	231	259	262
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							24.2 J	10.7 J	15.2 J	6.99	NT	NT
Chemical Oxygen Demand (COD)							56.5	20.8	17.8	11.7	NT	NT
Total Dissolved Solids (TDS)			500 to 1,000	500			524	555	449	495	530	536
Total Organic Carbon (TOC)							15.5	5 U	5 U	5 U	NT	NT
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					0.727±1.40	0.000±0.817	12.5±2.98	4.19±1.79	NT	NT
Gross Beta	50 pCi/L	4 mrem/yr					0.000±1.03	0.580±1.11	4.14±1.53	1.93±1.19	NT	NT

NOTES:

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pCi/L = picocurie per liter
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U = Analyte not detected above quantitation limit.

TABLE 3-11
Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels: CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	Analytical Results: MP-5_02 10/03/2003 Primary Sample	MP-5_02 10/03/2003 Field Duplicate	MP-5_02 04/22/2004 Primary Sample	MP-5_03 10/02/2003 Primary Sample	MP-5_03 04/22/2004 Primary Sample	MP-5_04 10/02/2003 Primary Sample
Other Inorganics												
Anions **:**												
Bromide							0.271 J	0.283 J	0.5 U	0.5 U	0.5 U	0.5 U
Chloride			250 to 500	250			32.2	31.9	23.8	50.2	40.3	57.4
Fluoride	2	4		2	1		0.618	0.614	0.262	0.541 J	0.255	0.623 J
Phosphorus (Orthophosphate)							0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sulfate			250 to 500	250			116	114	84.1	112	148	151
Nitrogen :												
Ammonia							0.319 U	0.278 U	NT	0.134 U	NT	0.1 U
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		3.24	3.29	3.58	4.57	5.74	6.6
Total Kjeldahl Nitrogen (TKN)							0.121 U	0.787 U	NT	0.351 U	NT	0.849 U
General Parameters												
Bicarbonate Alkalinity							176	176	185	219	252	254
Carbonate Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Hydroxide Alkalinity							5 U	5 U	5 U	5 U	5 U	5 U
Biochemical Oxygen Demand (BOD)							1 U	10.9	NT	1 U	NT	11.8
Chemical Oxygen Demand (COD)							10 U	17.5	NT	10 U	NT	23.4
Total Dissolved Solids (TDS)			500 to 1,000	500			417	405	370	558	556	640
Total Organic Carbon (TOC)							5 U	5 U	NT	5 U	NT	5 U
Radioactivity (in pCi/L)												
Gross Alpha	15 pCi/L	15 pCi/L					5.18±1.81	5.6±1.88	NT	7.73±1.85	NT	5.01±1.91
Gross Beta	50 pCi/L	4 mrem/yr					1.38±1.20	0.54±1.13	NT	1.54±1.28	NT	2.39±1.24

NOTES:

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TABLE 3-11

Analytical Results for Other Inorganics, General Parameters, and Radioactivity

Parameter	Regulatory Action Levels						Analytical Results			
	CA Primary MCL	USEPA Primary MCL	CA Secondary MCL	USEPA Secondary MCL	CA OEHHA PHG	CA DHS AL	MP-5_04 04/22/2004 Primary Sample		SS-1 02/11/2003 Primary Sample	
Other Inorganics										
Anions **:**										
Bromide							0.5	U	0.801	
Chloride			250 to 500	250			42.7		202	
Fluoride	2	4		2	1		0.343		1.67	
Phosphorus (Orthophosphate)							0.5	U	0.5	U
Sulfate			250 to 500	250			178		235	
Nitrogen :										
Ammonia							NT		0.259	
Nitrate+Nitrite (as Nitrogen [N])	10	10			10		7.4		0.1	U
Total Kjeldahl Nitrogen (TKN)							NT		0.4	
General Parameters										
Bicarbonate Alkalinity							296		234	
Carbonate Alkalinity							5	U	50.8	
Hydroxide Alkalinity							5	U	5	U
Biochemical Oxygen Demand (BOD)							NT		61	J
Chemical Oxygen Demand (COD)							NT		243	
Total Dissolved Solids (TDS)			500 to 1,000	500			670		1460	
Total Organic Carbon (TOC)							NT		89.2	
Radioactivity (in pCi/L)										
Gross Alpha	15 pCi/L	15 pCi/L					NT		9.61±3.13	
Gross Beta	50 pCi/L	4 mrem/yr					NT		6.85±3.54	

NOTES:

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Appendix B

Figures Reproduced from the Modeling Report Entitled
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California
Dated December 2004 by CH2MHILL

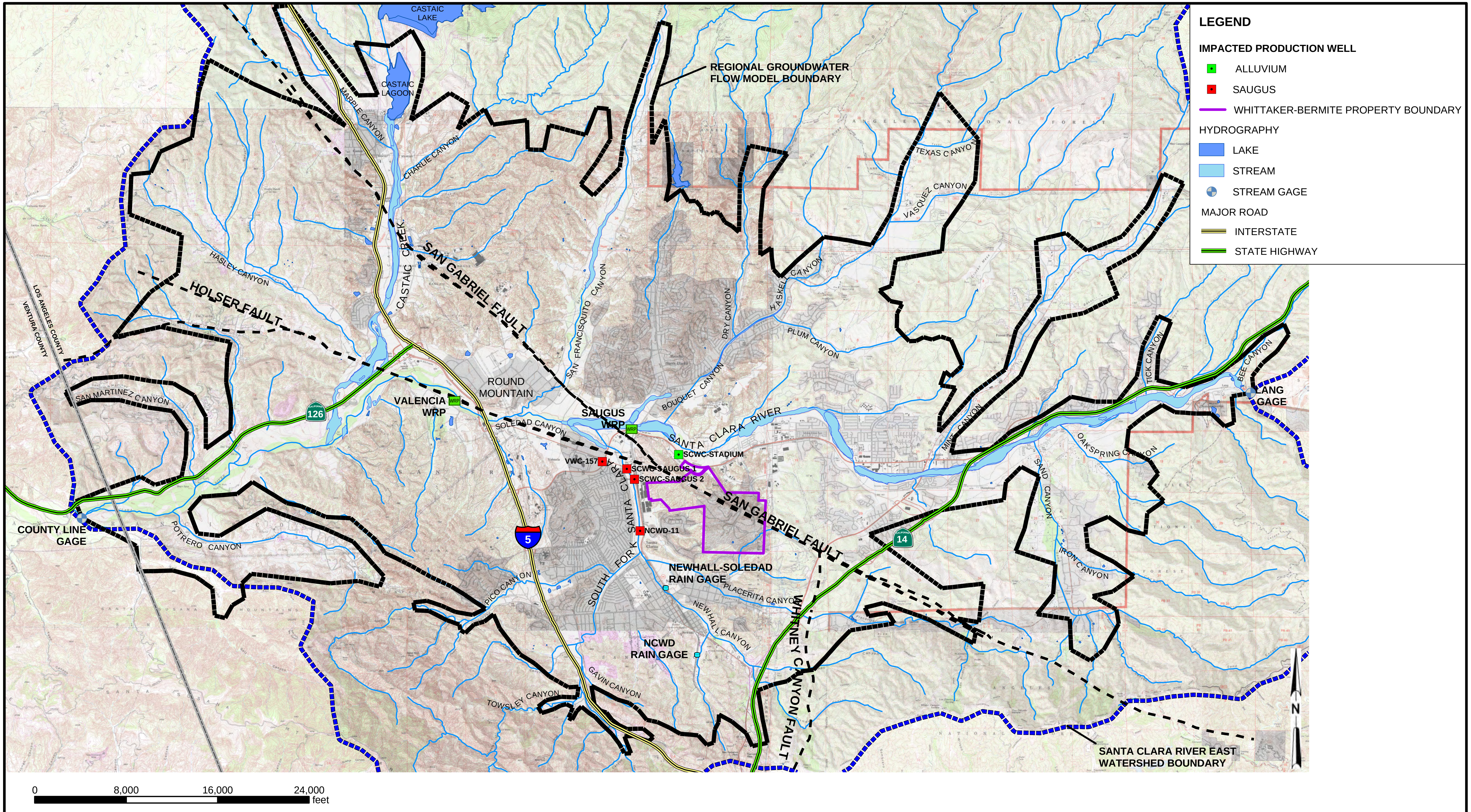

FIGURE 1-1
MAP OF STUDY AREA
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

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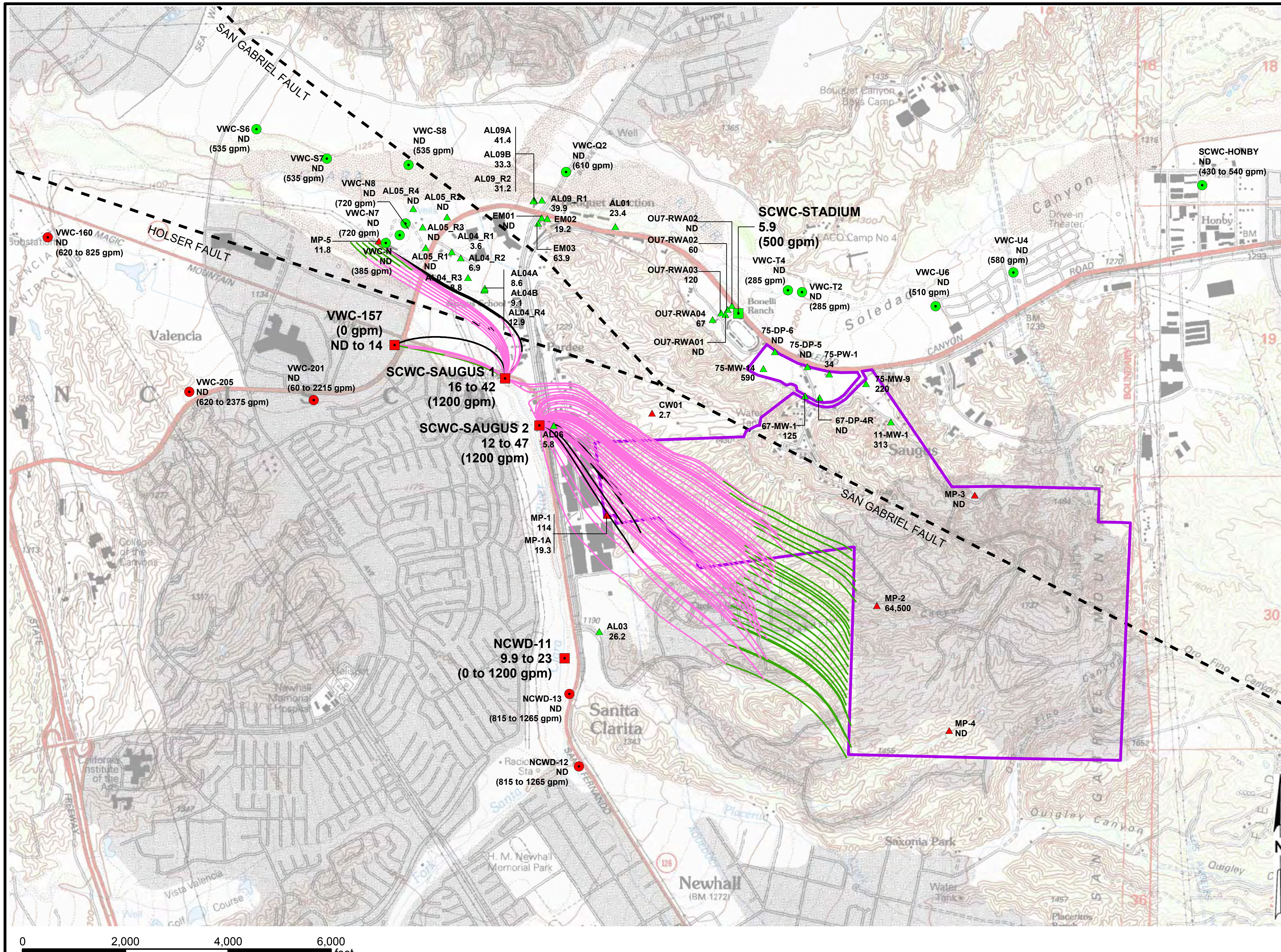


LEGEND

IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

NON-IMPACTED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELLS

- ALLUVIUM
- SAUGUS

GROUNDWATER FLOWPATH

- MODEL LAYER 1
- MODEL LAYER 2
- MODEL LAYER 3
- MODEL LAYER 4
- MODEL LAYER 5
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (μg/L).
2. INDICATED PUMPING RATES REPRESENT INSTANTANEOUS RATES WHEN THE WELL OPERATES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. μg/L = MICROGRAMS PER LITER; gpm = GALLONS PER MINUTE
5. FLOWPATHS AT VWC-157 AND MP-5 ARE INITIATED IN MODEL LAYERS 2, 3, 4, AND 5. FLOWPATHS AT THE WHITTAKER-BERMITE PROPERTY BOUNDARY ARE INITIATED IN MODEL LAYER 3.
6. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND THE SAUGUS FORMATION.

FIGURE ES-3
GROUNDWATER FLOWPATHS IN THE SAUGUS FORMATION FROM VWC-157, MP-5, AND THE WESTERN BOUNDARY OF THE WHITTAKER-BERMITE PROPERTY
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

Appendix C

Cost Analysis

Table C-1: Alternative 1 Capital Costs

Alternative: No Action
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Installation of sentinel monitoring wells and implementation of a long-term monitoring program.

Description	Quantity	Unit	Unit Cost	Total
Sentinel Monitoring Programs				
Monitoring Well Installation	2	EA	$ 328,000	$ 656,000
Baseline Sampling	11	EA	$ 610	$ 6,710
Baseline Analyses	11	EA	$ 533	$ 5,863
Baseline Residuals Management	1	LS	$ 1,500	$ 1,500
Subtotal				$ 670,073
Subtotal				**$ 670,073**
Engineering, Admin., Inspection, Permitting, Easement	25%			$ 167,518
Contingency	20%			$ 134,015
Total Capital Cost for Alternative 1				**$ 971,606**

Notes:

1. Costs associated with capacity replacement are not included (i.e. additional wells, piping, and associated pumps).

Table C-2: Alternative 1 Annual O&M Costs

Alternative: No Action
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Installation of sentinel monitoring wells and implementation of a long-term monitoring program.

	Quantity	Unit	Unit Cost	Total Cost	
				Odd Year	Even Year
Sentinel Monitoring Program					
Odd Year Sampling	22	EA	$ 488	$ 10,736	
Even Year Sampling	22	EA	$ 610		$ 13,420
Odd Year Analysis	22	EA	$ 525	$ 11,550	
Even Year Analysis	22	EA	$ 773		$ 17,006
Residuals Management	2	LS	$ 1,500	$ 3,000	$ 3,000
Subtotal				$ 25,286	$ 33,426
Subtotal				**$ 25,286**	**$ 33,426**
Contingency	20%			$ 5,057	$ 6,685
Subtotal				**$ 30,343**	**$ 40,111**
Technical Support and Report Preparation	15%			$ 4,551	$ 6,017
Total Annual O&M Costs for Alternative 1				**$ 34,895**	**$ 46,128**

Notes

1. Costs associated with capacity replacement are not included (i.e. additional wells, piping, and associated pumps).

Table C-3: Alternative 1 Present Value Analysis

Alternative: No Action
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Installation of sentinel monitoring wells and implementation of a long-term monitoring program.

Year	Capital Costs	Annual O&M Costs	Period Costs	Total Costs	Cost Factor:	Present Value
0	$ 971,606	$ -	$ -	$ 971,606	1.000	$ 971,606
1	$ -	$ 34,895	$ -	$ 34,895	0.966	$ 33,715
2	$ -	$ 46,128	$ -	$ 46,128	0.934	$ 43,061
3	$ -	$ 34,895	$ -	$ 34,895	0.902	$ 31,473
4	$ -	$ 46,128	$ -	$ 46,128	0.871	$ 40,198
5	$ -	$ 34,895	$ -	$ 34,895	0.842	$ 29,380
6	$ -	$ 46,128	$ -	$ 46,128	0.814	$ 37,525
7	$ -	$ 34,895	$ -	$ 34,895	0.786	$ 27,427
8	$ -	$ 46,128	$ -	$ 46,128	0.759	$ 35,030
9	$ -	$ 34,895	$ -	$ 34,895	0.734	$ 25,603
10	$ -	$ 46,128	$ -	$ 46,128	0.709	$ 32,701
11	$ -	$ 34,895	$ -	$ 34,895	0.685	$ 23,901
12	$ -	$ 46,128	$ -	$ 46,128	0.662	$ 30,527
13	$ -	$ 34,895	$ -	$ 34,895	0.639	$ 22,312
14	$ -	$ 46,128	$ -	$ 46,128	0.618	$ 28,497
15	$ -	$ 34,895	$ -	$ 34,895	0.597	$ 20,828
16	$ -	$ 46,128	$ -	$ 46,128	0.577	$ 26,602
17	$ -	$ 34,895	$ -	$ 34,895	0.557	$ 19,443
18	$ -	$ 46,128	$ -	$ 46,128	0.538	$ 24,833
19	$ -	$ 34,895	$ -	$ 34,895	0.520	$ 18,151
20	$ -	$ 46,128	$ -	$ 46,128	0.503	$ 23,182
21	$ -	$ 34,895	$ -	$ 34,895	0.486	$ 16,944
22	$ -	$ 46,128	$ -	$ 46,128	0.469	$ 21,641
23	$ -	$ 34,895	$ -	$ 34,895	0.453	$ 15,817
24	$ -	$ 46,128	$ -	$ 46,128	0.438	$ 20,202
25	$ -	$ 34,895	$ -	$ 34,895	0.423	$ 14,766
26	$ -	$ 46,128	$ -	$ 46,128	0.409	$ 18,859
27	$ -	$ 34,895	$ -	$ 34,895	0.395	$ 13,784
28	$ -	$ 46,128	$ -	$ 46,128	0.382	$ 17,605
29	$ -	$ 34,895	$ -	$ 34,895	0.369	$ 12,867
30	$ -	$ 46,128	$ -	$ 46,128	0.356	$ 16,434
Total	$ 971,606	$ 1,215,338	$ -	$ 2,186,944		$ 1,714,914

Total Present Value of Alternative 1 **$ 1,714,914**

Notes:

1. Real discount rate (base year 2004): 3.5%
   As indicated for a 30-year maturity in Circular A94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. http://www.whitehouse.gov/omb/circulars/a094/a094.html

Table C-4: Alternative 2 Capital Costs

Alternative: Ion Exchange
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, ion-exchange treatment with 2,400 gpm capacity, discharge of treated groundwater into existing 84-inch treated water distribution pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Description	Quantity	Unit	Unit Cost	Total
Conversion of existing infrastructure				
16-inch Steel CMC&L Pipe	4621	FT	$ 160	$ 739,360
Connection for SCWD Saugus Well #1	1	LS	$ 10,000	$ 10,000
10-inch Steel CMC&L Pipe	1300	FT	$ 60	$ 78,000
Connection for SCWD Saugus Well #2	1	LS	$ 10,000	$ 10,000
Connection Between 10-inch and Existing 14-inch Pipe	1	LS	$ 10,000	$ 10,000
Connection Between Existing 14-inch and Existing 21-inch Pipe	1	LS	$ 10,000	$ 10,000
Disconnection of 21-inch from Existing Treated Water Pipe	1	LS	$ 5,000	$ 5,000
Connection of 21-inch to New 16-inch Pipe	1	LS	$ 10,000	$ 10,000
Connection at RVIPS	1	LS	$ 10,000	$ 10,000
1-inch AVAR	2	LS	$ 2,000	$ 4,000
2-inch AVAR	1	LS	$ 3,000	$ 3,000
4-inch Pump Out	2	LS	$ 5,000	$ 10,000
16-inch Valve	5	EA	$ 4,000	$ 20,000
16-inch Flex Coupling Sets	5	EA	$ 8,000	$ 40,000
Contractor Overhead & Profit (included in above items)	1	LS	$ -	$ -
Subtotal				$ 959,360
Ion Exchange Treatment System				
Design, procurement, mobilize, and storage/security (includes analytical start-up)	1	LS	$ 1,536,260	$ 1,536,260
Construction Costs	1	LS	$ 323,175	$ 323,175
Inlet Bag Filter	1	LS	$ 45,700	$ 45,700
Acid Feed Equipment	1	LS	$ 24,500	$ 24,500
Resin Spill Containment	1	LS	$ 5,250	$ 5,250
Hydrotest and Sanitation Water	1	LS	$ 41,260	$ 41,260
Insurance Premium	1	LS	$ 47,000	$ 47,000
Contractor Overhead & Profit (included in above items)	1	LS	$ -	$ -
Subtotal				$ 2,023,145
Ancillary Treatment System Components				
Site Preparation	1	LS	$ 20,000	$ 20,000
Site Piping	1	LS	$ 75,000	$ 75,000
Earthwork	1	LS	$ 15,000	$ 15,000
Slope Protection	1	LS	$ 5,000	$ 5,000
Paving	1	LS	$ 15,000	$ 15,000
Concrete Curb and Gutters	1	LS	$ 5,000	$ 5,000
Security Fencing	1	LS	$ 10,000	$ 10,000
Landscape Restoration	1	LS	$ 15,000	$ 15,000
Concrete Pads	1	LS	$ 30,000	$ 30,000
Concrete Retaining Walls/Stairs	1	LS	$ 25,000	$ 25,000
Handrail and Miscellaneous Metals	1	LS	$ 10,000	$ 10,000

Table C-4: Alternative 2 Capital Costs

Alternative: Ion Exchange
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, ion-exchange treatment with 2,400 gpm capacity, discharge of treated groundwater into existing 84-inch treated water distribution pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Description	Quantity	Unit	Unit Cost	Total
Architectural Screen	1	LS	$ 75,000	$ 75,000
Pumps	1	LS	$ 30,000	$ 30,000
Treated Water Tank	1	LS	$ 15,000	$ 15,000
Mechanical Piping	1	LS	$ 100,000	$ 100,000
Electrical	1	LS	$ 128,800	$ 128,800
Instrumentation and SCADA	1	LS	$ 77,280	$ 77,280
Chloramination System (includes equipment, electrical, and instrumentation)	1	LS	$ 265,675	$ 265,675
Contractor Overhead & Profit	1	LS	$ 165,016	$ 165,016
Subtotal				$ 1,081,771
Well Abandonment				
Abandonment of Well NC-11	1	LS	$ 100,000	$ 100,000
Abandonment of Well V-157	1	LS	$ 100,000	$ 100,000
Subtotal				$ 200,000
Monitoring Programs				
Sentinel Monitoring Well Installation	2	EA	$ 328,000	$ 656,000
Sentinel Baseline Sampling	11	EA	$ 610	$ 6,710
Sentinel Baseline Analyses	11	EA	$ 533	$ 5,863
Sentinel Baseline Residuals Management	1	LS	$ 1,500	$ 1,500
Subtotal				$ 670,073
Subtotal				**$ 4,934,349**
Engineering, Admin., Inspection, Permitting, Easement	25%			$ 1,233,587
Contingency	20%			$ 986,870
Total Capital Cost for Alternative 2				**$ 7,154,806**

Notes:

1. Costs associated with capacity replacement are not included (i.e. additional wells, piping, and associated pumps).
2. Costs associated with pump replacement in Wells Saugus 1 and Saugus 2 have already been incurred by the Purveyors and have not been included in this cost estimate.

Table C-5: Alternative 2 Annual O&M Costs

Alternative: Ion Exchange
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, ion-exchange treatment with 2,400 gpm capacity, discharge of treated groundwater into existing 84-inch treated water distribution pipeline, abandon Wells NC-11 and V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

	Quantity	Unit	Unit Cost	Total Cost	
				Odd Year	Even Year
Operations					
Turnkey Services	1	LS	$ 974,039	$ 974,039	$ 974,039
Electricity (treatment system)	1	LS	$ 301,741	$ 301,741	$ 301,741
Electricity (Saugus 1 & 2 Pumps)	3,919,399.2	KW-HR	$ 0.10	$ 391,940	$ 391,940
Inlet Bag Filter	1	LS	$ 12,540	$ 12,540	$ 12,540
Acid Feed	1	LS	$ 14,740	$ 14,740	$ 14,740
Disinfection	1	LS	$ 24,402	$ 24,402	$ 24,402
Annual Laboratory cost	1	LS	$ 12,000	$ 12,000	$ 12,000
Backwash Effluent Disposal (not included)	1	LS	$ -	$ -	$ -
Subtotal				$ 1,731,402	$ 1,731,402
Sentinel Monitoring Program					
Odd Year Sampling	22	EA	$ 488	$ 10,736	
Even Year Sampling	22	EA	$ 610		$ 13,420
Odd Year Analysis	22	EA	$ 525	$ 11,550	
Even Year Analysis	22	EA	$ 773		$ 17,006
Residuals Management	2	LS	$ 1,500	$ 3,000	$ 3,000
Subtotal				$ 25,286	$ 33,426
Subtotal				**$ 1,756,688**	**$ 1,764,828**
Contingency	20%			$ 351,338	$ 352,966
Subtotal				**$ 2,108,025**	**$ 2,117,793**
Technical Support and Report Preparation	15%			$ 316,204	$ 317,669
Total Annual O&M Costs for Alternative 2				**$ 2,424,229**	**$ 2,435,462**

Notes

1. Costs associated with capacity replacement are not included (i.e. additional wells, piping, and associated pumps).
2. Costs based on a flow rate of 2,200 gallons per minute.
3. Cost for turnkey services includes the cost of resin removal and incineration at a non-hazardous waste disposal facility.

Table C-6: Alternative 2 Present Value Analysis

Alternative: Ion Exchange
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, ion-exchange treatment with 2,400 gpm capacity, discharge of treated water into existing 84-inch treated water distribution pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Year	Capital Costs	Annual O&M Costs	Period Costs	Total Costs	Cost Factor:	Present Value
0	$ 7,154,806	$ -	$ -	$ 7,154,806	1.000	$ 7,154,806
1	$ -	$ 2,424,229	$ -	$ 2,424,229	0.966	$ 2,342,250
2	$ -	$ 2,435,462	$ -	$ 2,435,462	0.934	$ 2,273,530
3	$ -	$ 2,424,229	$ -	$ 2,424,229	0.902	$ 2,186,516
4	$ -	$ 2,435,462	$ -	$ 2,435,462	0.871	$ 2,122,364
5	$ -	$ 2,424,229	$ -	$ 2,424,229	0.842	$ 2,041,136
6	$ -	$ 2,435,462	$ -	$ 2,435,462	0.814	$ 1,981,250
7	$ -	$ 2,424,229	$ -	$ 2,424,229	0.786	$ 1,905,422
8	$ -	$ 2,435,462	$ -	$ 2,435,462	0.759	$ 1,849,518
9	$ -	$ 2,424,229	$ -	$ 2,424,229	0.734	$ 1,778,732
10	$ -	$ 2,435,462	$ -	$ 2,435,462	0.709	$ 1,726,545
11	$ -	$ 2,424,229	$ -	$ 2,424,229	0.685	$ 1,660,465
12	$ -	$ 2,435,462	$ -	$ 2,435,462	0.662	$ 1,611,748
13	$ -	$ 2,424,229	$ -	$ 2,424,229	0.639	$ 1,550,062
14	$ -	$ 2,435,462	$ -	$ 2,435,462	0.618	$ 1,504,584
15	$ -	$ 2,424,229	$ -	$ 2,424,229	0.597	$ 1,446,999
16	$ -	$ 2,435,462	$ -	$ 2,435,462	0.577	$ 1,404,545
17	$ -	$ 2,424,229	$ -	$ 2,424,229	0.557	$ 1,350,789
18	$ -	$ 2,435,462	$ -	$ 2,435,462	0.538	$ 1,311,158
19	$ -	$ 2,424,229	$ -	$ 2,424,229	0.520	$ 1,260,976
20	$ -	$ 2,435,462	$ -	$ 2,435,462	0.503	$ 1,223,980
21	$ -	$ 2,424,229	$ -	$ 2,424,229	0.486	$ 1,177,135
22	$ -	$ 2,435,462	$ -	$ 2,435,462	0.469	$ 1,142,599
23	$ -	$ 2,424,229	$ -	$ 2,424,229	0.453	$ 1,098,868
24	$ -	$ 2,435,462	$ -	$ 2,435,462	0.438	$ 1,066,628
25	$ -	$ 2,424,229	$ -	$ 2,424,229	0.423	$ 1,025,805
26	$ -	$ 2,435,462	$ -	$ 2,435,462	0.409	$ 995,709
27	$ -	$ 2,424,229	$ -	$ 2,424,229	0.395	$ 957,600
28	$ -	$ 2,435,462	$ -	$ 2,435,462	0.382	$ 929,505
29	$ -	$ 2,424,229	$ -	$ 2,424,229	0.369	$ 893,930
30	$ -	$ 2,435,462	$ -	$ 2,435,462	0.356	$ 867,703
Total	$ 7,154,806	$ 72,895,364	$ -	$ 80,050,170		$ 51,842,857

Total Present Value of Alternative 2 **$ 51,842,857**

Notes:

1. Real discount rate (base year 2004): 3.5%
   As indicated for a 30-year maturity in Circular A94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. http://www.whitehouse.gov/omb/circulars/a094/a094.html

Table C-7: Alternative 3 Capital Costs

Alternative: Fluidized Bed Reactor
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, fluidized bed reactor treatment with 2,400 gpm capacity, discharge of treated water into existing 102-inch raw water pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Description	Quantity	Unit	Unit Cost	Total
Conversion of existing infrastructure				
16-inch Steel CMC&L Pipe	4621	FT	$ 160	$ 739,360
Connection for SCWD Saugus Well #1	1	LS	$ 10,000	$ 10,000
10-inch Steel CMC&L Pipe	1300	FT	$ 60	$ 78,000
Connection for SCWD Saugus Well #2	1	LS	$ 10,000	$ 10,000
Connection Between 10-inch and Existing 14-inch Pipe	1	LS	$ 10,000	$ 10,000
Connection Between Existing 14-inch and Existing 21-inch Pipe	1	LS	$ 10,000	$ 10,000
Disconnection of 21-inch from Treated Water Pipe	1	LS	$ 5,000	$ 5,000
Connection of 21-inch to New 16-inch Pipe	1	LS	$ 10,000	$ 10,000
Connection at RVIPS	1	LS	$ 10,000	$ 10,000
1-inch AVAR	2	LS	$ 2,000	$ 4,000
2-inch AVAR	1	LS	$ 3,000	$ 3,000
4-inch Pump Out	2	LS	$ 5,000	$ 10,000
16-inch Valve	5	EA	$ 4,000	$ 20,000
16-inch Flex Coupling Sets	5	EA	$ 8,000	$ 40,000
Contractor Overhead & Profit (included in above items)	1	LS	$ -	$ -
Subtotal				$ 959,360
Fluidized Bed Reactor Treatment System				
Design	1	LS	$ 1,017,300	$ 1,017,300
Procurement, mobilize, storage/security (includes analytical for start up)	1	LS	$ 3,437,500	$ 3,437,500
Construction Costs	1	LS	$ 1,093,700	$ 1,093,700
Filtration Equipment	1	LS	$ 1,900,000	$ 1,900,000
Acid Feed Equipment	1	LS	$ 24,500	$ 24,500
Insurance Premium	1	LS	$ 47,000	$ 47,000
Contractor Overhead & Profit (included in above items)	1	LS	$ -	$ -
Subtotal				$ 7,520,000
Ancillary Treatment System Components				
Site Preparation	1	LS	$ 20,000	$ 20,000
Site Piping	1	LS	$ 75,000	$ 75,000
Earthwork	1	LS	$ 15,000	$ 15,000
Slope Protection	1	LS	$ 5,000	$ 5,000
Paving	1	LS	$ 15,000	$ 15,000
Concrete Curb and Gutters	1	LS	$ 5,000	$ 5,000
Security Fencing	1	LS	$ 10,000	$ 10,000
Landscape Restoration	1	LS	$ 15,000	$ 15,000
Concrete Pads	1	LS	$ 30,000	$ 30,000
Concrete Retaining Walls/Stairs	1	LS	$ 25,000	$ 25,000
Handrail and Miscellaneous Metals	1	LS	$ 10,000	$ 10,000
Architectural Screen	1	LS	$ 75,000	$ 75,000

Table C-7: Alternative 3 Capital Costs

Alternative: Fluidized Bed Reactor
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, fluidized bed reactor treatment with 2,400 gpm capacity, discharge of treated water into existing 102-inch raw water pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Description	Quantity	Unit	Unit Cost	Total
Pumps	1	LS	$ 30,000	$ 30,000
Treated Water Tank	1	LS	$ 15,000	$ 15,000
Mechanical Piping	1	LS	$ 100,000	$ 100,000
Electrical	1	LS	$ 117,375	$ 117,375
Instrumentation and SCADA	1	LS	$ 70,425	$ 70,425
Chloramination System (includes equipment, electrical, and instrumentation)	1	LS	$ 265,675	$ 265,675
Contractor Overhead & Profit	1	LS	$ 161,726	$ 161,726
Subtotal				$ 1,060,201
Well Abandonment				
Abandonment of Well NC-11	1	LS	$ 100,000	$ 100,000
Abandonment of Well V-157	1	LS	$ 100,000	$ 100,000
Subtotal				$ 200,000
Monitoring Programs				
Sentinel Monitoring Well Installation	2	EA	$ 328,000	$ 656,000
Sentinel Baseline Sampling	11	EA	$ 610	$ 6,710
Sentinel Baseline Analyses	11	EA	$ 533	$ 5,863
Sentinel Baseline Residuals Management	1	LS	$ 1,500	$ 1,500
Subtotal				$ 670,073
Subtotal				**$ 10,409,634**
Engineering, Admin., Inspection, Permitting, Easement	25%			$ 2,602,408
Contingency	20%			$ 2,081,927
Total Capital Cost for Alternative 3				**$ 15,093,969**

Notes:

1. Costs associated with capacity replacement are not included (i.e. additional wells, piping, and associated pumps).
2. Costs associated with pump replacement in Wells Saugus 1 and Saugus 2 have already been incurred by the Purveyors and have not been included in this cost estimate.

Table C-8: Alternative 3 Annual O&M Costs

Alternative: Fluidized Bed Reactor
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, fluidized bed reactor treatment with 2,400 gpm capacity, discharge of treated water into existing 102-inch raw water pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

	Quantity	Unit	Unit Cost	Total Cost	
Operations				Odd Year	Even Year
Turnkey Services (includes electricity)	1	LS	$ 730,995	$ 730,995	$ 730,995
Electricity (Saugus 1 & 2 Pumps)	3,919,399.2	KW-HR	$ 0.10	$ 391,940	$ 391,940
Disinfection Equipment	1	LS	$ 24,402	$ 24,402	$ 24,402
Solids Disposal	1	LS	$ 6,738	$ 6,738	$ 6,738
Subtotal				$ 1,154,074	$ 1,154,074
Sentinel Monitoring Program					
Odd Year Sampling	22	EA	$ 488	$ 10,736	
Even Year Sampling	22	EA	$ 610		$ 13,420
Odd Year Analysis	22	EA	$ 525	$ 11,550	
Even Year Analysis	22	EA	$ 773		$ 17,006
Residuals Management	2	LS	$ 1,500	$ 3,000	$ 3,000
Subtotal				$ 25,286	$ 33,426
Subtotal				**$ 1,179,360**	**$ 1,187,500**
Contingency	20%			$ 235,872	$ 237,500
Subtotal				**$ 1,415,232**	**$ 1,425,000**
Technical Support and Report Preparation	15%			$ 212,285	$ 213,750
Total Annual O&M Costs for Alternative 3				**$ 1,627,517**	**$ 1,638,750**

Notes

1. Costs associated with capacity replacement are not included (i.e. additional wells, piping, and associated pumps).
2. Does not include costs for treatment (filtration and disinfection) of groundwater (approximately 3.2 million gallons per day) at RVWTP.

Table C-9: Alternative 3 Present Value Analysis

Alternative: Fluidized Bed Reactor
Site: Production Wells
Location: Santa Clarita Valley, CA
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, fluidized bed reactor treatment with 2,400 gpm capacity, discharge of treated water into existing 102-inch raw water pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Year	Capital Costs	Annual O&M Costs	Period Costs	Total Costs	Cost Factor:	Present Value
0	$ 15,093,969	$ -	$ -	$ 15,093,969	1.000	$ 15,093,969
1	$ -	$ 1,627,517	$ -	$ 1,627,517	0.966	$ 1,572,480
2	$ -	$ 1,638,750	$ -	$ 1,638,750	0.934	$ 1,529,791
3	$ -	$ 1,627,517	$ -	$ 1,627,517	0.902	$ 1,467,927
4	$ -	$ 1,638,750	$ -	$ 1,638,750	0.871	$ 1,428,076
5	$ -	$ 1,627,517	$ -	$ 1,627,517	0.842	$ 1,370,325
6	$ -	$ 1,638,750	$ -	$ 1,638,750	0.814	$ 1,333,124
7	$ -	$ 1,627,517	$ -	$ 1,627,517	0.786	$ 1,279,213
8	$ -	$ 1,638,750	$ -	$ 1,638,750	0.759	$ 1,244,486
9	$ -	$ 1,627,517	$ -	$ 1,627,517	0.734	$ 1,194,159
10	$ -	$ 1,638,750	$ -	$ 1,638,750	0.709	$ 1,161,741
11	$ -	$ 1,627,517	$ -	$ 1,627,517	0.685	$ 1,114,761
12	$ -	$ 1,638,750	$ -	$ 1,638,750	0.662	$ 1,084,497
13	$ -	$ 1,627,517	$ -	$ 1,627,517	0.639	$ 1,040,641
14	$ -	$ 1,638,750	$ -	$ 1,638,750	0.618	$ 1,012,390
15	$ -	$ 1,627,517	$ -	$ 1,627,517	0.597	$ 971,450
16	$ -	$ 1,638,750	$ -	$ 1,638,750	0.577	$ 945,077
17	$ -	$ 1,627,517	$ -	$ 1,627,517	0.557	$ 906,859
18	$ -	$ 1,638,750	$ -	$ 1,638,750	0.538	$ 882,239
19	$ -	$ 1,627,517	$ -	$ 1,627,517	0.520	$ 846,562
20	$ -	$ 1,638,750	$ -	$ 1,638,750	0.503	$ 823,580
21	$ -	$ 1,627,517	$ -	$ 1,627,517	0.486	$ 790,275
22	$ -	$ 1,638,750	$ -	$ 1,638,750	0.469	$ 768,821
23	$ -	$ 1,627,517	$ -	$ 1,627,517	0.453	$ 737,730
24	$ -	$ 1,638,750	$ -	$ 1,638,750	0.438	$ 717,702
25	$ -	$ 1,627,517	$ -	$ 1,627,517	0.423	$ 688,679
26	$ -	$ 1,638,750	$ -	$ 1,638,750	0.409	$ 669,983
27	$ -	$ 1,627,517	$ -	$ 1,627,517	0.395	$ 642,889
28	$ -	$ 1,638,750	$ -	$ 1,638,750	0.382	$ 625,436
29	$ -	$ 1,627,517	$ -	$ 1,627,517	0.369	$ 600,144
30	$ -	$ 1,638,750	$ -	$ 1,638,750	0.356	$ 583,851
Total	$ 15,093,969	$ 48,994,002	$ -	$ 64,087,971		$ 45,128,856

Total Present Value of Alternative 3 **$ 45,128,856**

Notes:

1. Real discount rate (base year 2004): 3.5%
   As indicated for a 30-year maturity in Circular A94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. http://www.whitehouse.gov/omb/circulars/a094/a094.html

Table C-10: Alternative 4 Capital Costs

Alternative: Membrane Filtration
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, membrane filtration treatment with 2,400 gpm capacity, discharge of treated water into existing 84-inch treated water distribution pipeline, abandon well NC-11. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Description	Quantity	Unit	Unit Cost	Total
Conversion of existing infrastructure				
16-inch Steel CMC&L Pipe	4621	FT	$ 160	$ 739,360
Connection for SCWD Saugus Well #1	1	LS	$ 10,000	$ 10,000
10-inch Steel CMC&L Pipe	1300	FT	$ 60	$ 78,000
Connection for SCWD Saugus Well #2	1	LS	$ 10,000	$ 10,000
Connection Between 10-inch and Existing 14-inch Pipe	1	LS	$ 10,000	$ 10,000
Connection Between Existing 14-inch and Existing 21-inch Pipe	1	LS	$ 10,000	$ 10,000
Disconnection of 21-inch from Treated Water Pipe	1	LS	$ 5,000	$ 5,000
Connection of 21-inch to New 16-inch Pipe	1	LS	$ 10,000	$ 10,000
Connection at RVIPS	1	LS	$ 10,000	$ 10,000
1-inch AVAR	2	LS	$ 2,000	$ 4,000
2-inch AVAR	1	LS	$ 3,000	$ 3,000
4-inch Pump Out	2	LS	$ 5,000	$ 10,000
16-inch Valve	5	EA	$ 4,000	$ 20,000
16-inch Flex Coupling Sets	5	EA	$ 8,000	$ 40,000
Contractor Overhead & Profit (included in above items)	1	LS	$ -	$ -
Subtotal				$ 959,360
Membrane Filtration Treatment System				
Design, procurement, mobilize, storage/security, and construction costs (includes pre-filtration and analytical start up)	1	LS	$ 9,700,000	$ 9,700,000
Booster Pump Station	1	LS	$ 963,500	$ 963,500
Insurance Premium	1	LS	$ 47,000	$ 47,000
Reject Disposal (not included)	1	LS	$ -	$ -
Contractor Overhead & Profit (included in above items)	1	LS	$ -	$ -
Subtotal				$ 10,710,500
Ancillary Treatment System Components				
Site Preparation	1	LS	$ 20,000	$ 20,000
Site Piping	1	LS	$ 75,000	$ 75,000
Earthwork	1	LS	$ 15,000	$ 15,000
Slope Protection	1	LS	$ 5,000	$ 5,000
Paving	1	LS	$ 15,000	$ 15,000
Concrete Curb and Gutters	1	LS	$ 5,000	$ 5,000
Security Fencing	1	LS	$ 10,000	$ 10,000
Landscape Restoration	1	LS	$ 15,000	$ 15,000
Concrete Pads	1	LS	$ 30,000	$ 30,000
Concrete Retaining Walls/Stairs	1	LS	$ 25,000	$ 25,000
Handrail and Miscellaneous Metals	1	LS	$ 10,000	$ 10,000
Architectural Screen	1	LS	$ 75,000	$ 75,000
Pumps	1	LS	$ 30,000	$ 30,000

Table C-10: Alternative 4 Capital Costs

Alternative: Membrane Filtration
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, membrane filtration treatment with 2,400 gpm capacity, discharge of treated water into existing 84-inch treated water distribution pipeline, abandon well NC-11. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Description	Quantity	Unit	Unit Cost	Total
Treated Water Tank	1	LS	$ 15,000	$ 15,000
Mechanical Piping	1	LS	$ 100,000	$ 100,000
Electrical	1	LS	$ 111,250	$ 111,250
Instrumentation and SCADA	1	LS	$ 66,750	$ 66,750
Chloramination System (includes equipment, electrical, and instrumentation)	1	LS	$ 265,675	$ 265,675
Contractor Overhead & Profit	1	LS	$ 159,962	$ 159,962
Subtotal				$ 1,048,637
Well Abandonment				
Abandonment of Well NC-11	1	LS	$ 100,000	$ 100,000
Abandonment of Well V-157	1	LS	$ 100,000	$ 100,000
Subtotal				$ 200,000
Monitoring Programs				
Sentinel Monitoring Well Installation	2	EA	$ 328,000	$ 656,000
Sentinel Baseline Sampling	11	EA	$ 610	$ 6,710
Sentinel Baseline Analyses	11	EA	$ 533	$ 5,863
Sentinel Baseline Residuals Management	1	LS	$ 1,500	$ 1,500
Subtotal				$ 670,073
Subtotal				**$ 13,588,570**
Engineering, Admin., Inspection, Permitting, Easement	25%			$ 3,397,142
Contingency	20%			$ 2,717,714
Total Capital Cost for Alternative 4				**$ 19,703,426**

Notes:

1. Costs associated with capacity replacement are not included (i.e. additional wells, piping, and associated pumps).
2. Costs associated with pump replacement in Wells Saugus 1 and Saugus 2 have already been incurred by the Purveyors and have not been included in this cost estimate.
3. Membrane filtration treatment system costs are estimated using cost curve for nanofiltration from the 5 May 2000 American Water Works Association Research Foundation (AwwaRF) Report entitled "Cost Implications of a Lower Arsenic MCL. Final Report."
4. Pump station based on actual costs for Port Hueneme Water Authority's Brackish Water Reclamation Demonstration Facility.
5. Costs associated with disposal of RO reject water are not included, but could be substantial.

Table C-11: Alternative 4 Annual O&M Costs

Alternative: Membrane Filtration
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, membrane filtration treatment with 2,400 gpm capacity, discharge of treated water into existing 84-inch treated water distribution pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

	Quantity	Unit	Unit Cost	Total Cost	
Operations				Odd Year	Even Year
Turnkey Services	1	LS	$ 1,305,700	$ 1,305,700	$ 1,305,700
Extra Electricity - Booster Pump Station	1	LS	$ 67,650	$ 67,650	$ 67,650
Electricity (Saugus 1 & 2 Pumps)	3,919,399.2	KW-HR	$ 0.10	$ 391,940	$ 391,940
Value of Reject Water	1	LS	$ 284,167	$ 284,167	$ 284,167
Disinfection Equipment	1	LS	$ 24,402	$ 24,402	$ 24,402
Reject (Brine) Disposal (not Included)	1	LS	$ -	$ -	$ -
Subtotal				$ 2,073,858	$ 2,073,858
Sentinel Monitoring Program					
Odd Year Sampling	22	EA	$ 488	$ 10,736	
Even Year Sampling	22	EA	$ 610		$ 13,420
Odd Year Analysis	22	EA	$ 525	$ 11,550	
Even Year Analysis	22	EA	$ 773		$ 17,006
Residuals Management	2	LS	$ 1,500	$ 3,000	$ 3,000
Subtotal				$ 25,286	$ 33,426
Subtotal				**$ 2,099,144**	**$ 2,107,284**
Contingency	20%			$ 419,829	$ 421,457
Subtotal				**$ 2,518,973**	**$ 2,528,741**
Technical Support and Report Preparation	15%			$ 377,846	$ 379,311
Total Annual O&M Costs for Alternative 4				**$2,896,819**	**$2,908,052**

Notes

1. Membrane filtration treatment system "Turnkey" O&M costs are estimated using cost curve for nanofiltration from 2004 AwwaRF final report on "Cost Implications of a Lower Arsenic MCL."
2. Extra electricity to boost RO permeate 80 psig to 100 psig delivery pressure.
3. Value of RO reject water has been included, as this is a lost asset.
4. O&M costs associated with RO reject disposal are not included, but could be substantial.

Table C-12: Alternative 4 Present Value Analysis

Alternative: Membrane Filtration
Site: Production Wells
Location: Santa Clarita, California
Phase: Planning (-30% to +50% accuracy)
Base Year: 2004

Description: Utilization of existing water distribution system with some modifications and additions, membrane filtration treatment with 2,400 gpm capacity, discharge of treated water into existing 84-inch treated water distribution pipeline, abandon Wells NC-11 & V-157. Capital costs occur in Year 0. Annual O&M costs occur in Years 1-30.

Year	Capital Costs	Annual O&M Costs	Period Costs	Total Costs	Cost Factor:	Present Value
0	$ 19,703,426	$ -	$ -	$ 19,703,426	1.000	$ 19,703,426
1	$ -	$ 2,896,819	$ -	$ 2,896,819	0.966	$ 2,798,859
2	$ -	$ 2,908,052	$ -	$ 2,908,052	0.934	$ 2,714,698
3	$ -	$ 2,896,819	$ -	$ 2,896,819	0.902	$ 2,612,765
4	$ -	$ 2,908,052	$ -	$ 2,908,052	0.871	$ 2,534,200
5	$ -	$ 2,896,819	$ -	$ 2,896,819	0.842	$ 2,439,044
6	$ -	$ 2,908,052	$ -	$ 2,908,052	0.814	$ 2,365,702
7	$ -	$ 2,896,819	$ -	$ 2,896,819	0.786	$ 2,276,874
8	$ -	$ 2,908,052	$ -	$ 2,908,052	0.759	$ 2,208,408
9	$ -	$ 2,896,819	$ -	$ 2,896,819	0.734	$ 2,125,486
10	$ -	$ 2,908,052	$ -	$ 2,908,052	0.709	$ 2,061,573
11	$ -	$ 2,896,819	$ -	$ 2,896,819	0.685	$ 1,984,164
12	$ -	$ 2,908,052	$ -	$ 2,908,052	0.662	$ 1,924,500
13	$ -	$ 2,896,819	$ -	$ 2,896,819	0.639	$ 1,852,238
14	$ -	$ 2,908,052	$ -	$ 2,908,052	0.618	$ 1,796,542
15	$ -	$ 2,896,819	$ -	$ 2,896,819	0.597	$ 1,729,084
16	$ -	$ 2,908,052	$ -	$ 2,908,052	0.577	$ 1,677,091
17	$ -	$ 2,896,819	$ -	$ 2,896,819	0.557	$ 1,614,119
18	$ -	$ 2,908,052	$ -	$ 2,908,052	0.538	$ 1,565,582
19	$ -	$ 2,896,819	$ -	$ 2,896,819	0.520	$ 1,506,797
20	$ -	$ 2,908,052	$ -	$ 2,908,052	0.503	$ 1,461,488
21	$ -	$ 2,896,819	$ -	$ 2,896,819	0.486	$ 1,406,611
22	$ -	$ 2,908,052	$ -	$ 2,908,052	0.469	$ 1,364,315
23	$ -	$ 2,896,819	$ -	$ 2,896,819	0.453	$ 1,313,086
24	$ -	$ 2,908,052	$ -	$ 2,908,052	0.438	$ 1,273,602
25	$ -	$ 2,896,819	$ -	$ 2,896,819	0.423	$ 1,225,780
26	$ -	$ 2,908,052	$ -	$ 2,908,052	0.409	$ 1,188,921
27	$ -	$ 2,896,819	$ -	$ 2,896,819	0.395	$ 1,144,279
28	$ -	$ 2,908,052	$ -	$ 2,908,052	0.382	$ 1,109,871
29	$ -	$ 2,896,819	$ -	$ 2,896,819	0.369	$ 1,068,197
30	$ -	$ 2,908,052	$ -	$ 2,908,052	0.356	$ 1,036,076
Total	$ 19,703,426	$ 87,073,070	$ -	$ 106,776,496		$ 73,083,378

Total Present Value of Alternative 4 **$ 73,083,378**

Notes:

1. Real discount rate (base year 2004): 3.5%
   As indicated for a 30-year maturity in Circular A94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. http://www.whitehouse.gov/omb/circulars/a094/a094.html

Appendix D

Proposed Confirmation Sampling Program – Perchlorate Containment and Treatment

Appendix D: Proposed Confirmation Sampling Program – Perchlorate Containment and Treatment System

Operation of the perchlorate containment and treatment program as described in this Interim Remedial Action Plan (IRAP) will include several forms of monitoring to evaluate the effectiveness of the containment pumping and perchlorate removal systems. The several components of the proposed monitoring and sampling program are summarized below.

Because the treated groundwater will be pumped into the community water distribution system, the proposed sampling program is also subject to the approval of the California Department of Health Services (DHS). As the proposed project is further developed during design, and/or in response to DHS requirements regarding community water supply systems, modifications to the proposed monitoring and sampling program may be identified. It is anticipated that a more detailed operation, maintenance and monitoring plan will be developed and implemented following completion of CLWA's 97-005 Engineer's Report and its approval by DHS. Personnel assigned the responsibility for collection of samples will be appropriately trained.

D.1 Sampling of Production Wells

During operation, wellhead samples will be collected from the Saugus 1 and Saugus 2 production wells in accordance with applicable DHS requirements. The proposed sampling frequency and analytical suite is set forth in Table D-1. The wellheads include sample taps to facilitate collection of water samples.

After the production wells have been operated for at least one year, and the operators and agencies have developed confidence in the stability in the chemical parameters of interest, CLWA may request a reduction in the sampling frequency and/or the number of analytical parameters.

The operational status of the well pumps will be remotely monitored on a continuous basis. A flow recorder will be installed and maintained at each of the two production wells to allow evaluation of the amount of groundwater extracted from each well.

D.2 Sampling at Perchlorate Treatment System

Monitoring and sampling will be performed at the perchlorate treatment system for the purposes of process control and to confirm the effectiveness of perchlorate removal and disinfection. The proposed treatment system sampling program is summarized in Table D-2. In-line sample taps will be included in the piping upstream of the lead vessel, between the lead and lag vessels and downstream of the lag vessel to allow collection of water samples.

When perchlorate concentrations in a sample collected downstream of the lead vessel reach or exceed 4 micrograms per liter (µg/l), the supplier of the resin will be contacted to replace the exhausted ion exchange resin in the lead vessel. Replacement of exhausted resin will include switching the piping valves so that the previous lag vessel is now in the lead position, and that the replacement resin is placed into the vessel now serving in the lag position.

Samples will be collected downstream of the lag vessel on a weekly basis to confirm that perchlorate concentrations are less than analytical reporting limits (2 µg/l).

Samples will be analyzed for perchlorate and the standard water quality parameters at CLWA's analytical laboratory at the Rio Vista Water Treatment Plant. The CLWA analytical laboratory is certified by DHS for the analysis of these parameters.

In addition to parameters that will be evaluated through the collection and laboratory analysis of samples, other parameters will be monitored on an ongoing basis, with information transmitted electronically to operators at the Rio Vista Water Treatment Plant. These parameters include:

- Operational status of chemical feed pumps
- High water level in equalization tank
- Operational status of treated water pumps
- Operational status of production well pumps
- Pressure loss in containment piping
- Chlorine residual
- pH

CLWA's objective is to maintain residual chloramine at a concentration between 2.5 and 3.5 milligrams per liter (mg/l). Chloramine concentrations will be monitored using an in-line sampling and analysis process at the perchlorate treatment system. Confirmation samples will be collected as indicated in Table D-2.

In order to reduce accumulation of scale (hardness compounds) within the ion exchange vessels, an acidic solution will be injected into the groundwater upstream of the vessels. In-line analysis of pH will be performed to confirm the correct adjustment of pH.

D.3 Sampling of Sentinel Groundwater Monitoring Wells

Nine sentinel groundwater monitoring wells will be sampled on a semiannual basis to evaluate potential changes in chemical concentrations in groundwater that is approaching the Saugus 1 and Saugus 2 production wells. The locations of the sentinel wells were selected so that the sampling results can be used to provide "early warning" regarding potential increased concentrations of perchlorate or other site-related chemicals (such as volatile organic compounds (VOCs)) that may develop in groundwater within the capture zone of the production wells and that could potentially affect the proposed perchlorate treatment process. The sentinel wells are intentionally located a sufficient distance upgradient of the production wells to allow response time (such as construction of an additional treatment unit process) before chemical concentrations in the production wells exceed applicable drinking water standards.

Table D-3 summarizes the locations of the monitoring wells proposed for inclusion in the sentinel well monitoring program. At this time, six of the nine monitoring wells have been installed and three additional wells will be installed as part of the activities identified in the IRAP.

It is anticipated that the sentinel wells will be monitored on a semiannual basis, with samples submitted to a state-certified analytical laboratory for analysis of VOCs and perchlorate. Samples will be collected from the single-completion monitoring wells using standard well purging and sample techniques. Sampling of the individual ports on the multi-port wells requires specific equipment, but does not require purging. The proposed analytical parameters are listed in Table D-4. It is anticipated that the monitoring events for the sentinel wells will be coordinated with groundwater monitoring events to be performed by Whittaker. During the sentinel well monitoring events, field parameters including temperature, pH and conductivity will be measured using hand-held field instruments.

Table D-1: Proposed Production Well Sampling Program

Frequency	Analytical Parameter	EPA Method	Purpose
Monthly	Coliform	SM9222B	DHS requirements[a]
	HPC[b]	SM9215B	DHS requirements
	Perchlorate	314.0	
Quarterly[c]	Hardness	200.7	DHS requirements, process control
	Total alkalinity	310.1	DHS requirements
	Chloride	300.0	DHS requirements
	Nitrate	352.1	DHS requirements, process control
	Sulfate	300.0	DHS requirements, process control
	pH	Field	DHS requirements, process control
	Iron	6010	DHS requirements
	Manganese	6010	DHS requirements
	Turbidity	180.1	DHS requirements
	Total Dissolved Solids	160.1	DHS requirements
	VOCs	524.2	DHS requirements and ongoing monitoring of OU7 groundwater quality
Annual	Title 22 and vulnerable constituents[d]	Various	DHS requirements and ongoing monitoring of OU7 groundwater quality

(a) DHS requirements applicable to operation of groundwater production wells for non-transient community water supply systems.
(b) HPC = heterotrophic plate count, a measure of heterotrophic bacteria.
(c) The quarterly monitoring event will be scheduled to coincide with a monthly event, and will include the parameters subject to monthly monitoring requirements.
(d) May include metals, explosive residuals, semivolatile organic compounds. Analytical suite may be modified in response to chemicals encountered in ongoing sampling of OU7 monitoring wells by Whittaker Corporation.

Table D-2: Proposed Compliance and Process Control Sampling – Perchlorate Treatment System

	Frequency		
Location	**Daily**	**Weekly**[(a)]	**Quarterly**[(b)]
Combined Influent	pH, turbidity, TDS[(c)], hardness, total alkalinity, chloride	Nitrate, sulfate, perchlorate	Iron, manganese, total organic carbon, dissolved organic carbon
Effluent from Lead Vessel	Chloride, perchlorate		
Effluent from Lag Vessel	TDS, chloride	Hardness, total alkalinity, perchlorate, nitrate, HPCs[(d)], total coliform	
Effluent from Equalization Tank	pH, turbidity, total chlorine, temperature	HPCs, total coliform	Iron, manganese

(a) Weekly sampling includes daily parameters, plus additional parameters listed.
(b) Quarterly monitoring event will be scheduled to coincide with a weekly event.
(c) TDS = total dissolved solids.
(d) HPC = heterotrophic plate count, a measure of heterotrophic bacteria.

Table D-3: Proposed Sentinel Well Groundwater Quality Monitoring[a]

Production Well	Location/Purpose	Actual or Target Screened Interval (feet bgs)[b]	Sentinel Well Name	Comments
Saugus 1				
	Magic Mountain Parkway east of Saugus 1	60-80	AL-12A	Monitor potential alluvium pathway to Saugus 1
	Magic Mountain Parkway east of Saugus 1	180-190	AL-12B	Monitor potential alluvium pathway to Saugus 1
	Magic Mountain Parkway east of Saugus 1	265-285 (HSU S-I)[c]	SG1-HSU1	Monitor HSU S-I
	Proposed – north of Saugus 1 near intersection of Magic Mountain and San Fernando	490-520 (HSU S-III)	SG1-HSU3a	Monitor HSU S-III
	Proposed – north of Saugus 1 near intersection of Magic Mountain and San Fernando	580-640 (HSU S-III)	SG1-HSU3b	Monitor HSU S-III
	Proposed – north of Saugus 1 near intersection of Magic Mountain and San Fernando	750-770 (HSU S-III)	SG1-HSU3c	Monitor HSU S-III
Saugus 2				
	Across San Fernando, east of Saugus 2	65-85	AL06	Monitor potential alluvium pathway to Saugus 2
	At Whittaker property line, southeast of Saugus 2	391.4-401.4 (HSU S-III)	MP-1 (port 2)	Monitor HSU S-III
	At Whittaker property line, southeast of Saugus 2	747.5-757.5 (HSU S-V)	MP-2 (port 4)	Monitor HSU S-V

(a) Sentinel well sampling program as developed in accordance with requirements of DHS Policy Memo 97-005, and presented in the *Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California. Prepared for Upper Basin Water Purveyors in Support of the 97-005 Permit Application*. CH2MHILL, 2004.

(b) Feet bgs = feet below ground surface.

(c) HSU = hydrostratigraphic unit as identified in the *Eastern Santa Clara Subbasin Groundwater Study, Santa Clarita, California, Conceptual Hydrogeology Technical Memorandum*. CH2MHILL, 2005. HSUs in Saugus Formation identified from shallowest to deepest as S-I to S-VII.

Table D-4: Analytical Parameters for Sentinel Well Sampling[a]

Analytical Parameters	EPA Method	Sample Collection Frequency			
		Initial	Semiannual	Annual	Biannual
Volatile Organic Compounds[b]	524.2	X	X		
Perchlorate	314.0	X	X		
General Minerals					
Aluminum	6010	X			X
Bicarbonate/Alkalinity	310.1	X			X
Calcium	6010	X			X
Chloride	300	X			X
Total Phosphorus	365.3	X			X
Potassium	7610	X			X
Iron	6010	X			X
Magnesium	6010	X			X
Manganese	6010	X			X
Sodium	7770	X			X
Sulfate	300	X			
Nitrate	352.1	X		X	
Ammonia	350.3	X		X	X

(a) Sentinel well sampling program as developed in accordance with requirements of DHS Policy Memo 97-005, and presented in *Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California. Prepared for Upper Basin Water Purveyors in Support of the 97-005 Permit Application.* CH2MHILL 2004.

(b) Will include reporting of methyl tertiary butyl ether (MTBE) and 1,2,4-trimethyl benzene as well as any tentatively identified compounds.

Appendix E

CEQA Documentation

RECEIVED NOV 30 2005 By______

Notice of Determination

Appendix D

TO: ☐ Office of Planning and Research

For U.S. Mail:
P.O. Box 3044
Sacramento, CA 95812-3044

Street Address:
1400 Tenth Street
Sacramento, CA 95814

☐ County Clerk
County of: Los Angeles Registrar Recorder
Address: 12400 Imperial Hwy/P.O. Box 53592
Norwalk, CA 90650

FROM: Castaic Lake Water Agency
Address: 27234 Bouquet Canyon Road
Santa Clarita, CA 91350-2173

Contact: Mr. Ken Petersen
Phone: 661-513-1260
Lead Agency (if different from above):

Address:

Contact
Phone

SUBJECT: ***Filing of Notice of Determination in compliance with Section 21152 of the Public Resources Code.***

State Clearinghouse Number (if submitted to State Clearinghouse): SCH# 2005081053
Project Title: Groundwater Containment, Treatment, and Restoration Project

Project Location: City of Santa Clarita and portions of unincorporated Los Angeles County [Need map]

Project Description (include county): Project consists of modified wells to intercept perchlorate-contaminated groundwater, use of new and existing pipelines to deliver perchlorate-contaminated water to a new treatment plant, several new production wells, and new pipelines associated to deliver treated water and water from new wells.

This is to advise that the Castaic Lake Water Agency (☒ Lead Agency or ☐ Responsible Agency) has approved the above described project on September 14, 2005 and has made the following determinations regarding the above described project:

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. A Mitigated Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☐ was ☒ was not] adopted for this project.
6. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the Final Mitigated Negative Declaration and record of project approval, is available to the General Public at: Castaic Lake Water Agency, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350 and the Custodian of the Agency Record is April Jacobs, Acting-Secretary to the Board of Directors

Signature (Public Agency) [signature] *Title* GENERAL MANAGER
Date: 9/19/05

Date Received for filing at OPR:

Revised 2004

Authority cited: Sections 21083 and 21087, Public Resources Code.
Reference: Sections 21000-21174, Public Resources Code.

05 0017483

RECEIVED
NOV 30 2005
By___________

California Department of Fish and Game

CERTIFICATE OF FEE EXEMPTION

De Minimis Impact Finding

Project Title/Date Certified/Location Name:

Title: Groundwater Containment, Treatment and Restoration Project

Date Certified: September 14, 2005

Location: City of Santa Clarita and portions of unincorporated Los Angeles County (see attached map)

Project Proponent: Castaic Lake Water Agency (CLWA)

Address of Project Proponent: 27234 Bouquet Canyon Road, Santa Clarita, CA 91350

Project Description: The proposed project's goals and objectives are as follows: Project consists of modified wells to intercept perchlorate-contaminated groundwater, use of new and existing pipelines to deliver perchlorate-contaminated water to a new treatment plant, several new production wells, and new pipelines associated to deliver treated water and water from new wells.

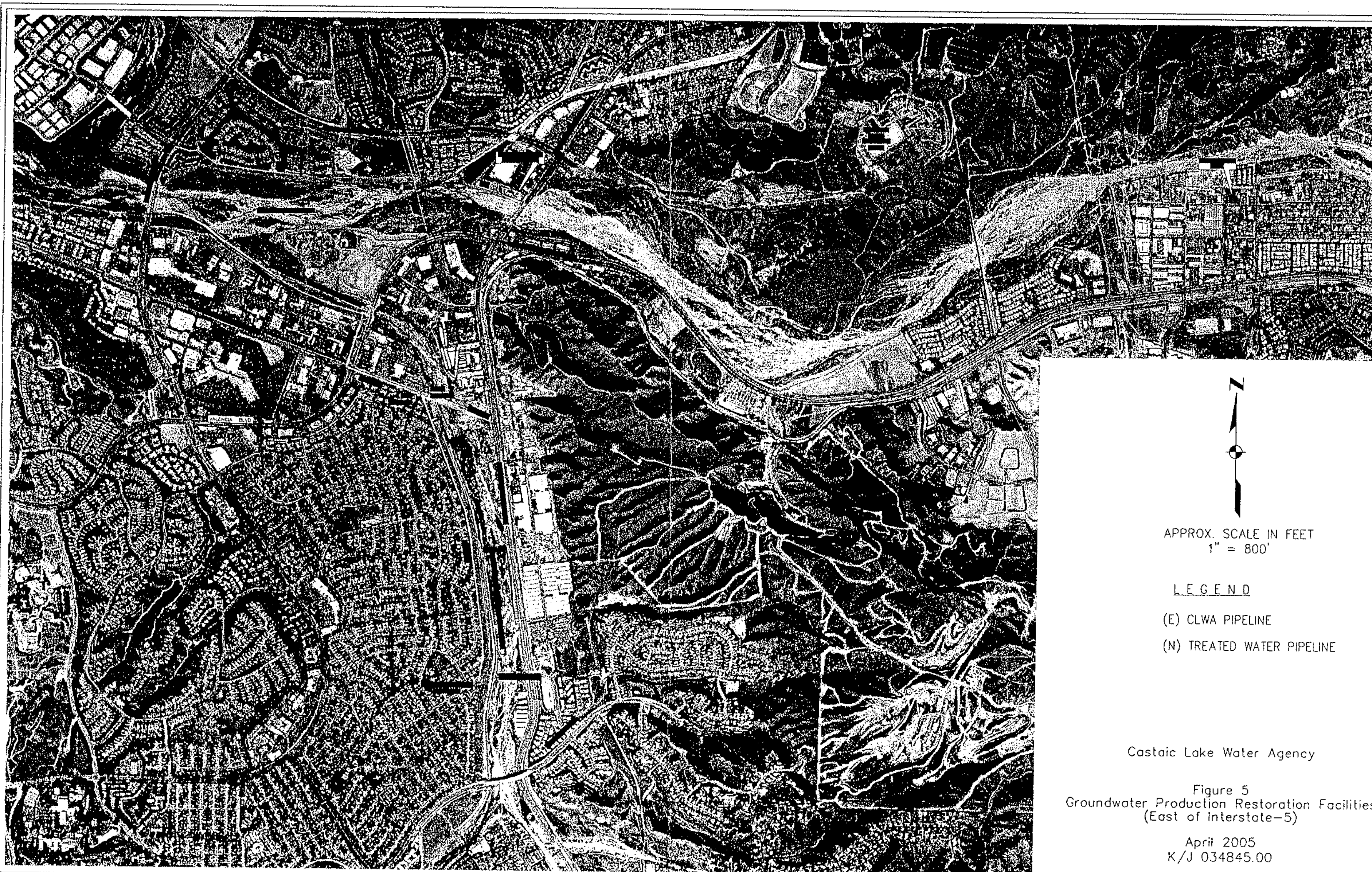
Findings of Exemption: The Negative Declaration, which consists of the Project Description and Environmental Analysis, was prepared pursuant to California Environmental Quality Act (CEQA) Guidelines §15164. It was concluded in the Negative Declaration, and previously prepared Initial Study, that the proposed project would have no direct or indirect effects on wildlife resources or the habitat upon which the wildlife depends. Further, no secondary adverse impacts to plant and animal life were identified in the Initial Study that would result from the proposed project. No comments were received on the previously prepared documents that refuted the conclusion of insignificant impacts to biological resources.

Certification:
I hereby certify that the decision maker of the lead agency, has made the above findings of fact for this project and that based upon the Initial Study, the project will not individually or cumulatively have adverse effects on wildlife resources, as defined in Section 711.2 of the Fish and Game Code.

Dan Masnada
General Manager
Castaic Lake Water Agency

Lead Agency: Castaic Lake Water Agency
Date: September 23, 2005

05 0017483



N

APPROX. SCALE IN FEET
1" = 800'

LEGEND

(E) CLWA PIPELINE

(N) TREATED WATER PIPELINE

Castaic Lake Water Agency

Figure 5
Groundwater Production Restoration Facilities
(East of Interstate-5)

April 2005
K/J 034845.00

K/J FILE: N:\135342 - CLWA DHS 97-005\CEQA\Aerials photo FIG\BACKER-15-2040405.dwg

N

APPROX. SCALE IN FEET
1" = 500'

LEGEND

(E) CLWA PIPELINE
(N) TREATED WATER PIPELINE
(N) GROUNDWATER PIPELINE

Kennedy/Jenks Consultants

Castaic Lake Water Agency

Figure 6
Groundwater Production Restoration Facilities
(West of Interstate-5)

April 2005
K/J 034845.00

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CLWA
27234 Bouquet Canyon Rd.
Santa Clarita, Ca 91350

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91350+2173-34 C010

RESOLUTION NO. 2429
ADOPTION OF MITIGATED NEGATIVE DECLARATION
CASTAIC LAKE WATER AGENCY
GROUNDWATER CONTAINMENT, TREATMENT
AND RESTORATION PROJECT

WHEREAS, the Castaic Lake Water Agency circulated for public comment a proposed Mitigated Negative Declaration and an Initial Study on its proposed Castaic Lake Water Agency Groundwater Containment, Treatment and Restoration Project ("Project") to prevent further downstream migration of perchlorates (containment), treat any water extracted as part of the containment process (containment), and recover lost local groundwater production (production restoration);

WHEREAS, the said Agency received written public comments during the comment period from August 9, 2005 to September 8, 2005 on the said proposed Project;

WHEREAS, the Agency scheduled a public hearing on the proposed project at its Board Room, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350 for September 14, 2005 at 7:00 P.M. for purposes of considering the public comments as part of its decisional process concerning the proposed Project;

WHEREAS, pursuant to Public Resources Code section 21092.5 the public hearing did not constitute an extension of the public comment period, and no responses are required under said Public Resources Code section to comments made because the hearing was scheduled after the close of the public comment period;

WHEREAS, this Board has carefully and thoroughly reviewed the proposed Final Mitigated Negative Declaration and the Initial Study (Exhibit "A" to this Resolution), all public comment period comments pertaining thereto (Exhibit "B" to this Resolution), and the Mitigation and Monitoring Plan (Exhibit "C" to this Resolution), all of which documents are hereby attached as exhibits to this Resolution, and thereby incorporated herein by reference into this Resolution;

WHEREAS, as a result of public comment period comments and comments made at the public hearing on September 14, 2005, the Agency's Board has determined that the proposed Project can be approved because there is no substantial evidence in light of the whole record that the Project may have a significant effect on the environment; and

WHEREAS, the Agency and its Board have considered all of the information presented to it as set forth above and this Resolution and action taken hereby is a result of the Board's independent judgment and analysis.

NOW, THEREFORE, BE IT RESOLVED that this Board of Directors of the Castaic Lake Water Agency does hereby find and determine that the Final Mitigated Negative Declaration was prepared pursuant to the provisions of CEQA, that there is no substantial evidence in light of the whole record that the Project will have a significant effect or impact on the environment, that the Final Mitigated Negative Declaration reflects the Agency Board's independent judgment and analysis;

RESOLVED FURTHER that the Agency's Board does hereby adopt the Final Mitigated Negative Declaration attached as Exhibit "A" to this Resolution and does hereby approve the Project;

RESOLVED FURTHER that this Agency's Board does hereby adopt the attached findings (Exhibit "D" to this Resolution) which the Agency's Board finds are supported by substantial evidence in light of the whole record, does certify this Final Mitigated Negative Declaration to be accurate and complete, as well as legally sufficient pursuant to the provisions of CEQA, and does direct Agency staff to promptly file a Notice of Determination with respect to the Project;

RESOLVED FURTHER that the location of the Agency's record on this matter is at the Castaic Lake Water Agency, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350 and the Custodian of the Agency Record is April Jacobs, Acting-Secretary to the Board of Directors;

RESOLVED FURTHER, that the Project's environmental review process identified numerous mitigation measures designed to prevent potentially significant impacts that might occur. These mitigation measures either have been incorporated into the Project or specified in the Initial Study, and will be monitored and enforced pursuant to the Mitigation and Monitoring Plan ("MMP"). The MMP includes the feasible mitigation measures for potentially significant direct Project impacts that are within CLWA's jurisdiction and authority to enforce. The MMP is required by Public Resources Code section 21081.6 and is attached to this Resolution as Exhibit "C" and is incorporated herein by this reference;

RESOLVED FURTHER, that the Agency's Board does hereby adopt the MMP; and

RESOLVED FURTHER, that the General Manager is authorized to execute all documents required to carry out and implement the Project as reviewed and approved by Agency's legal counsel, including, but not limited to, a Notice of Determination.

William Pecsi,
Board President

ATTEST:

April Jacobs

Board Secretary

EXHIBIT "A"
Attached
FINAL MITIGATED NEGATIVE DECLARATION AND INITIAL STUDY
(Previously distributed to Board of Directors)

EXHIBIT "B"
Attached
WRITTEN PUBLIC COMMENTS
(Previously distributed to Board of Directors)

EXHIBIT "C"
Attached
MITIGATION AND MONITORING PLAN

EXHIBIT "D"
FINDINGS

Finding No. One: Castaic Lake Water Agency ("Agency") has complied with all of the requirements for public notice under the Public Resources Code and the CEQA Guidelines.

Finding No. Two: The Agency has met all the requirements for public review under the Public Resources Code and CEQA Guidelines. Additionally, the Agency's Board has considered all received comments, both written and oral, including those comments submitted at the hearing on September 14, 2005. The comments, both written and oral, made at the public hearing do not raise any new information or issues that have not already been raised in the public comment period comments.

Finding No. Three: The proposed Final Mitigated Negative Declaration contains all the information required under the Public Resources Code and the CEQA Guidelines.

Finding No. Four: The Agency met all requirements for notice of the September 14, 2005 public hearing on the proposed Final Mitigated Negative Declaration.

Finding No. Five: The Initial Study meets the requirements of the Public Resources Code and the CEQA Guidelines, and the Agency followed all of the required procedures under the Public Resources Code and the CEQA Guidelines in preparing the Initial Study.

Finding No. Six: The Initial Study contains no evidence that the Project, with the mitigation specified, may have a significant effect upon the environment.

Finding No. Seven: The Agency is the proper lead agency for preparation of a mitigated negative declaration under the Public Resources Code and the CEQA Guidelines.

Finding No. Eight: Based upon the above it is found and determined that the Project will not have a significant effect and impact upon the environment, that the Public Resources Code and the CEQA Guidelines permit preparation of a Mitigated Negative Declaration for this Project, and that the Mitigated Negative Declaration reflects the Agency Board's independent judgment.

EXHIBIT "A"
FINAL MITIGATED NEGATIVE DECLARATION AND INITIAL STUDY

FINAL MITIGATED NEGATIVE DECLARATION

Project Name: Castaic Lake Water Agency, Groundwater Containment, Treatment, and Restoration Project

Project File Number: NA

Project Location: The project is located in the City of Santa Clarita and on lands west of the City of Santa Clarita and southwest of Magic Mountain Amusement Park.

County Supervisorial Districts: Fifth District (Michael Antonovich)

Mailing Address and Phone Number of Applicant Contact Person for this Project:

Mr. Ken Petersen,
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350-2173
Phone 661-513-1260

Project Description:

The purpose of the proposed Castaic Lake Water Agency Groundwater Containment, Treatment, and Restoration Project (Proposed Project) is to prevent further perchlorate contamination of groundwater basins in the Santa Clarita Valley originating at an historic weapons manufacturing site located east of the South Fork of the Santa Clara River near the confluence of the South Fork and the Mainstem Santa Clara River. The Proposed Project will intercept the existing plume of perchlorate in the Saugus Formation groundwater and pump the contaminated water from intercepting wells to a new treatment plant, where perchlorate will be removed and the treated water utilized as part of Castaic Lake Water Agency's (CLWA) drinking water supply.

The Proposed Project would involve (a) modification of existing production wells, (b) construction and operation of new monitoring and production wells, (c) modification of existing pipelines and construction of new pipelines, (d) construction of a new, modular perchlorate water treatment plant, and (e) closing of existing production wells.

The Propose Project has two interrelated elements. First, there are facilities for the containment and treatment of perchlorate-contaminated groundwater. Second, there are service restoration facilities to replace and relocate existing facilities which must be closed or modified to accomplish the containment program objectives. With the exception of two pipeline segments under bridge decks, pipelines will be buried. The Proposed Project incorporates a number of conservation/impact minimization measures into its project description, including measures related to:

- Facility Siting
- Construction Schedule

- River Crossings
- Best Management Practices, Construction in Roads
- Best Management Practices, Construction in Bike Trails
- Aesthetic Treatment of the Treatment Facility
- Air quality
- Noise
- Biological Resources
- Water Quality
- Cultural Resources

As appropriate, these conservation/impact minimization procedures will be incorporated into construction contracts and performance will be independently verified by CLWA and/or qualified monitors. These elements of the project, described in full in the Initial Study, result in reduction of potential environmental impacts to a level of less-than-significant. In addition, CLWA proposes an additional site-specific monitoring and mitigation measure related to noise that may be implemented if on-site monitoring determines that minimization measures have not reduced noise levels to the desired levels.

Measures Included in the Project to Reduce Potentially Significant Effects to a Level of Less-Than-Significant (Described in detail in the Initial Study and incorporated by reference herein.)

Aesthetics: Facilities have been sited to avoid impact to scenic resources. Above ground facilities will be designed to be consistent with existing visual character of adjacent development.

Agricultural Resources: None. The Proposed Project will not affect agricultural resources.

Air Quality: The Proposed Project incorporates best management practices per Rule 403 of the South Coast Air Quality Management District, Table 1.

Biological Resources: The project has been sited to avoid direct impact to wildlife and wildlife habitat. Indirect effects associated with noise and visual disturbance are avoided/minimized by construction scheduling outside of nesting/breeding season for special-status birds in the adjacent Santa Clara River. The project includes construction crew training, on-site biological monitoring, and isolation of the construction area from any adjacent habitats during construction to prevent adverse impacts associated with wildlife incidental use of the construction area.

In response to comments received from the California Department of Fish and Game (CDFG) during the public comment period, CLWA hereby adopts additional mitigation measures related to biological resources. Specifically, CLWA will consider the breeding bird season to be March 1 through September 1 and as early as February 1 for raptors. Accordingly, to the extent feasible, CLWA will schedule construction activities along the south bank of Santa Clara River to avoid construction during the breeding season. In accordance with CDFG's comments, if construction cannot be scheduled to avoid the breeding bird season, CLWA will arrange for weekly bird surveys by a qualified biologist to detect any protected native birds in habitat within 300 feet of the construction work area (within 500 feet for raptors). Surveys should continue such that the last survey shall be conducted no more than 3 days prior to initiation of construction. If an active nest is located, construction within 300 feet (500 feet for raptors) shall be postponed until the nest is vacated and juveniles have fledged and when there is no evidence of a second attempt at nesting. Nest avoidance limits described above shall be identified in the field by flagging and stakes or construction fencing. Construction personnel will be instructed on the sensitivity of the avoidance area. Particular care shall be taken with regard to white-tailed kite nesting habitat upstream of the Bouquet Canyon Road crossing of the Santa Clara River.

In addition, CLWA will survey for bats under the Bouquet Canyon Bridge prior to construction. Per CDFG's request, CLWA will develop avoidance and mitigation measures if bats are found. If bats are located, impacts may be avoided by scheduling work during the non-nesting season (after September 1 and before March 1). Bats leaving the structure at night may then be excluded from returning to the bridge with fine mesh. CLWA will consult with CDFG during implementation of such impact avoidance measures.

Finally, CLWA will adopt additional measures to ensure that there are less-than-significant impacts associated with work in the river bed of the Santa Clara River during installation of the proposed pipeline under bridge decking:

a. All construction will be done in dry conditions;
b. Construction equipment will access the river bed via an area without native riparian vegetation;
c. Construction equipment fueling and maintenance will be performed outside of the riverbed or if necessary these activities will be performed using containment vessels;
d. Spills of fuel or other materials used during construction will be immediately reported and cleaned up in accordance with rules of the Regional Water Quality Control Board.

CLWA will confer with CDFG staff during processing of a Fish and Game Code Section 1600 permit (Streambed Alteration Permit) and implement other best management practices as required.

Cultural Resources: Project siting focuses on already heavily disturbed areas, reducing the potential for effects on cultural resources. Where buried cultural resources may occur, construction personnel training, construction monitoring and resource recovery, and compliance with California Department of Health Services requirements of treatment of buried human remains will reduce cultural resource impacts to a level of less-than-significant.

Geology and Soils: Mitigation measures to reduce erosion and drainage from construction sites are included, consistent with the requirements of the City of Santa Clarita Encroachment Permit Policy.

Hazards and Hazardous Materials: Materials associated with operation of the perchlorate treatment facility are stable and not considered hazardous. All water treatment materials will be transported, handled, and stored in accordance with current regulations, including use of secondary containment vessels.

Hydrology and Water Quality: The project includes best management practices for construction to avoid and minimize potential construction-related effects on drainage and water quality.

Land Use and Planning: None. The Proposed Project would have no effects on land use.

Mineral Resources: None. The Proposed Project would have no effects on mineral resources.

Noise: Project siting reduces potential construction and operation related noise impacts. The Proposed Project incorporates measures that will reduce potential noise from above ground facilities. The Proposed

Project includes noise monitoring and mitigation measures to reduce noise effects on residential housing adjacent to pipeline construction areas.

Population and Housing: None. The Proposed Project would have no effects on population and housing.

Public Services: None. The Proposed project has no effects on public service requirements or facilities.

Recreation: None. The Proposed Project will have only temporary and less-than-significant impacts on recreation facilities. Per comments from County of Los Angeles Department of Parks and Recreation, CLWA will coordinate any trail issues related to the South Fork Trail with the City of Santa Clarita.

Transportation and Traffic: Construction best management practices defined in the City of Santa Clarita Encroachment Permit will be implemented to minimize traffic effects associated with construction in and adjacent to roads. Per comments from the California Department of Transportation, CLWA will also require construction contractors to (a) avoid excessive or poorly timed truck platooning and (b) limit construction-related truck traffic on state highways to off-peak commute periods. CLWA recognizes that a Caltrans Encroachment Permit would be needed for construction in the State Right-of-Way but concurs with Caltrans that the project will not have an impact on State right of way.

Utilities and Service Systems: Pre-construction coordination will identify potential utilities which may be affected by the project and coordination with owners and construction best management practices will avoid impacts to utilities.

Cumulative Impacts: None. The Proposed Project has no significant cumulative impacts.

Mandatory Findings of Significance: None. The Proposed Project does not cause impacts that require a mandatory finding of significance

FINDINGS

1. CLWA has considered comments received during the public review period and has added specific impact avoidance and mitigation measures as recommended by CDFG, County of Los Angeles Department of Parks and Recreation, and California Department of Transportation. Copies of these comments are attached to this Mitigated Negative Declaration.

2. CLWA finds that the additional avoidance and minimization measures recommended by CDFG, County of Los Angeles Department of Parks and Recreation, and California Department of Transportation are consistent with the intent of the avoidance and minimization measures already incorporated into the project. CLWA finds that recirculation of the Mitigated Negative Declaration is not required because these more specific mitigation measures clarify and provide for more effective avoidance and mitigation measures consistent with Section 15074.1 of the CEQA Guidelines.

3. No other substantive comments, verbal or written, were received. There were no project revisions. No new information has been added to the Mitigated Negative Declaration.

4. CLWA has adopted a Mitigation Monitoring Plan for the project.

5. CLWA finds that the inclusion of the additional impact avoidance and mitigation measures requested by CDFG, County of Los Angeles Department of Parks and Recreation, and California Department of Transportation strengthens the finding that the Proposed Groundwater Containment, Treatment, and Restoration Project will have less-than-significant impacts on the environment.

Based on the above, the Board of Directors of the Castaic Lake Water Agency adopted this Mitigated Negative Declaration on September 14, 2005.

Dan Masnada
General Manager
For Castaic Lake Water Agency

EXHIBIT "B"
WRITTEN PUBLIC COMMENTS

DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 MAIN STREET, Suite 100
LOS ANGELES, CA 90012-3606
PHONE (213) 897-3747
FAX (213) 897-1337
TTY (213) 897-4937

Flex your power!
Be energy efficient!

August 30, 2005

IGR/CEQA cs/050817 – NEG DEC
Santa Clarita
Groundwater Containment, Treatment, and Restoration
Vic. LA-5-53.40; SCH # 2005081053

Mr. Ken Peterson
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, California 91350

Dear Mr. Peterson:

Thank you for including the California Department of Transportation in the environmental review process for the above-mentioned project. Based on the information received, we have the following comments:

It appears that the proposed project would not have an impact on the State Right-of-way. However, any work to be performed within the State Right-of-way will need a Caltrans Encroachment Permit. A Transportation Management Plan will be needed for any lane closures, detours, parking restrictions, etc.

We recommend that construction related truck trips on State highways be limited to off-peak commute periods. Transport of over-size or over-weight vehicles on State highways will need a Caltrans Transportation Permit.

The contractor should agree to avoid excessive or poorly timed truck platooning (caravans of trucks) to minimize transportation related operational conflicts, minimize air quality impacts, and maximize safety concerns.

If you have any questions regarding our comments, please refer to our IGR/CEQA Record number cs/050817 and do not hesitate to contact me at (213) 897-3747.

Sincerely,

Cheryl J. Powell

Cheryl J. Powell
IGR/CEQA Program Manager

cc: Scott Morgan, State Clearinghouse

State of California · The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg. a.gov
4949 Viewridge venue
San Diego, CA 9. 123
(858) 467-4201

ARNOLD SCHWARZENEGGER, *Governor*

September 7, 2005

BY FACSIMILE ND U.S. MAIL

Mr. Ken Peterso
Castaic Lake Wa er Agency
27234 Bouquet C nyon Road
Santa Clara, CA 1350
Fax No.: (661) 51: 1202

FLEX YOUR POWER

**Draft Mitigated Negative Declaration for
Castaic Lake Water Agency
G oundwater Contaminant Treatment and Restoration Project
SCH # 2005081053, Los Angeles County**

Dear Mr. Peterso

The Departm nt of Fish and Game (Department) has reviewed the Draft Mitigated Negative Declaration (MND and Initial Study (IS) for the above-referenced project. The project consists of modifying existing groundwater wells to intercept perchlorate-contaminated groundwater, use of new and existing pelines to deliver perchlorate-contaminated groundwater to a new modular treatment plant, in talling several new production wells, and new pipelines to deliver treated water and water fi m new wells. New pipelines will be installed via trenching along established road and recreatic al bike path right-of-ways. Proposed pipeline crossings of the Santa Clara River (SCR) will b achieved by jacking beneath the riverbed. One SCR pipeline crossing will be accomplished by a taching the pipeline beneath the Bouquet Canyon Road bridge deck. The project is loca ed in the City of Santa Clarita near Interstate 5, Magic Mountain Parkway and Bouquet Canyon F oad.

These comm nts have been prepared pursuant to the Department's authority as Trustee Agency with jurisdi tion over natural resources affected by the project (CEQA Section 15386) and pursuant to ou authority as a Responsible Agency under the California Environmental Quality Act (CEQA Section 15381 regarding those aspects of the proposed project that come under the purview f the California Endangered Species Act (Fish and Game Code Section 2050 et esq.) and Fish a d Game Code Section 1600 et seq.:

IMPACTS TO SEN ITIVE BIOLOGICAL RESOURCES

1. Native Nest ng Birds - The IS states that the project will be conducted along the Santa Clara River in Ser ember through Mid-March to avoid the nesting season.

   a. The Dep rtment concurs that the project may adversely impact native nesting birds. Th e Department generally recognizes the breeding bird season to run from Ma ch 1- September 1 and as early as February 1 for raptors. This expande no-work period will help avoid take, including disturbances which would ca ise abandonment of active nests containing eggs and/or young.

   b. The plac ment of the treatment water pipeline beneath the Bouquet Road Bridge deck ac oss the SCR should also take place outside of the nesting season as stated by tl › Department above to assist in avoiding nesting birds and bat nurseries/roosts.

c. The louquet Canyon Bridge should be surveyed for bats. If found, avoidance and iitigation measures should be developed.

d. If prc ect activities cannot avoid the breeding bird season, the Department reco imends that beginning thirty days prior to the disturbance of suitable nest g habitat the project proponent should arrange for weekly bird surveys to de ect any protected native birds in the habitat that is to be disturbed, and any her such habitat within 300 feet of the construction work area (within 500 et for raptors). The surveys should be conducted by a qualified biolo ist with experience in conducting breeding bird surveys. The surveys shou l continue on a weekly basis with the last survey being conducted no more han three days prior to the initiation of clearance/ construction work. If a pro ected native bird is found, the project proponent should delay all clear nce/ construction disturbance activities in suitable nesting habitat or withir 300 feet of nesting habitat (within 500 feet for raptor nesting habitat) until ugust 31 or continue the surveys in order to locate any nests. If an active nest is located, clearing and construction within 300 feet of the nest (withi 500 feet for raptor nests) shall be postponed until the nest is vacated and ju reniles have fledged and when there is no evidence of a second attem t at nesting.

The n st avoidance distance limits described above should be identified in the fie d with flagging and stakes or construction fencing. Construction perso nel should be instructed on the sensitivity of the avoidance area. The projec proponent should record the results of the recommended protective meas es described above, in order to document compliance with applicable State nd federal laws pertaining to the protection of native birds.

e. White ailed kite (WTK) a California Species of Special Concern and Fully Protected Speci s nested upstream near the Bouquet Canyon Road crossing of the SCR during he 2005 nesting season. It is especially important that project activities do not tal place near WTK active nest sites during the nesting season unless precor struction surveys for WTK along with other native bird species are conducted and av idance measures implemented as described above by the Department.

2. <u>Impacts to iparian Resources</u> – The IS states that the proposed pipeline will cross the SCR at the louquet Canyon Road Bridge under the bridge deck and that the use of constructio equipment will take place within the SCR where previous disturbances took place in 20(5 from bridge improvement work activities. The IS further states that all other SCR crossi gs shall occur by jacking beneath the riverbed.

The Depart ent may require a Streambed Alteration Agreement (SAA) pursuant to Section 160 et seq. of the Fish and Game Code, with the applicant prior to any project related dire or indirect impact to the SCR and/or other Department jurisdictional drainages o associated riparian resources. The Department's issuance of a SAA may be a project tha is subject to CEQA. To facilitate our issuance of the Agreement when CEQA appli s, the Department as a responsible agency under CEQA may consider the local jurisdic on's (lead agency) document for the project. To minimize additional requirement by the Department under CEQA the document should fully identify the potential imp cts to the stream or riparian resources and provide adequate avoidance, mitigation, m nitoring and reporting commitments for issuance of the Agreement. Early consultat n is recommended, since modification of the proposed project may be required to avoid (reduce impacts to fish and wildlife resources. Please contact Ms. Betty Courtney 661) 263-8306 to discuss further.

The Dep tment recommends that the above concerns are addressed prior to lead agency approval f the proposed project.

Thank yo for this opportunity to provide comment. Questions regarding th s letter and further coordinati n on these issues should be directed to Mr. Scott Harris, Associate Wildlife Biologist, at (626 797-3170.

Sincerely,

Larry L. Eng, Ph.D.
Regional Manager

cc: Ms. Morgan Vehtje, Camarillo
Mr. Scott Ha is, Pasadena
Ms. Betty C rtney, Newhall
RM-Chron; P-Chron
De rtment of Fish and Game

Mr. Scott Mc an
Sta Clearinghouse, Sacramento

SPH:sph/sl
spharris\MND CLWA VTRT_09-05.doc

Bryan Moscardini
510 South Vermont Avenue Suite 201
Los Angeles, CA 90020
(213) 351- 5133/ fax 213.639-3959

COUNTY OF LOS ANGELES DEPARTMENT OF PARKS AND RECREATION

Fax

To:	Ken Petersen	**From:**	Bryan Moscardini
Fax:	661 297-1611	**Pages:**	2 including this
Phone:	661 513-1260	**Date:**	9/7/2005
Re:	CLWA –Groundwater Restoration	**CC:**	

☐ **Urgent** x **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

- **Comments:**

Mr. Petersen,

I'm faxing you our Department's response letter to the above document, with hard copy to follow via U. S. Mail.

Bryan Moscardini

Park Project Coordinator

COUNTY OF LOS ANGELES

DEPARTMENT OF PARKS AND RECREATION

"Creating Community Through People, Parks and Programs"

Russ Guiney, Director

September 7, 2005

Ken Petersen, Project Manager
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350

Dear Mr. Petersen:

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION FOR THE CASTAIC LAKE WATER AGENCY GROUNDWATER CONTAINMENT, TREATMENT, AND RESTORATION PROJECT

The Mitigated Negative Declaration (MND) for the Groundwater Containment, Treatment, and Restoration Project has been reviewed for potential impacts on the facilities of the County of Los Angeles-Parks and Recreation. The Castaic Lake Recreation Area, a recreational lake that is managed and operated by this Department, is in the northern portion of the project's study area. The project will not impact this facility or any other facilities under the jurisdiction of our Department.

The proposed project may impact the South Fork Trail. Please contact Mr. Joe Inch at (661) 286-4000, City of Santa Clarita, to coordinate any trail issues.

Thank you for including the County of Los Angeles-Parks and Recreation in the review of this environmental document. If I may be of further assistance, please feel free to contact me at (213) 351-5133.

Sincerely,

Bryan Moscardini
Park Project Coordinator

BM:tv(c:response-CLWA MND1)

c: Boyd Horan-DPR
Kathleen Ritner-DPR

SOUTHERN CALIFORNIA
ASSOCIATION of GOVERNMENTS

Main Office
818 West Seventh Street
12th Floor
Los Angeles, California
90017-3435

t (213) 236-1800
f (213) 236-1825

www.scag.ca.gov

August 29, 2005

Mr. Ken Petersen
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350-2173

RE: SCAG Clearinghouse No. I 20050523 Castaic Lake Agency, Groundwater Containment, Treatment, and Restoration Project

Dear Mr. Petersen:

Thank you for submitting the **Castaic Lake Agency, Groundwater Containment, Treatment, and Restoration Project** for review and comment. As areawide clearinghouse for regionally significant projects, SCAG reviews the consistency of local plans, projects and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

We have reviewed the **Castaic Lake Agency, Groundwater Containment, Treatment, and Restoration Project**, and have determined that the proposed Project is not regionally significant per SCAG Intergovernmental Review (IGR) Criteria and California Environmental Quality Act (CEQA) Guidelines (Section 15206). Therefore, the proposed Project does not warrant comments at this time. Should there be a change in the scope of the proposed Project, we would appreciate the opportunity to review and comment at that time.

A description of the proposed Project was published in SCAG's **August 1-15, 2005** Intergovernmental Review Clearinghouse Report for public review and comment.

The project title and SCAG Clearinghouse number should be used in all correspondence with SCAG concerning this Project. Correspondence should be sent to the attention of the Clearinghouse Coordinator. If you have any questions, please contact me at (213) 236-1851. Thank you.

Sincerely,

B. Wallace

BRIAN WALLACE
Associate Regional Planner
Intergovernmental Review

EXHIBIT "C"
MITIGATION AND MONITORING PLAN

Mitigation and Monitoring Plan
Castaic Lake Water Agency
Groundwater Containment, Treatment, and Restoration Project

This Mitigation and Monitoring Plan (MMP) specifies mitigation actions and monitoring and reporting requirements for the *Castaic Lake Water Agency Groundwater Containment, Treatment, and Restoration Project*, consistent with the project Initial Study and Final Mitigated Negative Declaration. For each action or class of actions identified in the above documents, this plan specifies the following:

- The required action
- The schedule
- The party responsible for implementing the action
- The required reports
- The entity to receive reports

For ease of use, the MMP is presented in tabular format. Adoption of this Mitigation and Monitoring Plan constitutes a commitment by Castaic Lake Water Agency (CLWA) to comply with and fund the require mitigation and monitoring. At its discretion, CLWA will implement the MMP through construction contractors and other independent contractors, as noted. In all cases, CLWA's Project Manager and/or designated compliance staff will routinely audit contractor compliance with the requirements of the MMP.

In general, construction contractors will implement aspects of the MMP related to the acquisition and compliance with construction permits from the City of Santa Clarita, the County of Los Angeles, and the State of California. If it is determined that such plans are required, this may include preparation of construction plans such as the State of California Storm Water Pollution Prevention Plan. CLWA's primary role in these efforts will be to require these activities as part of the scope of work for each construction project and contract, to review plans and specifications, to periodically conduct compliance audits to ensure that contractors are acting in accordance with their plans, and to maintain records of all compliance activities and reports. CLWA may independently contract for specialized compliance monitoring, such as monitoring related to biological and cultural resources; these independent monitors will work with construction contractors to ensure compliance with mitigation and monitoring plan requirements. The MMP is thus organized to make the responsibilities of CLWA, design engineers, construction contractors, and independent contractors clear, and thus focuses on the actions required by each entity.

Table MMP-1. Mitigation and Monitoring Commitments Checklist (R = Review, C = Specify requirement in construction contract, A = Compliance Action, RP = Reporting Requirement, I = Inspect, M = Maintain during operation, NA = not applicable)

Impact Category	**Mitigation Measure (See Initial Study for details)**	**Responsible Parties and Role**			
		CLWA	Design Contractor	Construction Contractor	Independent Contractor
Aesthetics	Design and construct Treatment Plant to be consistent with Rio Vista Intake Pump Station	RC	A	AR	NA
	Landscape proposed treatment facility along the bike trail	RC	A	AR	NA
	Ensure Treatment Plant lights are directed away from bike trail	RC	A	AR	NA
	Contain wells in structures and landscape	RC	A	AR	NA
Air Quality	Comply with SCAQMD Rule 403	RI	NA	AR	NA
	Comply with SCAQMD Rule 1179 (b) (6)	RI	A	AR	NA
Biological Resources	Install automatic shut off valves in perchlorate pipeline to ensure pipeline shut down if pipeline is damaged during operation	RIM	A	AR	NA
	Schedule construction along south bank of Santa Clara River and Bouquet Canyon Road for September 1-February 1	RC	NA	AR	NA
	For construction outside of the September 1-February 1, survey weekly for raptor nests 30 days prior to initiation of construction.	RC	NA	NA	AR
	If nests are found within 300 feet of construction area (500 feet for raptors), suspend construction until nests are empty, young have fledged, and there is no evidence of new nesting activity	RC	NA	AR	AR
	Flag construction areas to clearly mark off-limits areas at 300-foot and 500-foot from active nests	RC	NA	AR	AR
	Survey for bats under the Bouquet Canyon Bridge. If bats are located, impacts may be avoided by scheduling work during the non-nesting season (after September 1 and before March 1). Bats leaving the structure at night may then be excluded from returning to the bridge with fine mesh. CLWA will consult with CDFG during implementation of such impact avoidance measures.	RC	NA	AR	AR
	Develop and conduct a CDFG and USFWS training program for workers along the south bank of the Santa Clara River and Bouquet Canyon Road; post species information at the site	RC	NA	AR	AR

	Following biological survey to confirm no special status species at the construction site, install fine-mesh drift fence along boundary between river and construction site along the south bank of the Santa Clara River and Bouquet Canyon Road	RC	NA	AR	AR
	For installation of pipelines at Bouquet Canyon Road bridge, comply with CDFG 1600 permit requirements. Specifically: a. All construction will be done in dry conditions; b. Construction equipment will access the river bed via an area without native riparian vegetation; c. Construction equipment fueling and maintenance will be performed outside of the riverbed or if necessary these activities will be performed using containment vessels; d. Spills of fuel or other materials used during construction will be immediately reported and cleaned up in accordance with rules of the Regional Water Quality Control Board.	RC	NA	AR	AR
	To the extent feasible, along Mainstem and South Fork of Santa Clara river, use landward right-of way for side casting of spoil and for construction laydown and vehicle fueling and maintenance to isolate these activities from the river.	RC	NA	AR	AR
Cultural Resources	Where there is potential to encounter buried cultural resources (roads and trails along the South Fork of the Santa Clara River): a. Prior to construction, train construction personnel regarding recognition of buried cultural remains and establish procedures to halt construction immediately and notify qualified archeologist. b. In areas near a known cultural resource site, a qualified archeologist shall monitor construction. If resources are found, initiate consultation with the State Historic Preservation Office. c. Comply with Department of Health Services requirements for treatment of buried human remains.	RC	NA	AR	AR
Geology and Soils	Install automatic shut off valves in perchlorate pipeline to ensure pipeline shut down if pipeline is damaged during operation	RIM	A	AR	NA
	On-going monitoring of Treatment Plant operation	A	NA	NA	NA
	Provide secondary containment vessels for hazardous treatment plant chemicals	AIM	A	AR	NA
Hazards and	Design, construct, and operate to provide for best management	AIM	A	AR	NA

Hazardous Materials	practices for handling of chemicals at chloramination facilities				
	Provide secondary containment vessels for hazardous treatment plant chemicals	AIM	A	AR	NA
	During construction, comply with City of Santa Clarita policies related to emergency response plans or evacuation plans	RC	NA	A	NA
	Comply with City of Santa Clarita Encroachment Policy and County of Los Angeles Code, Division 1, Title 16 (where appropriate) regarding trench backfill and covering	RC	NA	AR	NA
Hydrology and Groundwater Quality	Contain construction-site drainage and sediments: a. Daily pre-construction equipment inspections to detect and repair leaks b. Use of secondary containment for fueling and chemical storage areas c. Use of secondary containment for equipment wash water d. Use of silt traps or basins to control runoff e. Cover stockpiles to prevent runoff f. Protect loose soils areas from potentially erosive runoff g. For construction in the river channel, equipment shall be fitted with secondary containment materials at potential oil/fuel leakage sites.	RCI	NA	AR	NA
	Prepare a *Storm Water Pollution Prevention Plan* if required	RC	NA	AR	NA
Noise	For construction adjacent to housing, comply with City of Santa Clarita Noise ordinances: a. Permanent above-ground facilities (wells and treatment plant) will be contained in structures to ensure adjacent noise levels are below levels established for facilities in commercial and manufacturing areas; b. Limit construction to the period 7 am to 7 pm; c. Monitor noise levels adjacent to housing and if levels at adjacent housing exceed City Noise Ordinance permitted levels (65 dBA), install temporary noise attenuation barriers	RC	A	AR	NA
Recreation	No more than one segment of bike trail will be affected at any time	RC	NA	AR	NA
	Detours around the construction zone will be as short as possible and temporary. As part of this action, post and maintain	RC	NA	AR	NA

	signage related to trail closures and detours.				
Transportation and Traffic	Comply with City of Santa Clarita Encroachment Permit Policy and/or County of Los Angeles Public Works Encroachment Permit requirements, County Code Division 1, Title 16 As feasible, limit construction related truck trips on state highways to off-peak commute periods. Obtain Caltrans Transportation Permit for transport of oversized or over-weight vehicles on State highways. Avoid excessive or poorly timed truck platooning.	RC	NA	AR	NA

Table MMP-2. Mitigation and Monitoring Responsibilities

1. CLWA Responsibilities (CLWA Compliance Manager amd/or Project Manager)			
Action	**Schedule**	**Required Reports**	**Report provided to:**
Assign a staff person (compliance manager) to oversee compliance with the commitments of the Initial Study and Mitigated Negative Declaration.	Prior to issuing construction contracts	None	None
Incorporate monitoring requirements in construction contracts and scopes of work	Prior to issuing contracting documents	Memo Record of Review	PM
Review Designs and Specifications to ensure that mitigation commitments related to design and construction are met	Prior to approving designs and specifications	Memo Record of Review	PM
Review project schedule to ensure that mitigation commitments related to scheduling are met	Prior to approving schedule	Memo Record of Review	PM
Periodic inspection of contractor compliance records	On-going	Memo Record of Review	PM
Contracting for independent mitigation and monitoring services for biological monitoring and management for construction along the south bank of the Santa Clara River and at bridge crossings along Bouquet Canyon Road	Schedule to ensure that services will be available at least 30 days prior to initiation of construction in these alignments	Memo Record of Review Approved contract	PM
Contracting for independent mitigation and monitoring services for cultural resources monitoring and management for construction activities involving work where excavations may extend to previously undisturbed soils and to coordinate with permitting agencies and the State Historic Preservation office during pre-construction planning	Initiated upon CLWA Board adoption of MND or approval of the proposed project	Memo Record of Review Approved contract	PM
Periodic inspection of construction sites during construction to confirm contractor compliance with construction monitoring and mitigation requirements	During construction mobilization, activity, and demobilization	Inspection Report/Checklist	PM
On-going coordination with permitting agencies prior to, during, and following construction; resolution of construction-related issues	During construction mobilization, activity, and demobilization	Inspection Report/Checklist	PM
Resolution of issues raised by permitting agencies and/or the public related to contractor mitigation and monitoring activities	On-going following CLWA Board adoption of the mitigated negative declaration and approval of the project	Memo Report of issues and their resolution	PM
Maintain a file of mitigation and monitoring compliance documents	During design, construction, mobilization, demobilization, and	NA	PM

	initial start-up and inspection of facilities		
Apply for CDFG Section 1600 Permit for work in the Santa Clara River (installation of pipelines under bridge decks). Incorporate required monitoring and mitigation requirements into construction contracts.	Prior to issuance of construction contracts	Memo Report certifying that construction contracts include 1600 permit requirements	PM
Inspect, operate and maintain all facilities to minimize the potential for facility damage and associated release of water from pipelines and chemicals used in facility operations.	On-going	NA	NA
2. Design Engineers			
Action	**Schedule**	**Required Reports**	**Report provided to:**
Review Department of Health Services permit requirements for the treatment plant and ensure compliance with these requirements	During Design	Memo certifying compliance with approved plans and specifications	Compliance Manager and PM
Design facilities in accordance with (as appropriate) a. DHS requirements b. Standard Specifications for Public works Construction	During Design	Memo certifying compliance with approved plans and specifications	Compliance Manager and PM
Design above-ground facilities to be consistent with surrounding buildings per aesthetics commitments	During design	Memo certifying compliance with approved plans and specifications	Compliance Manager and PM
Design pipelines and treatment facilities to provide for pipeline automatic shutoff valves and hazardous materials containment	During design	Memo certifying compliance with approved plans and specifications	Compliance Manager and PM
3. Construction Contractors and Independent Monitoring Contractors (Biological and Cultural)			
Action	**Schedule**	**Required Reports**	**Report provided to:**
As needed, obtain permit applications and file permit requests with City of Santa Clarita for Encroachment Permit and/or County of Los Angeles Public works Encroachment Permit (including, as needed, development and processing of a State *Storm Water Pollution Prevention Plan*)	30 days prior to construction in the public right of way	Copy of Encroachment Permit Application	CLWA PM
Develop appropriate compliance and reporting procedures for all work for which action is specified on Table MMP-1.	Prior to initiation of construction	Copy of compliance and reporting procedures, with City/County approval as needed	CLWA PM
Comply with encroachment permits, including but not limited to:	On-going during mobilization,	Copies of insurance certificates,	CLWA PM

a. Notification of start of work b. Contact of Underground Service Alert c. 24-hour prior notification of persons within 300 feet of work d. Utility repair e. Caltrans MUTCD California Supplement f. Lane closure hours g. Reports of damage to traffic control equipment h. Trench/hole closure when work is not in progress i. Testing and certification of trench compaction j. Testing and certification of paving k. Removal of Underground Service Alert markings l. Compliance with utility cover requirements m. Use of non-skid steel plates to cover open trenches n. Use of recessed steel plating if required o. Night work plan approved by City as needed p. Backfill requirements met q. Concrete/asphalt removal requirements met r. Sidewalk removal and replacement requirements met s. Heavy equipment transportation requirements met	construction, and demobilization (Daily, weekly, monthly as specified in encroachment permits)	compliance reports, checklists, City/County inspection reports, correspondence with City and County, and other required reports or documentation	
Comply with SCAQMD Rule 403, including but not limited to: a. Designation of a dust control supervisor per Rule 403 b. Table 1: Best Available Control Measures	On-going during mobilization, construction, and demobilization (Daily, weekly, monthly as specified in encroachment permits)	Copies of insurance certificates, compliance reports, checklists, City/County inspection reports, correspondence with City and County, and other required reports or documentation	CLWA PM
Comply with biological resources mitigation measures per Table MMP-1. For work along the south bank of the Santa Clara River and Bouquet Canyon Road, the biological monitor shall periodically inspect construction and shall have the authority to stop construction if necessary to ensure compliance with biological resources mitigation measures.	On-going during mobilization, construction, and demobilization (Daily, weekly, monthly as specified in encroachment permits)	Copies of, compliance reports, checklists, results of field surveys prior to and during nesting season, correspondence with CDFG and USFWS, copies of construction training materials, and other required reports or documentation	CLWA PM
Comply with cultural resources mitigation measures per Table MMP-1.	On-going during mobilization, construction, and demobilization (Daily, weekly, monthly as specified in encroachment permits)	Copies of, compliance reports, checklists; correspondence with SHPO, DHS, and the Native American Heritage Commission,	CLWA PM

		as needed; copies of construction training materials; and other required reports or documentation	
Comply with plans and specifications with regard to all features related to leak prevention, and containment of hazards and hazardous materials.	On-going during mobilization, construction, and demobilization (Daily, weekly, monthly as specified in the noise ordinance)	Copies of insurance certificates, compliance reports, checklists, inspections, City inspection reports, correspondence with City, and other required reports or documentation	CLWA PM
Implementation of Best Management Practices for stormwater runoff control to contain runoff and sediment from construction. Preparation of a State *Storm Water Pollution Prevention Plan* if required. Specifically: a. Daily pre-construction equipment inspections to detect and repair leaks b. Use of secondary containment for fueling and chemical storage areas c. Use of secondary containment for equipment wash water d. Use of silt traps or basins to control runoff e. Cover stockpiles to prevent runoff f. Protect loose soils areas from potentially erosive runoff g. For construction in the river channel, equipment shall be fitted with secondary containment materials at potential oil/fuel leakage sites.	On-going during mobilization, construction, and demobilization (Daily, weekly, monthly as specified in the noise ordinance)	Copies of construction runoff control plan (a formal State *Storm Water Pollution Prevention Plan* as required), compliance reports, checklists, inspections, City inspection reports, correspondence with City, and other required reports or documentation	CLWA PM
Compliance with City of Santa Clarita Noise ordinances	On-going during mobilization, construction, and demobilization (Daily, weekly, monthly as specified in the noise ordinance)	Copies of insurance certificates, compliance reports, checklists, City inspection reports, correspondence with City, and other required reports or documentation	CLWA PM
Comply with MMP requirements for minimizing impacts to trails, including: a. Completion of construction and restoration of each segment of bike trail prior to initiation of construction of other segments b. Provide the shortest feasible detours around construction	On-going during mobilization, construction, and demobilization (Daily, weekly, monthly as specified in the noise ordinance)	Maps showing trail segments and proposed detours, schedule for construction,	CLWA PM

c. Post and maintain signs for trail closures and bike traffic detours d. Coordinate with City of Santa Clarita on bike trail closings and detours			

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SEP 20 2005

CONNY B. McCORMACK, COUNTY CLERK
H. Harper
H. HARPER DEPUTY

Draft
MITIGATED NEGATIVE DECLARATION

Project Name: Castaic Lake Water Agency, Groundwater Containment, Treatment, and Restoration Project

Project File Number: NA

Project Location: The project is located in the City of Santa Clarita and on lands west of the City of Santa Clarita and southwest of Magic Mountain Amusement Park.

County Supervisorial Districts: Fifth District (Michael Antonovich)

Mailing Address and Phone Number of Applicant Contact Person for this Project:

Mr. Ken Petersen,
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350-2173
Phone 661-513-1260

Project Description:

The purpose of the proposed Castaic Lake Water Agency Groundwater Containment, Treatment, and Restoration Project (Proposed Project) is to prevent further perchlorate contamination of groundwater basins in the Santa Clarita Valley originating at an historic weapons manufacturing site located east of the South Fork of the Santa Clara River near the confluence of the South Fork and the Mainstem Santa Clara River. The Proposed Project will intercept the existing plume of perchlorate in the Saugus Formation groundwater and pump the contaminated water from intercepting wells to a new treatment plant, where perchlorate will be removed and the treated water utilized as part of Castaic Lake Water Agency's (CLWA) drinking water supply.

The Proposed Project would involve (a) modification of existing production wells, (b) construction and operation of new monitoring and production wells, (c) modification of existing pipelines and construction of new pipelines, (d) construction of a new, modular perchlorate water treatment plant, and (e) closing of existing production wells.

The Propose Project has two interrelated elements. First, there are facilities for the containment and treatment of perchlorate-contaminated groundwater. Second, there are service restoration facilities to replace and relocate existing facilities which must be closed or modified to accomplish the containment program objectives. With the exception of two pipeline segments under bridge decks, pipelines will be buried. The Proposed Project incorporates a number of conservation/impact minimization measures into its project description, including measures related to:

- Facility Siting
- Construction Schedule
- River Crossings

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ON SEP 20 2005
UNTIL OCT 20 2005
REGISTRAR-RECORDER/COUNTY CLERK

05-0016920

- Best Management Practices, Construction in Roads
- Best Management Practices, Construction in Bike Trails
- Aesthetic Treatment of the Treatment Facility
- Air quality
- Noise
- Biological Resources
- Water Quality
- Cultural Resources

As appropriate, these conservation/impact minimization procedures will be incorporated into construction contracts and performance will be independently verified by CLWA and/or qualified monitors. These elements of the project, described in full in the attached Initial Study, result in reduction of potential environmental impacts to a level of less-than-significant. In addition, CLWA proposes an additional site-specific monitoring and mitigation measure related to noise that may be implemented if on-site monitoring determines that minimization measures have not reduced noise levels to the desired levels.

The Proposed Project is described in greater detail in the attached Initial Study.

Measures Included in the Project to Reduce Potentially Significant Effects to a Level of Less-Than-Significant (See Initial Study for more detail on the measures outlined below.)

Aesthetics: Facilities have been sited to avoid impact to scenic resources. Above ground facilities will be designed to be consistent with existing visual character of adjacent development.

Agricultural Resources: None. The Proposed Project will not affect agricultural resources.

Air Quality: The Proposed Project incorporates best management practices per Rule 403 of the South Coast Air Quality Management District, Table 1.

Biological Resources: The project has been sited to avoid direct impact to wildlife and wildlife habitat. Indirect effects associated with noise and visual disturbance are avoided/minimized by construction scheduling outside of nesting/breeding season for special-status birds in the adjacent Santa Clara River. The project includes construction crew training, on-site biological monitoring, and isolation of the construction area from any adjacent habitats during construction to prevent adverse impacts associated with wildlife incidental use of the construction area.

Cultural Resources: Project siting focuses on already heavily disturbed areas, reducing the potential for effects on cultural resources. Where buried cultural resources may occur, construction personnel training, construction monitoring and resource recovery, and compliance with California Department of Health Services requirements of treatment of buried human remains will reduce cultural resource impacts to a level of less-than-significant.

Geology and Soils: Mitigation measures to reduce erosion and drainage from construction sites are included, consistent with the requirements of the City of Santa Clarita Encroachment Permit Policy.

Hazards and Hazardous Materials: Materials associated with operation of the perchlorate treatment facility are stable and not considered hazardous. All water treatment materials will be transported, handled, and stored in accordance with current regulations, including use of secondary containment vessels.

Hydrology and Water Quality: The project includes best management practices for construction to avoid and minimize potential construction-related effects on drainage and water quality.

Land Use and Planning: None. The Proposed Project would have no effects on land use.

Mineral Resources: None. The Proposed Project would have no effects on mineral resources.

Noise: Project siting reduces potential construction and operation related noise impacts. The Proposed Project incorporates measures that will reduce potential noise from above ground facilities. The Proposed Project includes noise monitoring and mitigation measures to reduce noise effects on residential housing adjacent to pipeline construction areas.

Population and Housing: None. The Proposed Project would have no effects on population and housing.

Public Services: None. The Proposed project has no effects on public service requirements or facilities.

Recreation: None. The Proposed Project will have only temporary and less-than-significant impacts on recreation facilities.

Transportation and Traffic: Construction best management practices defined in the City of Santa Clarita Encroachment Permit will be implemented to minimize traffic effects associated with construction in and adjacent to roads.

Utilities and Service Systems: Pre-construction coordination will identify potential utilities which may be affected by the project and coordination with owners and construction best management practices will avoid impacts to utilities.

Cumulative Impacts: None. The Proposed Project has no significant cumulative impacts.

Mandatory Findings of Significance: None. The Proposed Project does not cause impacts that require a mandatory finding of significance

FINDINGS

With the implementation of the mitigation measures outlined above and detailed in the attached Initial Study, the Proposed Groundwater Containment, Treatment, and Restoration Project will have less-than-significant impacts on the environment.

PUBLIC REVIEW PERIOD

Before 5:00 PM on September 8, 2005, any person may:

(1) Review the Draft Mitigated Negative Declaration (MND)

(2) Submit written comments regarding the information, analysis, and mitigation measures in the Draft MND. Before the MND is adopted, CLWA staff will prepare written responses to any comments, and revise the Draft MND, if necessary, to reflect any concerns raised during the public review period. All written comments will be included as part of the Final MND, and/or

(3) File a formal written protest of the determination that the project would not have a significant effect on the environment. This formal protest must be filed at the Castaic Lake Water Agency, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350-2173, Attention: Mr. Ken Peterson. The written protest should make "fair argument" based on substantial evidence that the project will have one or more significant effects on the environment. If a valid written protest is filed with the Board of Directors of the Castaic Lake Water Agency within the noticed review period, the Board of Directors may (1) adopt the MND and set a noticed public hearing on the protest before the Board of Directors, (2) require the preparation of an environmental impact report and refund the filing fee to the person who filed the protest, or (3) require the draft MND to be revised and undergo additional noticed public review, and refund the filing fee to the person who filed the protest.

Dan Masnada
General Manager
For Castaic Lake Water Agency

Circulated on: August 5, 2005

05-0016920

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SEP 20 2005

CONNY B. McCORMACK, COUNTY CLERK
H. Harper DEPUTY
H. HARPER

PUBLIC NOTICE
INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION
Castaic Lake Water Agency, Santa Clarita, CA

Project Title, Description, and Location: Groundwater Containment, Treatment, and Restoration Project

Castaic Lake Water Agency proposes a two-component Groundwater Containment, Treatment, and Restoration Project. The first component will involve construction and use of existing facilities to intercept perchlorate contaminated groundwater, convey this water to a new treatment plant for treatment, and put the resulting clean water to beneficial use. The second component will involve construction and use of existing facilities to restore historic production from several wells that will be permanently closed due to contamination by perchlorate. Facilities will involve a new treatment plant, pipelines constructed in road and bike-trail rights-of-way, modifications to existing wells and pipelines, and new wells. If the Proposed Project is implemented, construction of underground pipelines and other facilities will occur in the following locations:

1. On the west side of San Fernando Road south of Magic Mountain Parkway
2. Parallel to Magic Mountain Parkway from San Fernando Road to Valencia Boulevard
3. Parallel to Valencia Boulevard/Soledad Canyon Road from Magic Mountain Parkway to the bridge at Bouquet Canyon Road
4. Across the Santa Clara River along Bouquet Canyon Bridge
5. Within the levee/bike trail west of Bouquet Canyon Bridge to The Rio Vista Intake Pump Station
6. Within the trail corridor west of the South Fork of the Santa Clara River
7. Within the bike trail along the south levee of the Santa Clara River from the Valencia Boulevard bridge to McBean Parkway
8. At Castaic Lake Water District's existing facilities at Furnivall Avenue
9. Parallel to Magic Mountain Parkway from Interstate 5 west to an unpaved road west of Magic Mountain Amusement Park
10. Along the unpaved road west of Magic Mountain Amusement Park

California State Law requires Castaic Lake Water Agency to conduct environmental review to determine if a project may have a potentially significant effect on the environment. Environmental review examines the nature and extent of any potentially significant adverse impacts on the environment that could occur if a project is approved and implemented. The Board of Directors of the Castaic Lake Water Agency would require the preparation of an Environmental Impact Report if the review concluded that the proposed project could have significant unavoidable effects on the environment. The California Environmental Quality Act (CEQA) requires this notice to disclose whether any listed toxic sites are present; there are no listed toxic sites within the proposed construction areas.

Based on initial study, the General Manager has concluded that the project, which incorporates a number of impact avoidance, minimization, and mitigation measures, will not have significant adverse effects on the environment. The project has been formulated to avoid such impacts where there was a potential for them to occur. Castaic Lake Water Agency has sent this intent to adopt a Mitigated Negative Declaration for the proposed project to the State Clearinghouse, responsible agencies, trustee agencies, and the County Clerks of Los Angeles and Ventura to inform them of a public hearing on the project that will be on September 14, 2005 at the administration building of Castaic Lake Water Agency, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350 at 5:00 PM. The draft Mitigated Negative Declaration, initial study, and the referenced technical documents are available for review under the above file number from 9:00 a.m. to 4:30 p.m., Monday through Friday at Castaic Lake Water Agency, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350. The public review period for the Mitigated Negative Declaration is from August 9, 2005 through September 8, 2005. Written comments on the Proposed Project must be received by Castaic Lake Water Agency, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350, ATTN: Mr. Ken Petersen, Project Manager on or before 5:00 PM, September 8, 2005.

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Adoption of a Mitigated Negative Declaration does not constitute approval of the proposed project. The decision to approve or deny the project described will be made separately. For additional information or to obtain a copy of the draft Mitigated Negative Declaration, please call Ken Petersen, Project Manager, at 661-513-1260.

Dan Masnada
General Manager
Castaic Lake Water Agency

Circulated on: August 5, 2005

05-0016920

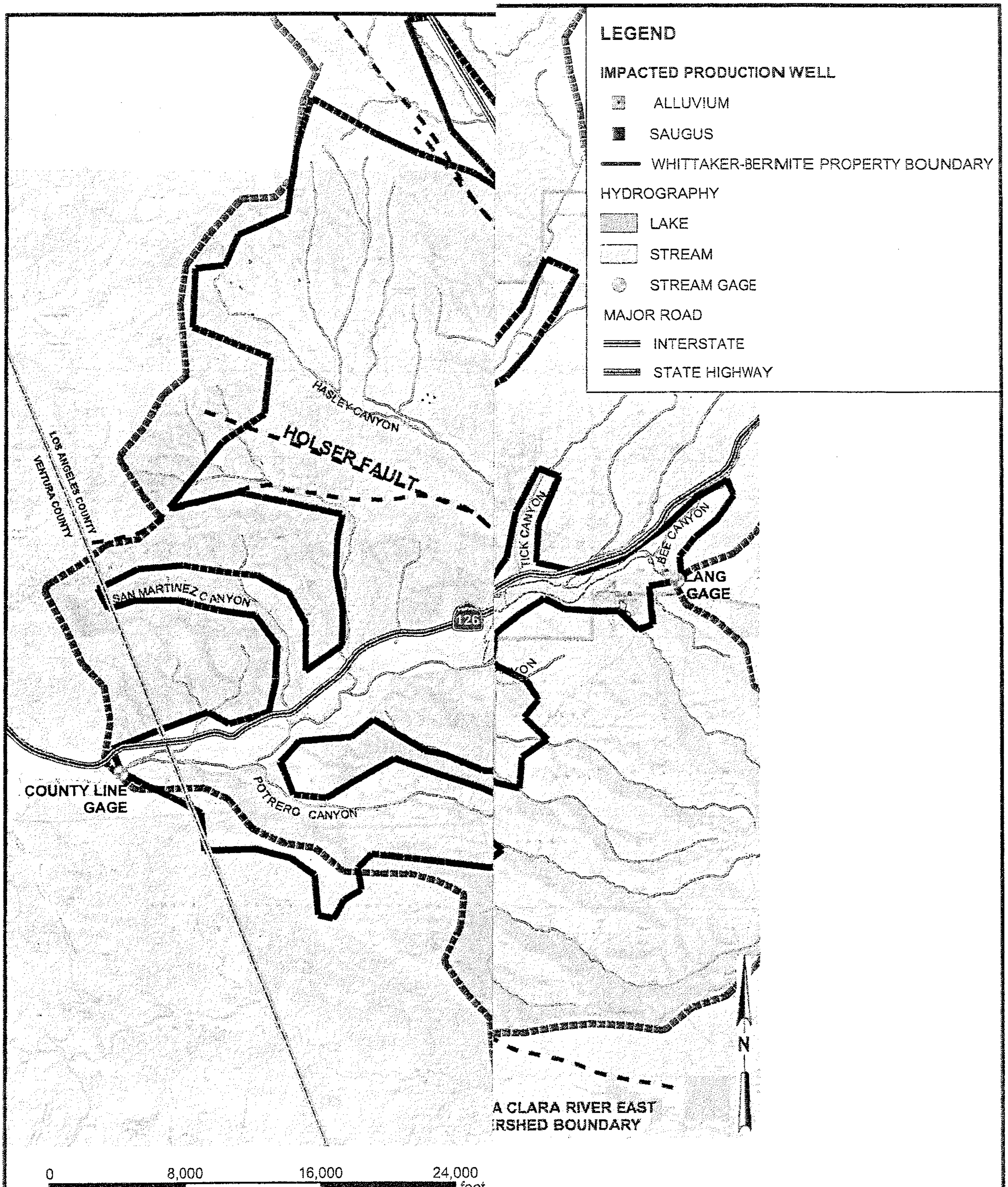

Figure 1
MAP OF STUDY AREA
ANALYSIS OF PERCHLORATE CONTAINMENT IN GROUNDWATER NEAR THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

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Appendix F

Transcripts of Public Meeting and Public Hearing

ORIGINAL

PUBLIC MEETING)
INTERIM REMEDIAL ACTION PLAN)
SEPTEMBER 7, 2005)
)
)
)

PUBLIC MEETING INTERIM REMEDIAL ACTION PLAN

September 7, 2005

205920

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(858) 455.5444 San Diego
(760) 322.2240 Palm Springs

PUBLIC MEETING)
INTERIM REMEDIAL ACTION PLAN)
SEPTEMBER 7, 2005)
)
)
)

Public Meeting of Interim Remedial Action Plan taken at Santa Clarita City Hall, 23920 Valencia Boulevard, Santa Clarita, California, commencing at 6:38 p.m., Wednesday, September 7, 2005, before Laurie A. Schmidt, Certified Shorthand Reporter No. 12719.

SANTA CLARITA, CALIFORNIA

WEDNESDAY, SEPTEMBER 7, 2005

6:38 P.M.

YVETTE LADUKE: Good evening. Let's go ahead and get started. We want to thank all of you for coming out tonight to the meeting. Just in case any of you did not get a chance to sign in, our sign-in sheet is here as well as some copies of our presentation. So if you didn't get a chance to pick one of those up and would like one, please grab one.

And also up here we have speaker cards. They look like this here. And we ask that if you would like to ask any questions, please fill out one of these speaker cards.

And also we would like to ask that you please hold your questions until the end of the presentation. After we have completed the full presentation we will have a question and answer session then.

Also we would like to let everyone know up front that there is a court reporter present tonight so when we do get to the question and answer session if we could please have you -- we have a portable mike here that we will pass around. If you could each speak one at a time and into the microphone so that she can hear any of your questions.

I would like to introduce our panel to you tonight.

The first is Sara Amir. She's the Chief of Southern California Cleanup Operations, the Site Mitigation and Brownfields Reuse Program for the Department of Toxic Substances Control. And we have Ken Petersen who is the Project Manager for the Castaic Lake Water Agency. And over there at the computer is Jose Diaz. He's the Project Manager for Toxic Substances Control. And we have Mr. John McGinnis (phonetic) here who is a geologist with our department. And Rita Kumats (phonetic) who is the Unit Chief. And then I'm Yvette LaDuke, and I'm the Public Participation Specialist for DTSC.

And so tonight we are going to give you a presentation. First Sara Amir will start out and give you some background on our department.

SARA AMIR: Good evening everyone. Thank you for being here.

What I want to do tonight is just go over very briefly about who we are, and why we are here, and what is the role of our department. And then after that, Ken Petersen will talk about this project and explain what this project is all about. And then later on Yvette LaDuke will talk about the public participations process. And at the end we will open it up to questions and answers.

If we cannot answer your questions, we will get it in writing. Make sure that we have it. That's why we have the court reporter here. And we will respond in writing.

With that, DTSC, Department of Toxic Substances Control is a department within the California EPA, like Water Board, Waste Board, Air Resources Board, and OHHA of Office of Health Hazard Assessment Department. The DTSC is charged with protecting public health and the environment from harmful chemicals and hazardous substances or waste.

We are responsible for regulating hazardous waste generation, transportation, treatment, storage, and disposal in California.

We have many different staff, multi-disciplinary staff that helps in like a team, and work on a project. For example, on the Whittaker-Bermite project or this project there has been a specific project, we have geologists, scientists, engineers, toxicologists, public participation, and other staff who work as a team together to make sure that we answer all the questions. Whatever decisions we make, it's sound engineering and scientist decision. And it's protective of public health and the environment.

DTSC Site Mitigation Program is responsible for overseeing cleanup activities at a site to address the public health and environmental protection. We identify, assess, and carry over. And we oversee the clean up of sites. And also sometimes there are sites that we actually conduct a clean up.

On this particular site we have a responsible party who is doing the investigation and also remedial activities. And we oversee those remedial activities.

We have several programs within the Site Mitigation Program that facilitate the assessment and clean up of these contaminated properties.

Under California Health and Safety Code, Section 25355.5(a)(1)(C), we created a voluntary cleanup program. And on this site we entered into a voluntary cleanup agreement with Castaic Lake Water Agency in order to conduct an investigation and cleanup activities.

And as I said, we will oversee the implementation of the water suppliers groundwater containment project.

This is the overview of the site mitigation process. When a site comes under DTSC's oversight, we first do a Preliminary Endangerment Assessment or (PEA). Under a (PEA) we determine if there has been a release of hazardous substances. If there is no release then we issue a no further action, but if there are releases, then we go to the next step which is Remedial Investigation Health Risk Assessment and Feasibility Study.

After we complete this portion of the process then we go through the Remedial Action Plan. And tonight that's why we are here. We have a Remedial Action Plan which is up for public comments and review. And we have a 30-day public comment period. And tonight's meeting is in order to get your comments and respond to your questions.

The next step would be the remedial design and then implementation. After that, certification then operation and maintenance. On some sites the remedial action has to go on for years. For example, when we have water treatment, the remedial action has to go on for a long time. And that's why we have operation and maintenance, making sure that everything is in place and when yearly, or quarterly, or semi-annual we do the monitoring and make sure that what we have done for the treatment is actually doing its work and operating properly. And we make sure that the contamination is being reduced and is being cleaned up. And the plume, for example, for groundwater is being reduced.

Under the Voluntary Cleanup Program we have an agreement with the Castaic Lake Water Agency. And under the Scope of Work with that Voluntary Cleanup Agreement we have done Remedial Investigation and Feasibility Studies, and Remedial Action Plan. And as I said, tonight we are here to review that. And again, under that VCA there will be a remedial design and implementation. The implementation will include construction of a perchlorate treatment system and also construction of a dedicated underground piping. And we oversee all those.

With that, Ken Petersen from Castaic Lake Water Agency. Ken Petersen, who is the Project Manager, will talk about the project in depth. Thank you very much.

KEN PETERSEN: Thank you, Sara.

My presentation tonight is to give you a little bit of a review of the project history, the development of alternatives, and of course the proposed projects. And the questions and answers I'm sure will clarify everything that I will say tonight.

Useful Terminology: Of course, Sara kind of gave you an overview of that already, what DTSC is, and what CERCLA is. And CERCLA is what we are trying to comply with, the Comprehensive Environmental Response, Compensation, and Liability Act. CERCLA provides an opportunity for us to recover costs as agencies from the cause of the contamination, et cetera. And, of course, we have talked about the Health and Safety Code. And the (RI), (FS) and (IRAP) is explained again there.

And of course, we are working today on an Interim Remedial Action Plan, therefore (IRAP) for those who like -- now this is a site plan of the area of concern. The Whittaker site is down here. The pump stations, the well pumps that have been affected by the perchlorate are shut down as Saugus-1 and Saugus-2 right here, Valencia V-157 is here, NC-11 down here, and a few years back Stadium Well here, and then of course Well Q-2 just recently.

This is the Rio Vista Intake Pump Station located in the Lowe's parking lot. It looks like a church. If you have seen it in the parking lot, you know what that is. And of course, the Rio Vista Treatment Plant which I will be talking about is located in the Central Park area. It's actually on top of the hill where the agency's offices are.

A little bit about the project history: In 1997 Perchlorate was detected in the Saugus wells and removed. And of course, they were removed from service immediately. DHS was involved with those findings, making this -- it was a contaminant concern, and we started testing for it at that time. In 2002 Stadium Well was removed from service when it was discovered. And then in 2003 we entered the Voluntary Agreement with DTSC.

Even though the Voluntary Agreement with Castaic Lake Water Agency and DTSC, the purveyors that have been affected by this was very much part of that. Just as Castaic Lake Water Agency became the overall agency that coordinated with DTSC to deal with this clean up.

Well Q2, too, was removed from service earlier this year from the heavy rains and also alluvium by the way. As far as from 2002 to 2005 recently and still working on some of the monies left over, purveyors obtained assistance from the United States Corps of Engineers for studies of the site which have been going on continually since then.

In 2005 the United States Corps of Engineers produced a Technical Memorandum which provided really the basis of our Feasibility Analysis that DTSC requires for the Interim Remedial Action Plan. Of course now tonight we have the drafts of the -- final drafts of the Feasibility Study and Interim Remedial Action Plan for review of the public.

Of course, most of us who have been in the valley for some time now know that there was a known source for perchlorate; that is the manufacturing and storage of testing explosives on the Whittaker property site. Which it's very vague here on this thing, but it's right here.

The water production wells are down gradient, the Saugus water from that site. And then of course we received -- those wells received elevated perchlorate and a little bit of VOC concentrations from that site. So we have started the ongoing remedial investigation, and that goes on today as we talk.

Impacted Wells: Impacted wells; where they are at -- this is very fuzzy thing, this slide. It's not high definition like the Discovery Channel. But anyway, the wells are shown. They are located on the Santa Clara River. The triangles are the alluvium wells, and the circles are Saugus wells, to clarify that. The red dots are the ones that have been impacted perchlorate as I've mentioned earlier. And if you read your handout and look at it very close if you have magnifying glasses you can see the levels that we have witnessed in the testing that we have done over the years of these wells. And basically we will have that -- we don't have that slide Post-it, but if you need any clarification on that, I will be glad to read that later.

Potential Pathways: The studies that the Army Corps of Engineers did in their analysis and Technical Memorandum really kind of signified to us where the pathways are of the perchlorate emanating from the Whittaker site. You see it in the green arrows, and the potential gradient of that contamination you can see as it flows down naturally, down the Santa Clara River flow.

Okay. So who has been involved in all this? We have had the water purveyors, of course, Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Water Company, and Valencia Water Company. We have DTSC, and also the Department of Health Services have been involved with this process that we've embarked on this action plan. We've also had the Army Corps of Engineers. And partly we have been involved with the Whittaker Corporation for the last two years, and Remediation Financial, an interim settlement type arrangement which has now passed. But most of the work that you see here tonight has been discussed with those parties. And the solutions and decisions that we have made as a group involved them at the time. And I will say no more to that.

Now as far as the project constraints, this slide is actually maybe a little confusing, but let me see if I can explain it again appropriately. The project constraints; we have basically two things that we are constrained by in this project. And that's that the perchlorate impact is deep. And that is, we can't really take it out by soil remediation or anything like that. We have to do some pumping. And plus our groundwater production wells are impacted. We want water supply from those wells, therefore we are kind of wanting to use that water beneficially for supply. And therefore, we are kind of limited with that. We have that constraint. So therefore, our need alternatives focused on containment and aboveground treatment. We wanted to contain the contamination, and we wanted to treat it in aboveground facilities.

So the containment criteria that was kind of decided through all the experts the last couple of years is that it was modeled by CH2M HILL in a full-fledge water modeling effort that is part of the record document that we have here in front of us tonight that showed that we can do containment in the Saugus Aquifer by pumping 2,200 gallons per minute, to 2,400 gallons per minute. And then that pumping would be accomplished by Saugus-1 and Saugus-2 wells at an initial rate of 1,100 gallons per well. And the other part is that we can use an existing pipeline to remove that water into a treatment facility.

General Concept: Basically this little graphic shows you pumping Saugus 1 and Saugus 2. Untreated water would go through a treatment system, filtration, perchlorate removal, disinfection, and back into the agency's distribution system as treated water. That's the process, the general concept. Now we get into the alternatives.

So we looked at. In the last couple of years we looked at treatment alternatives of Ion Exchange, the Bioreactor System, and a Membrane Filtration System to remove the perchlorate out of the water.

The Ion Exchange System; basically it's water that's -- first it's kind of roughly filtered. This is so it keeps any sand particles or any other particles that may be in the well that has come through the well screen out of the ion exchange basin. That's what that filtration is about, which they call back filters. And then we go through an ion exchange resin bed, a vessel. And that vessel provides the removal of the perchlorate ion from the water. And then of course that perchlorate ion and its constituents are left on the resin. And the resin is disposed of appropriately as waste. The next part of this is of course we go back through disinfection again, that disinfection today of course would be a chlorination. And then it's raised to the water distribution pipeline system as treated water. It's very simple.

The Bioreactor System is a little bit more complicated. It takes the water from the production wells and then puts it into a sealed vessel. And what you do is you put in a carbon type of straight into this vessel. Bacteria is grown. The bacteria uses up the oxygen from the perchlorate. And then it actually removes the perchlorate ion. And what's left is a chloride solution. And then, of course, you filter the bio solids that are left over and spent out and then you have waste solids to dispose of. And then you of course have to go through disinfection again. And then it has to go through the Rio Vista Treatment Plant. It has to be retreated again as drinking water after this process, using the capacity in the Rio Vista Treatment Plant, of course. The treated water is then distributed and it goes through its process at the Rio Vista Plant, and it's distributed.

Another system to look at, it's been actually a pilot tested, actually bench tested, was from production wells from another filtration process. The water is then put through membranes somewhere, you've heard about it in the reverse osmoses type things. But these membranes have specifically been allocated to the perchlorate ion. And then what happens is that after that's removed that perchlorate is then substituted and then it's a waste product which then has to be disposed of. And then that water is then disinfected again, and it can be treated water.

We are not very much aware of too many of these plants yet operating or that have been approved by DHS yet. But as far as the use of water, it could be very expensive because of the power that we have to generate to take that water through those membrane units and remove those perchlorate ions.

So the proposed system, the group that kind of came to a conclusion on in the last year, is that we will pump the two Saugus wells through the treated system into an ion exchange treatment system. And then, of course, we will filter it and we will disinfect it, and then re-institute it into the drinking water.

We showed the Well Q2. And some of you probably have driven by the Lowe's, and you will see the ion exchange units that DHS is in the process of working with Valencia on improving. It's the same kind of system that we are talking about for Saugus-1 and Saugus-2. It also goes through the same process and can be used as, if Q2 cleans up as some project, that this system could also be used to treat perchlorated water from the Saugus aquifers.

The project: I have very clear poster boards in the back, of the projects. The proposed containment project again, here is the former Whittaker-Bermite facility. This is Saugus-1 and Saugus-2. This is V-157 that is abandoned now. This is the NC-11 down here. There has been some discussions about abandoning NC-11, but that's still not decided yet. And, of course, this is an interim plant. As more information is available we will consider -- those things would be considered in the plan. But right now what the project is, is Saugus-1 and Saugus-2 is located here. And will construct a pipeline between the two wells, then use an existing pipeline, the dotted line that crosses the river, it comes down Magic Mountain Parkway, and a little bit into the bike trail there that's along the

Santa Clara River, down Magic Mountain, down Valencia. Then we switch over and build a new pipeline following this route right here, over into the new well or into the treatment facility at the Rio Vista Pump Station. So this is a new pipeline, and this is a new pipeline here.

So what we anticipate, the capture zone, and this is kind of shown very clearly. This green area is the, if you want to call it the plume, but it's really just taking the number of aquifer levels where the perchlorate is, and then sucking it into Saugus-1 and Saugus-2. But basically pumping it out right there at Saugus-1 and Saugus-2. And the modeling efforts that have been accomplished show that that physically contains the perchlorate contamination.

Before I go to this slide for a minute, of course this assumes actions on the site, also that DTSC is working with the Whittaker group and will continue to do that. And there will be cleanups there, of course. And we are hoping that as time goes on, that that Plume will diminish of course with the pumping.

The Proposed Treatment System: This is the Rio Vista plant as I said, that's right by Lowe's. You're sitting in the Lowe's parking lot looking across at it right now. This would be, looking at the other end, it would be the west end. The east end is right here where Bouquet is. And you can see the units that Valencia has just recently installed. And the pad area is right here in front of the fence, and the facilities will be placed here. The type of facility is like the one that's in Valencia. It's the same size. It's this unit right here. And there's two units by the way. You don't see the other one sitting here.

Operation: What we are going to do is they are always configured in the pump, a lead lag situation. That means that one vessel is always working while the other is a backup, while the flow is going through the first one. And if there was any breakthrough the last lag vessel will catch that and we will not have perchlorate in the water. Then we change out the resin. And the lead unit, make the lag unit go, and then it goes back and forth that way. That's a little bit of treatment. And all this will be operated from the Pump Control Room at CLWA's Rio Vista Treatment Plant. And then we do all our system monitoring, and chemical replacement, and Ion Exchange Media Replacement, which we project to be about a 12-month period.

And then the other part of the operation would be to install new monitoring wells, sort of like the wells that help to see how if the levels of perchlorate is increasing or decreasing as it comes to the wells. And then, of course, we do all reporting necessary to the DTSC, the Department of Health Services, and Community Members.

Operation-Monitoring: We want to make sure that we monitor it, and have an effect in capturing the perchlorate. We will continue to do that, of course, very diligently, working with all the parties concerned. And then the treatment system will of course, we have to evaluate the effectiveness of the perchlorate removal. And I have to say that these units have been -- the ion exchange units have been used -- are in use and permitted by DHS in a number of locations in Southern California. And DHS will be very much involved in this process.

YVETTE LADUKE: Thanks Ken.

Okay. Again my is Yvette LaDuke. I'm the Public Participation Specialist with Toxic Substances Control. And as Sara said earlier we are in the middle of a 30-day public comment period for the interim Removal Action Plan for this project. The comment period ends September 23rd, so we ask that if any of you want to submit any comments, that you do so by the 23rd of September. At the end of the comment period what we will do is we will collect all the comments and we review them. After our review we determine if there needs to be any changes to the plan based on the comments that we received. Once that's done we will prepare a written response for all of the comments that we receive, and we will send those written comments out to everybody who commented. So if you do send in a comment, please make sure that your name and address is legible on the comment so we can get those sent back to you.

Once that process is completed we will finalize the Interim Removal Action Plan, and then we will go ahead and approve it. Throughout this process there will be continued public involvement. As I said, we will then give a written response to comments. And also you can feel free at any time to give either myself or Jose Diaz a call. If you have any questions or concerns about what is going on, you can E-mail me, call me.

Right here, the information Repositories, these are the locations where the Interim Removal Action Plan is located. If you wish to review it before you submit a comment to us, you can go to any of these locations and take a look at it. And again if you have any questions about what you are reading, concerns, or don't understand anything, please don't hesitate to contact us, and we will get an answer to your question.

Right here, "For More Information" that is my contact, and also Jose Diaz, our DTSC Project Manager, his contact information. We are available in the office basically Monday through Friday. So you can feel free to contact us. We will get back to you.

And at this time we would like to open it up for questions. Again if you walked in late please come up to the front and sign in. We have comment cards available. We would like you to fill one of these out if you do have any questions and submit it to us just so we make sure that we have all of your concerns, and we can make sure that you all receive a response.

Also what we are going to do is I have a little portable mike here. What I'm going to do is come around to each of you so that you can ask your question in the microphone, because again, we do have a court reporter here, and we want to make sure that everybody is able to hear your question. And then we will have our panel respond to your question. And if there are any questions that we do not have an answer for right away, we will take your written comment back with us, and we will get you a response.

SARA AMIR: One brief announcement. As we discussed, this is a public meeting for the specific project that we discussed. If you have other concerns about Whittaker-Bermite, or schools, or other concerns, please make sure that you come to us after the meeting and we will discuss those with you. But please make sure that you only ask questions about the specific project that we discussed. We really appreciate that. Thank you.

YVETTE LADUKE: And just to let you know, too, if you do have questions about the Whittaker project there is a meeting coming up on September 14th. It will be in this room at 4:00 p.m. if you would like to attend that.

And now we will open it up for questions. Is there anybody that wanted to submit a speaker card to me?

CONNIE WORDEN-ROBERTS: We've raised the question that I asked Ken Petersen earlier. But I wanted to begin by thanking you for the definitive studies that you've done relative to the water. And there will be other questions that I will have on other subjects later, understanding what you've just said.

What I read in the report had to do with -- and I want to rephrase this so that everyone on the

C-A-C, the Citizens Advisory Committee, can hear the question that I ask. And I was interested in the fact that you were going to close two wells, which are west of Interstate 5. And that's, what the closing meant? That that just meant stop taking water? And what does it mean if there is perchlorate in that as to how that perchlorate will flow? Will it go back? Will it go downgraded? Will it be picked up in another well? Those were the questions that I have.

It seems based on the materials that you've presented and the concepts that were presented this evening are very good ones that will cleanse the water so we needn't worry about that. And I believe that you have already identified the fact that there would be sufficiency of water for the area. And so the question goes back to, when you get an opportunity to do so, talk to the group about what happens to the closed wells, as to downgrading with respect to the perchlorate.

KEN PETERSON: Thank you for the free --

CONNIE WORDEN ROBERTS: Free advice.

KEN PETERSEN: Yeah, free advice. If I could get to a slide, I could probably talk about this a little bit better. If you want to get to that slide.

The wells that we were discussing, that were on previous slides was 157 which is located right here, and NC-11. NC-11; it's still to be determined if we are going to close that off. But as far as 157, that has been already been closed off. And when we say closed off, to explain that, is that the Department of Health and the local health officials have rules about how you close off wells, especially deep wells like this. And then you fill them up with concrete basically. And then you say that they are abandoned. Then you have to make sure that the casing is destroyed at a certain level, too, at the same time.

So when that happens it was decided that this well is not important, as we have done some modeling efforts as we have talked about previously. Looking at pathways for how the contaminate moves off of the Whittaker site, which is in this green area.

What the modeling has shown is if we pumped at those rates, that would take care of sucking in, as I called it earlier, sucking in the perchlorate into these wells. And then that moves the perchlorate away from down gradient, stopping the down gradient migration.

There is another part of the project which we are considering and working on as an enhancement of our water supply. Replacing the water supply that was taken out by pumping these wells, two wells, when they were pumping in the system, was actually pumping at twice the rate that we were going to pump for containment. So we needed to substitute -- to find a way to substitute that lost capacity. And so we are discussing. And part of the project that's in front of the agency right now is a restoration -- groundwater restoration project west of the I-5, the Magic Mountain area, drilling two wells there, et cetera.

We feel that this area without monitoring, et cetera, that this will take care of any migration of this contaminant to this area where those new wells are going.

The idea here again is that when we put these wells in operation again, we can see exactly how we are containing the contaminant. And then from that point we can do other adjustments to the project.

YVETTE LADUKE: Okay. Next is Ed Dunn.

ED DUNN: Yes, Ed Dunn, Canyon Country. And for those that might not know me, I'm a former Director of the Newhall County Water District NC-11 Well, and a former Director of Castaic Lake Water Agency.

The NC-11 Well has completely been left out, and I am still a customer of the Newhall County Water District, completely left out of the program. And I was on the Newhall County Board at the time that we discovered perchlorate, and we closed the well. And that was 1997. We are starting to approach ten years of no use of that well.

Even though this project is supposed to be jointly by the purveyors, which is Newhall County Water District, and the Valencia Water Company, and the CLWA, and they are all paying in the lawsuits to Whittaker, they are all paying to have this cleanup done, CLWA has taken upon themselves to choose who it wants to treat and who it doesn't. And it's avoiding, even though Newhall County Water District is paying the prices to get their well back, and is talking about destruction of the well, and trading, and possibly building a new well. That well should be treated just exactly like they showed the Lincoln Avenue well on one of the slides. They showed you that Valencia is putting a well treatment on a well. They just discovered this in April, that Q2 Valencia had perchlorate, and by September it's going to have clean water coming out of its well. Newhall County Water District should have had this years ago. The treatment, using the ionization process has been going on throughout the State in numerous places. It's very effective. I'm sure the DTSC knows about it. The Environmental Health

Services approved it. Castaic Lake Water Agency wasted a lot of public funds, and a lot of time investigating the microbial and the biological system, investigating other systems before they would make a decision to use the ionization, which was already proven and accepted. That cost everyone a lot of time.

Now we hear what I call a cockamamie system of long pipes, new pipes being put into the ground to try and bring water from certain wells just to get it into CLWA's hands and into their treatment plant. And some of the pipes, you heard them say that they are going to use existing pipes. I believe that's even illegal. Any contaminated water is supposed to be in Purple Pipes, like the output from sand districts, et cetera. Anything that's not pure water is supposed to be in Purple Pipes. They are going to put it in pipes in the ground that are not Purple Pipes. Then they are going to go through all the expense of these new pipes when every one of these wells' output did go into a main. And the theory of using the individual treatment at wellheads, is because after the treatment, it can go right back into the main. That's what's happening down in La Puente, that's what's happening up in Sacramento, and that's what's happening now at Foothill. That's what should happen also in Newhall County Water

District. I am going to finally take it upon myself as an individual and a customer of Newhall County to contact Whittaker-Bermite. Because if they have me paying for something, for these pipelines that take it from wells all the way over to CLWA, that's senseless. It's senseless delay. And it's an interruption to the community, to the bike trails to able to put new pipes in the ground. It's only an intent in my opinion for Newhall County Water District to get their hands, and control of this water. Not Newhall, but CLWA to get control and their hands on this water. And they are ignoring the Newhall County Water County District Well. I think this is wrong. I think they should take the shortest and the least expensive. Use what is proven. They sure can do it for the Valencia Well in just six months. But they can't do it on the Newhall Well ever since 1997.

The water that's in the -- the contaminated water that is in the ground in the Saugus to the Newhall Well or to any of those well like they show the green there, but don't show it going to the Newhall well, the only way that water can come out is to pump it out. There is no new source of perchlorate or Bermite. They are not there making fireworks, or rockets, or ammunitions. So as we pump it out, like it was explained by Mr. Petersen, eventually that is going to diminish. If it is too deep in the soil, that Bermite, then we are going to wait and just pump it out at the wells. So we need the wellhead treatment. We need it now. Newhall's waited since 1997. I think DTSC and the Department of Health Services should take a look at that.

Anybody can have any consultant bottle what you want and make it look like it should go the way you want it to go. But look at the practical part of it. And the practical part of it is that well, Newhall-11, needs to have its own system now to clean it up. And I am going to see if I can do it individually.

SARA AMIR: Thank you for your comment.

One of the issues that you raised was that why they didn't do it immediately. We had to do a lot of investigation and make sure that if they pump those wells, it's not going to exacerbate the plume, and the modeling, and all the work that is being done. Now we have information that we can actually go ahead and let them know that they can pump these wells. And I just wanted to respond to that. But thank you for your comments. We are going to take a look at it.

ED DUNN: Okay. Very good.

YVETTE LADUKE: Okay. Next is Cam Noltemeyer.

CAM NOLTEMEYER: Cam Noltemeyer, Valencia. Yes, I understand from Mr. Petersen's comments that the reason that you were doing that is that the soil cannot be cleaned up. And that's my understanding from being at the (RAP) meetings for soil cleanup, is that it's so deep that it can't be cleaned up. And I believe that's what he said. And that means that the soil in certain areas is so deep, that perchlorate, the contamination, that they actually can't clean it up. And apparently that is why you are doing this interim or (IRAP). I don't understand why we have this interim (IRAP), and why the Valencia contaminated wells aren't being included in this. Because Mr. Manetta, when I brought this up at a C.A.G. meeting had said that it is going to be included, because it was kind of done very quitely. Though they've never had a public meeting about it. And that's the water that I'm supposed to be drinking. I don't drink their water. I don't think many people in this room do drink the water.

But my concern is this seems to be rushing through for some reason, and I assume it's for developers. Because that's basically what we are seeing here, is that it's for one development or another that it's being pushed through rapidly.

As far as I am concerned, as a consumer of the water that is coming from Valencia or from Castaic Lake Water Agency, it appears to me that if you can drill two new wells out there where it isn't going to be contaminated, why aren't you doing four? Because I don't want that dumped in my water supply. Like I said, even now we don't drink it. And I don't think there is anyone in our neighborhood that drinks the water. But yeah, we have to use it for cooking, bathing our children, everything like that. But I'm very much against dumping this even treated contaminated water back into our system where we have to drink it. It seems to me, drill new wells, clean it, dump it in the river or whatever, to let nature take its course on it. But to dump it back into our drinking water is very repulsive to me.

My other concern is that of the cost. On Valencia I questioned this. $500,000.00 is what they said they got from the Whittaker-Bermite. That's like a drop in the bucket. And I know who is going to be paying for it. It's going to be us. And that appears to be what is happening here, too. There's no discussion of who is actually paying for this. I read in the paper that they said that they were going to go after them. Well, we know how that goes. So far I believe it has been the taxpayers that have paid for everything. As far as it came from the Federal Government; fine, that's the taxpayers.

So I am concerned about the fact that this seems to be rushing through before we are doing the -- I believe it's the (RAP) seven through the Whittaker-Bermite.

And again, it's just one of those things where I think it's being done for the Riverpark site. Apparently this water is needed for that. That's in a lawsuit right now. Valencia did it because they need it for a different project. And I don't think the public is really being considered in all of this. And maybe they don't care. I do. And you know, like I said I am really repulsed by the idea of just dumping this water back into our water supply when you've broken --when you are doing two wells out there, why don't you do four?

And I would like an explanation of why they are so anxious to dump something else into our water supply when we already are treating so many things that they are mixing. And when you read everything that they are mixing. I don't know, maybe somebody has confidence in them. I don't think so. I think with what we have seen happen in New Orleans we have lost a lot of confidence in our public agencies. I know that

I have.

So what I really want to know is why can't we just dump this water somewhere else, but not in our water supply? I want to know why the Valencia alluvium wells are not included in this meeting, in this EIR. Did you do a health risk assessment? These other cities that are doing this; has there been a long-range health assessment of how it's affecting those people? I think we go into these things and say, yes, great. We are cleaning it. And yet when you look at the health risk assessments they are practically non-existent. So that's my concern as a consumer of this.

SARA AMIR: Cam, thank you for your comments. There were several questions that you raised, and I will try to answer them.

You mentioned, why Interim Remedial Action Plan. This is interim because the whole thing will be later on in terms of OU-7 for the groundwater at the Whittaker site. So this is part of that. So that is why we are calling it interim. And that (RAP) should be done by the end of this year for the Whittaker groundwater OU-7.

You also mentioned the deep soil contamination. It is correct that there is deep soil contamination on the Whittaker site. But you mentioned that it's not going to be cleaned up, and that's not true. It is going to be cleaned up. But it wasn't under OU-1 (RAP), it wasn't included. It was only shallow soil. So the deep soil will be cleaned up later on. It has to be with some, in C2 remediation because we can't really dig up the old (inaudible) in the Santa Clarita Valley and take them away. So there is a lot of deep contamination, and it will be dealt with.

And you also mentioned, rushing through. We started working on the Whittaker site in 1994. Right now it's 200t and we are doing Interim Remedial Action Plan. I don't think that we are rushing through this project. And so we have done a lot of -- in '97 you mentioned that they found perchlorate in the wells from '97 to 2005. It's been a long time. So it hasn't been rushed through. And the gentleman who spoke before you was criticizing the Castaic Lake Water Agency or the water purveyors, why they didn't do anything right away. And we understand that. We have to make sure that whatever we do is really protective of public health and the environment. And that is why it took a long time to get here.

I hope I've answered most of your questions.

Some of the questions about the cost, maybe Ken Petersen can answer. And about the public agencies and your confidence, I hope that with all the work that we have done in this community we have earned your confidence in our work. Thank you.

KEN PETERSEN: As I discussed earlier in my presentation, the project included a time when you we had an interim settlement with the Whittaker and Remedial Financial.

A lot of the work that you see tonight was accomplished under that remedial action, on the Remedial Action Plan and also on the studies that were accomplished. And those were funded actually by the insurance people for Whittaker. So that was not on the backs of our payers.

Presently, I'm just going to throw out some numbers here. We probably spent about $10,000,000.00 totally on this project so far in studies and analysis. And of that $10,000,000.00 we probably have only -- we've had reimbursements either through from the Whittaker group, and et cetera, almost two-thirds of that presently. We are still proceeding in final settlement with the parties that are concerned. And it's our hope that since we are doing this interim (IRAP) tonight and the feasibility studies that we have been discussing, that the insurance people for the Whittaker people would be glad to pay for the remaining part of the project. So that's how the costs are working out.

YVETTE LADUKE: Okay. And just to let you guys know, too, it might be a little bit easier for us to respond to your questions, I know some of you have a lot of questions, if you ask one question at a time and let the panel member respond, that way you will get a full response to each of your questions. It's kind of hard to remember them all when you have a list. So I will give you an opportunity to ask more than one question. It might be a little easier that way.

Marsha McLean.

MARSHA MCLEAN: Hi, I'm Marsha McLean and I'm Councilwoman for the City of Santa Clarita, however, I'm asking a question for myself, I'm not really representing the entire City Council.

First of all, I just want to say that this land has been contaminated far too long. I'm happy to see that this process -- that these steps are being taken and this process is being implemented. The faster we can implement this and get it finally cleaned up, the better. The citizens of Santa Clarita deserve to have this area cleaned up. So anything you all can do to help expedite this, and what we can do I'm sure is a good idea.

My question is, is when you take this water and it goes through the process, and you are saying that the water, the treated water is going to be put back into use. I'm just wonder, do you have documents at this point, how do you give the citizen's a level of comfort that the water actually is safe to drink? And do you have documentation that shows that previously treated water is safe to drink? I think that's one of the things that we are going to have to do as a public agency, as a city, to assure that this water is safe. And that's, you know, the first part.

The second part is, is how much water are we talking about? And would it be wise to use this water for say watering golf courses and those types of uses rather than to be put back into drinking water?

KEN PETERSEN: The project also includes another public process where we have to get a permit to supply this water as a drinking water source. And DHS is involved in that process. It's called -- they call it after a policy that was passed in 1997. That 97-005. It includes a 12-step process where that we go through analysis, somewhere what DTSC does on public health concerns. And when we do it on the water, we do risk analysis as one of the items on that list that we look at.

That process happens after the project is actually designed so that the agency, the Department of Health Services can review the plans, and make findings about the safety to our health as far as a drinking water source.

The other part of the process is that there is a public hearing involved. The water is actually -- what we are taking away from the water is just the perchlorate ion through a process. And everything else is the same, minerally, constituents of the water. That water is then tested as I said earlier, and monitored, and meets the Federal drinking water requirements as enforced by the Department of Health Services. And so they are our oversight. And we do the testing. As we do today in all waters that we supply to our customers through our treatment plants and the wells that are purveyors ground. So there is another process that will occur before the water is even actually turned into the system.

As far as the recycled water discussion, using the water, the recycled water causes -- needs a lot of infrastructure. And also we need to pump this water all the time. To be effective as a containment we would have to pump the water on a 24-hour basis, 365 days a year to achieve the containment scenario that we want.

Recycled water is, of course, oriented around landscaping usually, golf courses. And you know, as of this last winter you don't turn on your sprinklers a whole lot and use any water when you got nature helping you. So that's why the feasibility of using recycled water was kind of put aside. In this event, we needed to pump the water all the time, is how this goes, to be effective containment.

YVETTE LADUKE: Those are all of the speaker cards that I have. Are there any other questions out here?

And before you ask your question if you would please state your name, and then one question at a time please. And we will let you ask more than one.

JOAN DUNN: Okay. Well, these are basically statements. I'm Joan Dunn, and I am a Water Director on the Newhall County Water District, and I'm speaking for myself.

And in hearing some of these answers, the item that I thought was interesting is I think that Cam Noltemeyer was right about the Q2, the Valencia well, how quickly that seemed to go through, and the others are kind of on hold, and this one is going through. Well, they said that it's because it's an alluvial well. Well, whether it is or isn't, it's being done right now.

Now the other item, and that's just a statement, but VOC, you folks are very free with these things, and I don't go to all those meetings, but I don't know what VOC stands for.

SARA AMIR: Volatile organic compounds.

JOAN DUNN: Thank you. They probably should have in their diagram here, you know, qualify that.

SARA AMIR: Yes.

JOAN DUNN: And then the other thing that I wanted to make mention of is CLWA, and ask Mr. Masnada, I have heard him talking about that we are just going to go ahead and do the pipe system. And that sounds like they have already made up their mind. That's what they are going to do, no matter who does what. And I thought that's pretty interesting because -- they're kind of arrogant anyhow, so it wasn't surprising. But anyway, I have that on tape if you don't believe me. Anyway that was my last comment.

SARA AMIR: I know that you didn't ask questions, but regarding your last comment, we are going through a public process. And there is CEQA also with this process. So everyone gets to comment. And this is not a done deal.

YVETTE LADUKE: Okay. Cam.

CAM NOLTEMEYER: I don't believe I received an answer. And I did receive this in the mail, you know, as far as giving comments. And in here it says actions to respond to perchlorate contamination into alluvia water supply wells are being considered separately. Those are the Valencia water wells. And they are not being considered under this environmental mitigated negative deck. When are they? When will we have a right to say something about what is going on with the Valencia Water Company?

When I asked about that, you know, you all acted -- you being Jose and everyone at the last meeting I was at, that you didn't know anything about it. Then they did finally admit that there was an agreement between the DTSC, and Whittaker-Bermite, and Valencia Water Company. But where was the public involved in this? And since you state right in here, actions are being considered separately, when are they going to be considered, and when will the environmental impact report be presented to the public on the Valencia water wells? Because I have to drink that water. Well, I don't drink it, but --

SARA AMIR: This is a public meeting for the project that we talked about. I'm more than happy to talk to you after the meeting about the Q2 well and other wells.

But we want to really restrict our comments, and questions, and answers to this specific project. There is a court reporter here recording everything that is being said regarding this specific project. And next week on the 14th we can talk about it, or after the meeting. But I would really appreciate it if you would keep your comments to this specific project.

CAM NOLTEMEYER: Then I guess my comment is, why is the cleanup of the contaminated water being piecemealed in this way? It seems to me that it should be that all of it should be considered, not piecemealing it in the manner that they are doing right now. And that concerns me a lot.

And also I am concerned about whether you are really containing the plume of what you are doing. The fact that it has spread to other wells already indicates that you haven't. And there doesn't seem to be any guarantee of what you are saying here that they're actually containing it.

I would like to hear from the Corps of Engineers, or people that we have been giving all this money to, to tell us exactly if they think this is going to contain the plume, and spread.

YVETTE LADUKE: Okay.

ED DUNN: I just wanted to further comment on what my wife said about the General Manager at CLWA. I find it interesting that this is a public hearing for input on this project. And this project from what was described here tonight is this big expense of all these pipes going to take a tablet of wells down to CLWA's property and then treat it there so it can go into CLWA's pipes.

And what the General Manager said when this was presented at the Engineering Committee Meeting, or else it was their Board meeting, but one of the two, he said, "We are going to go ahead with this no matter what." And the indication was, it didn't matter whether Bermite would pay for it or agree with it, or whether DTSC or anyone else would agree to it. They were going to go ahead with it. So I find it interesting that we are having a public hearing about this project when someone else has already made that decision of what they are going to do. And that's what goes on with this particular agency.

YVETTE LADUKE: I think we have a responds back here.

DAN MASNADA: I'm Dan Masnada, the General Manager of the Castaic Lake Water Agency.

The point that I made once or twice before, I can't remember if it was at a Board or a committee meeting, was simply that the Agency and the purveyors were committed to going ahead with the containment and the treatment regardless of whether we obtained the funding, or when we would obtain the funding from the polluters, recognizing that the containment was necessary to protect the environment and to protect the Saugus formation.

That's it in a nutshell. Thank you.

YVETTE LADUKE: Do we have any other questions?

ED DUNN: I will provide him a copy of the tape of what he said, in video.

YVETTE LADUKE: Okay. Cam.

CAM NOLTEMEYER: Can I get a reply to my question? Can we hear about whether this going to --

SARA AMIR: The questions that we cannot provide the answer tonight, will we provide them in writing to you. Not all of the questions can be answered tonight.

YVETTE LADUKE: Okay. Are there any other questions?

PUBLIC PARTICIPANT: Circle J Ranch Estates, which seems to be sitting underneath or on top of the plume. And I am wondering if the whole idea is to keep that plume from spreading further off into Saugus, off into Valencia. Right now it looks like we are getting the benefit of it all. And I wonder what the environmental studies have shown about the people who are actually -- we are just underneath the Whittaker property. And what does anybody know about the impact on us? I don't know whether those two wells, Saugus Wells 1 and 2, did you say, are our wells, or the one down in Newhall which has been waiting since 1977. Or if my geography isn't quite right, but I think that green area is Circle J Ranch, or mostly. And what are we drinking while all this cleanup is proposed? What have we been drinking?

SARA AMIR: I just want to mention that the green area that you see, this is in the groundwater, it's not in soil. So you are not being exposed to perchlorate. This is showing that when those wells are being pumped, its perchlorate contamination will go into those wells and will be cleaned up as containment, so that the perchlorate will not end up going further to the east area. So it's a containment system to contain the perchlorate contamination in groundwater in the area that has been affected, and not going further. But you had a question about what you have been drinking.

PUBLIC PARTICIPANT: Well, you are talking in the future tense; this will be when it's contained. I'm sort of interested in the past.

SARA AMIR: It has affected those wells. We know that.

PUBLIC PARTICIPANT: And those are our wells? Serving our area?

SARA AMIR: But you haven't been drinking the water. Those wells have been shut down.

PUBLIC PARTICIPANT: When were they shut down?

SARA AMIR: In '97, '98. 97.

PUBLIC PARTICIPANT: Okay. We've been here since '88 I think our development; '87, '88. So that's ten years earlier.

SARA AMIR: That was the first time that perchlorate was detected in the well, and that was the time that it was shut down. So the previous monitoring did not show any perchlorate.

PUBLIC PARTICIPANT: So it's not in our drinking water, it's just in the soil?

SARA AMIR: It's in the groundwater, and it's deep soil, but you are not drinking that water;

PUBLIC PARTICIPANT: Okay. Thanks.

YVETTE LADUKE: Does anybody else have any questions? Okay. With that I want to thank everybody for coming out tonight. Again, if you didn't get a chance to sign in, we ask that you please sign in. And that we have your current address so we can make sure all of you are on our mailing list and we have your current address so that we can make that our information gets out to you. And again, the comment period ends September 23rd, so if you have any comments that you would like a response, please make sure that you get that into us.

Thank you.

(Public Meeting adjourned at 7:55 p.m.)

STATE OF CALIFORNIA)
) ss
COUNTY OF LOS ANGELES)

I, Laurie Schmidt, Certified Shorthand Reporter, Certificate No. 12719, for the State of California, hereby certify:

I am the person that stenographically recorded the Transcript of proceeding held on September 7, 2005

The foregoing transcript is a true record of said proceeding.

Dated September 26, 2005

Laurie Schmidt

ORIGINAL

CASTAIC LAKE WATER AGENCY, et al.,)

PUBLIC HEARING OF CASTAIC LAKE WATER AGENCY

September 14, 2005

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CASTAIC LAKE WATER AGENCY,)
ITEM 4.1, PUBLIC HEARING ON THE)
GROUNDWATER CONTAINMENT,)
TREATMENT AND RESTORATION)
PROJECT MITIGATED NEGATIVE)
DECLARATION)
)
______________________________)

Public hearing of Castaic Lake Water Agency at 27234 Bouquet Canyon Road, Santa Clarita, California, commencing at 7:05 P.M., Wednesday, September 14, 2005, before Laurie A. Schmidt, Certified Shorthand Reporter No. 12719.

SANTA CLARITA, CALIFORNIA

WEDNESDAY, SEPTEMBER 14, 2005

7:05 P.M.

PRESIDENT PECSI: The next item, 4.1 is a public hearing on the Groundwater Containment, Treatment and Restoration Project Mitigated Negative Declaration. General Counsel, Russ Behrens and Operations Manager, Ken Petersen are here to assist. Mr. Behrens.

MR. BEHRENS: Yes, Mr. Chairman, members of the Board. Tonight's public hearing is on the Groundwater Containment, Treatment and Restoration Project. And this is the next step toward completion of the CEQA process. We are having a public hearing tonight, and the staff requests that the Board consider whether or not to certify the Mitigated Negative Declaration, and adopt findings and related documents to complete the CEQA process after the completion of the public hearing. If the Board certifies the Mitigated Negative Declaration, then it may consider whether to authorize the Project to proceed to construction.

After the staff completes their presentation to the Board, then the Board can address its questions to the staff.

And then after the Board's questions are answered, then we will proceed into the hearing.

After the public completes their comments, the Chairman should then close the public comment portion of the hearing. And then the staff would recommend whether to consider the certification of the Mitigated Negative Declaration. Comments made tonight by the public at the hearing should be considered by the Board as part of their deliberations on whether or not to adopt the Negative Declaration, Mitigated Negative Declaration.

Are there any questions about the procedure?

PRESIDENT PECSI: Any questions for Mr. Behrens?

All right. Thank you. You may proceed with the presentation, Mr. Behrens.

MR. BEHRENS: Thank you. Ken Petersen is here tonight. He is going to describe the project and the CEQA process that we went through to develop the Mitigated Negative Declaration. And I just want to point out to you, we received some compliments on the Mitigated Negative Declaration. This is just the initial study that was prepared by Ken and his staff. And it's very, very complete. It's very detailed. And the compliment was that it was a very sincere effort.

It's very transparent as to what we are doing, and what we are trying to do, and the purposes of it. So I just wanted to share that with you before Ken took the mike, because he won't tell you.

PRESIDENT PECSI: Good job. Thank you.

KEN PETERSEN: Well, tonight I will provide the project, an overview of the project, the purpose of the project, what the components of the project are, and then a little bit of background on what we have gone through with the Negative -- the posting of the Negative Declaration, and the pending adoption here.

First off, the purpose of this project is that groundwater supplies and production of the Saugus Formation and the alluvial aquifer in the valley, downstream of the Santa Clara River are currently threatened by the Whittaker Corporation Bermite facility perchlorate contamination caused by their previous business activities at that site for up to 80 years now.

Today we have five production wells that have been taken out of service with the total capacity of 8,700 gallons per minute, and an historic annual production -- with an historic annual production of 5,300 acre feet per year. Without a program to contain the thread of the contaminated water going into the vicinity or from the vicinity of the Whittaker-Bermite property, perchlorate is expected to migrate further downstream and contaminate other wells and portions of the Saugus Aquifer.

So to address this perchlorate contamination, it's necessary to prevent two things -- three things that we have to do is contain this migration, and prevent it further from going downstream, treat any water that's extracted as part of the containment process, and recover lost groundwater production. That's what we call production restoration.

To accomplish these objectives the proposed project has two functional elements. Containment, treatment facilities; that's one element. The other element is service restoration facilities.

Let me explain the containment facilities. In front of you we have a figure from the Initial Study, Figure No. Five.

MARY LOU COTTON: Yeah, it's Five.

KEN PETERSEN: Thank you. So the facilities that we contemplate is two Saugus wells which are located at this location, and this location here. You know, you would think I --

JERRY GLADBACH: It's hard to see that point.

KEN PETERSEN: Yeah, I know. Let me do this.

I'll do it a little bit differently.

JERRY GLADBACH: Yeah, there we go.

KEN PETERSEN: Okay. The figure that I really want to get to is this one. That's what confused me a little bit.

Okay. The project, this is the containment facilities that I am going to talk about first. It includes the two wells; Saugus-1 and Saugus-2. That's to add new pumps, variable speed to pump 1,200 gallons per minute. Each flow into pipelines, et cetera. And I will go through that. We are going to put -- this project also contemplates a network of monitoring wells north of the system, meaning in this area. Some wells have already been drilled but we need to do more for the monitoring of contaminants as it comes off the Whittaker site. This is the Whittaker site.

The groundwater gradient flows this way down the river, and that's what I expect the contamination flow is, from this direction. These wells are located in the prime spots for pumping hydraulically the contaminates away from downstream migration of the perchlorate in this area.

The other project as -- part of the project is for the containment facilities, is to built pipelines to transfer the water that's been pumped out of

Saugus-1 and Saugus-2 in this new green -- existing green pipe sitting here, into a new or existing pipe, Agency pipe right here, up to this point, and then the brand new pipeline in the solid line, to the Rio Vista Pump Station which is located here where the line is, right by Lowe's and In-N-Out.

This line is contemplated to be in bike trails, paved areas. It's contemplated presently to be in the bridge of Bouquet, the new section of the bridge which we are working with the City, of course, if that's capable. But this project provides that opportunity to do that.

The other pipelines that are shown here are existing Agency pipelines in red. And that's just for reference purposes on this part of the presentation.

The treatment plant is, of course, going to be a one-train, two-vessel ion exchange system using a PWA two strong based Ion exchange resin followed by chlorination, disinfection for the capacity of 2,400 gallons per minute. And it has the capabilities of adding more units on it in the future.

The last part of this process is, of course, the conveyance from the treatment plant itself, and it has what would be provided in the treated water lines of the Agency at this point, or we are looking at other alternatives, too, for distribution of that treated water in the Agency's system downstream. We don't show that here on this.

The second part of the project is the facilities for the restoration of service. As I said earlier we are only going to pump 1,200 gallons a minute each, that's 2,400 gallons. But we need a capacity of, as I said earlier, of 8,700 gallons per minute. So we are going to make up that capacity lost in wells on what we call the west side of the valley; Saugus wells.

And let me go to the next slide and I will show you that. This is the actual pipeline system. Let me go to the wells itself, and then we will work east. The wells are located near Magic Mountain Parkway. It contemplates two wells presently with a combined capacity of 4,000 gallons per minute. The construction would be in an unpaved area, in this area right here. And this is the park, of course, the Magic Mountain Park, Amusement Park. These are basically in an area that there is an existing well here that was recently drilled by Valencia Water B-206, which is in the Saugus Aquifer, and these two wells will also be in the Saugus Aquifer to provide that capacity.

That contemplates new pipeline to here, down this area, and paved roads. One eventually will be developed in this area. The pipeline would be extended from the Agency's system presently. It's being extended right here by another project that we are working on called, Magic Mountain Pipelines. And eventually it will be extended all the way up here. And when that happens we will be able to convey that water, that supplied water into this pipeline and bring it up back to where the points of Saugus-1 and Saugus-2 are. And I will get to that.

JACQUE MCMILLAN: Is that the 126, or what is that?

KEN PETERSEN: This is Magic Mountain Parkway right here.

JACQUE MCMILLAN: Right there; okay.

KEN PETERSEN: And there is the realigning of the Old Road right here. I kind of drew that in there. This is the development that's being planned presently above Magic Mountain. And eventually there will be a -- we are also -- this is not part of this project, but there will be a reservoir over here eventually. We haven't decided it exactly yet. That would be Castaic's. And that is another environmental work.

All right. Back towards the east. Now there is Saugus-1, and there is Saugus-2. And Saugus-1 is a little bit out of the picture right now. But it's contemplated to, as we have taken out pipelines to use for the perchlorate water, we are going to replace them with larger pipelines that will provide the capacity that has been lost by these two wells and bring it back to locations for turnout to Santa Clarita Water to replace their system, and also to bring -- the project contemplates new pipeline down the bike trail from McBean Parkway. That will bring in more capacity, that capacity that we were just discussing earlier from the wells. And that capacity would then be put in two new pipelines going to this point, and also to replace capacity for NC-11 down south here along the bike trail. You can see here, this is the new pipeline that would contemplate.

This pipeline in the red will still exist, and that's why we received further capacity augmentation in this part of the system for replacing NC-11. The project also contemplates, which is not on the map here, a replacement well for the Stadium Well, a new 800-gallon-per-minute well, and it would be probably up to 100 feet along the pipeline for connection in the Furnivall area of Canyon Country, or I guess it's called the Honby area. Yes, the Honby area.

So what I have done is gone through the

description as described in the CEQA Initial Study document.

Now I can get into, if there is anymore questions I would be glad to answer on this part of project.

PRESIDENT PECSI: Mr. Gladbach.

JERRY GLADBACH: Two questions. Where is the treatment plant going to be located?

KEN PETERSEN: At the In-take Pump Station, on Rio Vista right by Lowe's.

JERRY GLADBACH: Okay.

KEN PETERSEN: And I have quite a slide for that, but I didn't bring it. I didn't make it part of the presentation.

JERRY GLADBACH: Okay. And then the other question. Are we not going to, or is Newhall County Water District not going to pump from their well that's been --

KEN PETERSEN: Well, that's still out right now.

JERRY GLADBACH: Okay.

KEN PETERSEN: It's still being studied. But this solution, this project contemplates replacement water through pipelines for replacement of that well if it's not being used.

PRESIDENT PECSI: Director Cooper.

BILL COOPER: Mr. Petersen, the migration of the perchlorate going towards the west, what about migration of the perchlorate off of the site coming off of the Stadium area, the train station, towards the river in that direction? No cutoff wells going in there?

KEN PETERSEN: As far as this project, no. This project contemplates our containment of the Saugus Aquifer pollution. The situation on the north side of what I would call the north side of the -- let me get to PDF-4 here.

Director Cooper was asking about what is going to happen with the perchlorate that's been found in alluvium wells in the -- Well, actually in the alluvium wells in the Santa Clara River where I am pointing right now. Coming off the site this way basically. The situation is that that is under a different -- it's under OU-7 of the DTSC, and they are contemplating various solutions to that situation for that. There is some thought that pumping Saugus-1 and Saugus-2 will draw some of that perchlorate into, and get it out basically, and provide a hydraulic system to stop the plume from raising. But alluvium is such a porus media, and the perchlorate in the water just goes right through it basically. So the idea is that we are, DTSC is studying that and working with the property owner or representatives, and working towards solutions for that. But this project does not contemplate that solution.

BILL COOPER: Thank you.

BOB DIPRIMIO: If it's okay, I just wanted to add to Mr. Petersen's response. It's not about this project, it's about the Northern Alluvium Containment.

DTSC has reviewed an Internum Action Plan prepared by Whittaker to install some extraction wells in the hot spots up in the Metrolink Station area. Those wells have been constructed and installed, and they have an on-site treatment plant that will be operated, and will pump those wells in small volumes but remove a lot of perchlorate because there is a highly concentrated area there. And so that will provide some containment in the source area that they've found thus far. And that treatment should be online probably by October, November of this year, so we will begin to see some containment and control in the Northern Alluvium. It's an interim measure, but it's something that Whitaker and DTSC have responded to primarily because of the Water Company's insistence that something happen there sooner than later.

JACQUE MCMILLAN: What happens to the treated water, is it reinjected?

BOB DIPRIMIO: No, the treated water I believe they are going to use the same technology that we are using. And it will be discharged to the Santa Clara River. So we will remove the perchlorate and discharge it to the river.

PRESIDENT PECSI: Mr. Manetta has a comment.

WILLIAM MANETTA: Yes, there is also another process that they are working on up in that area. It's called in situ Bioremediation. Shaw (phonetic) Environmental is doing the pilot study now, or preparing for one, which will basically put bugs in the ground that will be eating the perchlorate before it leaves the site. So that's part of the process to keep the site from oozing this perchlorate into the river. Once it hits the river it dilutes and moves rapidly west. So the best way to get it is at the source.

BILL COOPER: Any thoughts of a cutoff wall?

MR. MANETTA: Well, I brought that up to one of their experts. They did punch tests on the Manelli's (phonetic) property just south of the -- excuse me, just west of their parking lot here on the screen, about six or seven punch tests across their property. And they say the ribbon of the plume is very narrow. And that three or four of the punch holes showed perchlorate, but as you move further north there was nothing there. And they thought that there was the possibility that they may put one or two wells at that point if they can't get it all with the method that Bob was talking about.

KEN PETERSEN: And I'm outlining where the perchlorate is actually. And of course, this is where Q2 is right here. And it still is an anomaly as far as all that came here. So Basically that's where the ribbon of perchlorate is as it comes out. And the idea is that these wells will have some contact with alluvium, but we still have to do more. That's almost pretty consistent with the technical --

PRESIDENT PECSI: So that concludes the project description portion?

KEN PETERSEN: That's correct.

PRESIDENT PECSI: Thank you.

KEN PETERSEN: Now as far as what's in the document that you find in front of you tonight, the mitigation measures that's been incorporated in the project, let me just kind of review that very quickly.

We have, the first item is the facility site selection. We are extent feasible. We have sited the projects on existing sites, Saugus-1 and 2, for instance, using roads for construction or existing bike paths where most of the pipelines and wells for service are combined to existing roads, or will be in the future constructed in new roads.

As far as the areas that -- all the areas that had previous activity and has removed all wildlife habitat roads due to that, I guess. About 40 percent of the pipeline to be constructed for service restoration would be within the alignments of the regional bike trails, and thus minimize -- thus take away the -- or reduce some of the traffic impacts. The construction schedule will coincide with what is typical of this area. We will try to stay out of the river when there is habitat or nesting periods going on. We have done some studies of that presently, or research. We have done -- we have looked at river crossings. And that we will do these things in relationship to the existing CLWA pipeline, thus minimizing any impacts that we could have in the river bottom.

As far as the South Fork of the Santa Clara River, we are using existing piping, and we also will be jacking in pipe under the river. And that's in this area right here.

We will use Best Management Practices when constructing public Right-of-Way, working with the City of Santa Clarita Transportation and Engineering Services getting encroachment permits, and coincide with their policies. We have also, if there are any County of Los Angeles roads that we would be building in, such as on the west side of the I-5, we will do the same.

As far as Best Management Practices for construction of bike trails, we will construct no more than one section, or take one section of the bike trail out of service at any time, and work with the local bike enthusiasts and the City and make sure that detours are clearly marked.

The aesthetic treatment of the water treatment plant at the Rio Vista In-take Pump Station presently will match the decor that we have there, which is the Spanish-American architecture. And we will try to make that blend into the -- or we will make it blend into the aesthetic visual character.

Air Quality: We will adopt best management practices to control due to the dust from construction, and comply with the South Coast Air Quality Management, Table 1, as it's stated in the report.

The noise of the project will contribute to the siting of the project, it will contribute to avoidance. We will avoid noise impacts to adjacent businesses and residences. Containment facilities will be constructed to residential development. And the majority of containment facility pipelines will be separate from the nearby commercial development by major arterial roads. As far as construction is concerned, we will have construction crew training, on-site biological monitoring, and isolation of the construction area away from habitat areas.

We will comply with all water quality best management practices for avoidance of construction runoff, construction activities. We also will ensure that the construction scheduling and potential construction will not impact cultural resources, and will manage all potential cultural resources through excavations, and not to extent to undisturbed soils. And of course, we will comply with all DHS requirements.

The mitigation, the Notice of Intent to Adopt the Mitigated Negative Declaration for the project was put out in the street. It was sent to the State Clearinghouse on August 23rd. The review period ended September 23rd. The project notices were provided here at this site. Library copies of the project documents were provided at the Darcy Library and the Valencia

Library. And also I personally had posted notices four or five different places along the route of the pipeline at the two wells here at this site for notice. With that, I will be glad to answer any questions.

PRESIDENT PECSI: Thank you. Are there any questions concerning the staff's presentation? Director Diprimio.

BOB DIPRIMIO: Ken, is there another environmental process related to this project just on the treatment system? Or maybe to say it another way, for 9705? Or is this the environmental process for the whole project, and there won't be any other?

KEN PETERSEN: That's correct. This is the complete project that contemplates the 9705 permit. This is the CEQA for that, and also for the (IRAP), Interim Remedial Action Plan for DTSC. This is the environmental work for that.

BOB DIPRIMIO: Thank you.

PRESIDENT PECSI: Director Campbell.

DIRECTOR CAMPBELL: I just wanted to point out that DHS will require public hearings as part of their 97005. It's not CEQA related, but they will require public hearings under that process.

BOB DIPRIMIO: Okay. Then I've got a question for either Tom or Ken. If that's the case, then based upon public input, could the project change as a result of DHS's own process?

KEN PETERSEN: We are pretty far along with the DHS process. And I would say always it can be changed by DHS. But DHS will not approve the project until they have the public clearing, and the design is complete.

BOB DIPRIMIO: And maybe it's also true to say that their focus will be on the treatment plant only, and not the pipelines and the replacements.

KEN PETERSEN: That's correct.

BOB DIPRIMIO: Okay. Thank you.

KEN PETERSEN: And the groundwater restoration part of the project is more oriented to bring back the capacity that's been lost on the system with the reduction of Saugus-1 and 2, NC-11 and 157.

PRESIDENT PECSI: Director Gladbach.

JERRY GLADBACH? Ken, at what point will DHS -- I assume that they will have their own public hearings then on the treatment process?

KEN PETERSEN: Yes.

JERRY GLADBACH: And when will that be? I mean --

KEN PETERSEN: Well, it happens pretty close to almost as the project is constructed actually.

JERRY GLADBACH: Really?

KEN PETERSON: We are ready to turn the switch. And then they will have the public hearing and consider all the -- they will give us an interim design approval and construction approval, but the process ends when they have the public hearing, and they give you the water permit.

PRESIDENT PECSI: Any other questions, comments by the Board for staff? Good. Thank you. Thank you for a comprehensive presentation on the project.

Okay. We will now open the public hearing portion of this for the Groundwater Containment, Treatment Restoration Project Mitigated Negative Declaration.

Are there any members of the public who wish to comment on the Project Mitigated Negative Declaration?

Thank you. Hearing none we will now close the public hearing portion of the meeting.

Are there any comments from the Board based upon the comments we heard?

Thank you.

The next step is to consider certification -- Oh, I'm sorry.

DIRECTOR CAMPBELL: I'm just curious. Did we receive any written comments during the public comment period?

PRESIDENT PECSI: According to staff shaking their head, I hear a yes.

KEN PETERSEN: I forgot that part.

You will find on Exhibit B, the Written Public Comments, we didn't receive one verbal comment from the Department of Water Resources saying that they would not -- they did not have any comments. We have a Department of Caltrans, or Department of Transportation letter. We have a Department of Fish and Game letter, a comment letter. And we have a comment letter from the County of Los Angeles Department of Parks and Recreation. And we also have a SCAG Clearinghouse comment letter.

And that sum total was the comments that I've received; four letters, and one verbal.

PRESIDENT PECSI: Does that address your comment, Director Campbell?

DIRECTOR CAMPBELL: Yes, thank you.

PRESIDENT PECSI: And the findings of those written comments are --

KEN PETERSEN: Are in Exhibit D.

PRESIDENT PECSI: And responded to?

RUSSEL BEHRENS: That's correct. And they were addressed in the Mitigation Monitoring Program.

PRESIDENT PECSI: Thank you.

Any other comments by the Board?

All right, then the next step is to consider certification of the Mitigated Negative Declaration for the Groundwater Containment, Treatment and Restoration Project by adoption of proposed Resolution Number?

APRIL JACOBS: 2429.

PRESIDENT PECSI: 2429?

APRIL JACOBS: 2429.

PRESIDENT PECSI: Thank you.

Which is before us. Is that correct, Mr. Behrens?

RUSSEL BEHRENS: That's correct. I think it would be appropriate now for me to just briefly go through the resolution for you.

Basically the recitals indicate that the project is broken down into two containment parts; one for downstream migration interception, and the other one for treatment. And then the other one is to recover. The third one is to recover the lost wells.

Recite the fact that we have received public comments, the fact that we are having a hearing tonight, we are doing this pursuant to the Public

Resources Code, and that the Board has carefully and thoroughly reviewed the proposed Final Mitigated Negative Declaration and Initial Study which you've previously received. We didn't hand those out again to you tonight because of the volume and the waste of good taxpayers' money for making extra copies, but you've receive this previously. There is a couple of copies here for the public, and the staff has theirs which will be attached to this Negative Declaration. And that the Board has determined that the Project can be approved because there is no substantial evidence in light of the whole record that the Project may have a significant effect on the environment.

And the next recital is that. And that's because the Board has evaluated this on their own independent judgment.

So then we get into on the second page the action that you are taking. And you find that the document was prepared consistent with CEQA. And the Mitigated Negative Declaration reflects the Agency Board's independent judgment and analysis that you do hereby adopt the Final Negative Declaration, Mitigated Negative Declaration, and that you adopt the findings, which are Exhibit D, which are actually a part of the resolution and not attached, but they are part of the resolution. And we will go into that in a minute. And the Board finds that the findings are supported by substantial evidence in light of the whole record, and does certify this Final Mitigated Negative Declaration to be accurate and complete as well as legally sufficient pursuant to the provisions of CEQA. And you do direct the Agency staff to promptly file a Notice of Determination with respect to the project.

The location of the records are here at the main offices on Bouquet Canyon Road, and that you resolve further to adopt the Mitigation Monitoring Program which is attached as an exhibit, Exhibit C, and is consistent with the Public Resources Code Section 21081.6. And that you adopt the Mitigation Monitoring Program, and that the General Manager has authorized to execute all documents required to carry out this Mitigated Negative Declaration.

Then the Exhibit D Findings are set forth here, one through eight, which repeats the information that we have just gone over in the Resolution.

You have met all the requirements. Finding No. One is that you've complied with CEQA. Finding No. Two is that you have met all the requirements for public review, and including this hearing tonight. And no new issues were raised.

That the Final Mitigation Declaration contains all the information required by the Public Resources Code and the CEQA guidelines.

Finding Four: The Agency met all the requirements for notice for the September 14th hearing tonight.

Finding No. Five: The Initial Study meets the requirements of the Public Resources Code and the CEQA guidelines.

Finding No. Six: The Initial Study contains no evidence that the Project, with mitigation specified, may have a significant effect on the environment.

Finding No. Seven: The Agency is the proper lead agency for preparation of the Mitigated Negative Declaration under the Code and under the Guidelines.

And then finally and last, Finding No. Eight: It is found and determined that the Project will not have a significant effect and impact upon the environment, and is consistent with the Code and the Guidelines. And for the preparation of this document and for proceeding with the project.

And that the action taken tonight is a result of the Agency Board's independent judgment.

So with that you will find then attached after the findings, the Final Mitigated Negative Declaration which is a summary of what you heard from Ken. It's in a little more detail.

After that you will find the written comments that we received.

And then after that you will see as Exhibit C, the Mitigation and Monitoring Program. And it's set out in tabular form which is easy to handle. And then as well as laying out all of the mitigation measures that are going to be implemented. It also has a tracking system for who's responsible for what attached to it, which makes it a lot easier to monitor and to assure that the progress is made, and the protections that you want are implemented.

So with that, Mr. Chairman, I have nothing further to add unless there are any comments.

PRESIDENT PECSI: Thank you. Thank you for the overview on Resolution. Do the Board members have any comments or questions regarding the Resolution?

Hearing none I will now entertain a motion to adopt Resolution 2429 to certify the Mitigated Negative Declaration for Groundwater Containment, Treatment and Restoration Project.

Is there a motion?

DIRECTOR COLLEY: So moved.

DIRECTOR CAMPBELL: Second.

PRESIDENT PECSI: A first by Director Colley, and a second by Director Campbell.

With that, all in favor signify by saying aye.

THE BOARD: Aye.

PRESIDENT PECSI: Opposed, none.

Motion passes. Thank you.

Good job on bringing us to a point where we can move forward with rectifying. I think it's one of the biggest environmental concerns this valley has. And so congratulations. We look forward to moving forward with the engineering, design, and construction operation.

So good job. Thank you.

(Public hearing adjourned at 7:45 p.m.)

STATE OF CALIFORNIA)
) ss
COUNTY OF LOS ANGELES)

I, Laurie A. Schmidt Certified Shorthand Reporter, Certificate No. 12719, for the State of California, hereby certify:

I am the person that stenographically recorded the Transcript of proceeding held on 9/14/05

The foregoing transcript is a true record of said proceeding.

Dated 9/30/05.

Laurie A. Schmidt

ITEM NO. 4.1

RESOLUTION NO. ____
ADOPTION OF MITIGATED NEGATIVE DECLARATION
CASTAIC LAKE WATER AGENCY
GROUNDWATER CONTAINMENT, TREATMENT AND RESTORATION PROJECT

WHEREAS, the Castaic Lake Water Agency circulated for public comment a proposed Mitigated Negative Declaration and an Initial Study on its proposed Castaic Lake Water Agency Groundwater Containment, Treatment and Restoration Project ("Project") to prevent further downstream migration of perchlorates (containment), treat any water extracted as part of the containment process (containment), and recover lost local groundwater production (production restoration);

WHEREAS, the said Agency received written public comments during the comment period from August 9, 2005 to September 8, 2005 on the said proposed Project;

WHEREAS, the Agency scheduled a public hearing on the proposed project at its Board Room, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350 for September 14, 2005 at 7:00 P.M. for purposes of considering the public comments as part of its decisional process concerning the proposed Project;

WHEREAS, pursuant to Public Resources Code section 21092.5 the public hearing did not constitute an extension of the public comment period, and no responses are required under said Public Resources Code section to comments made because the hearing was scheduled after the close of the public comment period;

WHEREAS, this Board has carefully and thoroughly reviewed the proposed Final Mitigated Negative Declaration and the Initial Study (Exhibit "A" to this Resolution), all public comment period comments pertaining thereto (Exhibit "B" to this Resolution), and the Mitigation and Monitoring Plan (Exhibit "C" to this Resolution), all of which documents are hereby attached as exhibits to this Resolution, and thereby incorporated herein by reference into this Resolution;

WHEREAS, as a result of public comment period comments and comments made at the public hearing on September 14, 2005, the Agency's Board has determined that the proposed Project can be approved because there is no substantial evidence in light of the whole record that the Project may have a significant effect on the environment; and

WHEREAS, the Agency and its Board have considered all of the information presented to it as set forth above and this Resolution and action taken hereby is a result of the Board's independent judgment and analysis.

NOW, THEREFORE, BE IT RESOLVED that this Board of Directors of the Castaic Lake Water Agency does hereby find and determine that the Final Mitigated Negative Declaration was prepared pursuant to the provisions of CEQA, that there is no substantial evidence in light of the whole record that the Project will have a significant effect or impact on the environment, that the Final Mitigated Negative Declaration reflects the Agency Board's independent judgment and analysis;

RESOLVED FURTHER that the Agency's Board does hereby adopt the Final Mitigated Negative Declaration attached as Exhibit "A" to this Resolution and does hereby approve the Project;

RESOLVED FURTHER that this Agency's Board does hereby adopt the attached findings (Exhibit "D" to this Resolution) which the Agency's Board finds are supported by substantial evidence in light of the whole record, does certify this Final Mitigated Negative Declaration to be accurate and complete, as well as legally sufficient pursuant to the provisions of CEQA, and does direct Agency staff to promptly file a Notice of Determination with respect to the Project;

RESOLVED FURTHER that the location of the Agency's record on this matter is at the Castaic Lake Water Agency, 27234 Bouquet Canyon Road, Santa Clarita, CA 91350 and the Custodian of the Agency Record is April Jacobs, Acting-Secretary to the Board of Directors;

RESOLVED FURTHER, that the Project's environmental review process identified numerous mitigation measures designed to prevent potentially significant impacts that might occur. These mitigation measures either have been incorporated into the Project or specified in the Initial Study, and will be monitored and enforced pursuant to the Mitigation and Monitoring Plan ("MMP"). The MMP includes the feasible mitigation measures for potentially significant direct Project impacts that are within CLWA's jurisdiction and authority to enforce. The MMP is required by Public Resources Code section 21081.6 and is attached to this Resolution as Exhibit "C" and is incorporated herein by this reference;

RESOLVED FURTHER, that the Agency's Board does hereby adopt the MMP; and

RESOLVED FURTHER, that the General Manager is authorized to execute all documents required to carry out and implement the Project as reviewed and approved by Agency's legal counsel, including, but not limited to, a Notice of Determination.

Appendix G

Responsiveness Summary

Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

1011 North Grandview Avenue
Glendale, California 91201

Arnold Schwarzenegger
Governor

November 28, 2005

RESPONSIVENESS SUMMARY

Project Title: Castaic Lake Water Agency, Groundwater Containment and Restoration Project

Project Location: The Project is located in the City of Santa Clarita, California

Contact Person: Jose Diaz (818) 551-2171

In compliance with Health and Safety Code section 25356.1(e) (1) a public comment period was held from August 22nd to September 23rd 2005, and in compliance with the California Environmental Quality Act (CEQA), a public comment period was held from August 5th to September 8th 2005. The purpose of the comment period was to provide the public with an opportunity to review and comment on the activities described in the draft Interim Remedial Action Plan (draft IRAP) proposed by the Department of Toxic Substances Control (DTSC) and Mitigated Negative Declaration proposed by the Castaic Lake Water Agency (CLWA) for the subject project. A public meeting was held on September 7, 2005.

Written and verbal comments were received on the CEQA draft Mitigated Negative Declaration and the draft IRAP, during their respective comment periods. Transcripts from the September 7, 2005 public meeting and DTSC responses to written comments are included in Appendices F and G of the final IRAP.

List of Revisions: DTSC has fully reviewed and evaluated the comments received. DTSC revised the following portions of the IRAP:

Revision 1: Section 6.1.5 of the draft IRAP has been revised to indicate that approval of modifications to the existing water supply system is not within DTSC's jurisdiction.

COMMENTS ON THE DRAFT INTERIM REMEDIAL ACTION PLAN (IRAP)
PUBLIC COMMENT PERIOD: AUGUST 22ND TO SEPTEMBER 23RD, 2005
PUBLIC MEETING: SEPTEMBER 7TH, 2005

Comment from Mr. and Mrs. Gerald Hall, 27446 Arriola Avenue, Saugus, CA 91350

<u>Comment 1a</u>: Total destruction of perchlorate by biological means strikes us the best method.

a. Why would this method be "more difficult to reliably operate than ion exchange systems?
b. What "further treatment prior to pumping it into the distribution system" would be required?
c. Why is this a problem?

<u>Response</u>: In pilot studies of the fluidized bed reactor (FBR) and fixed bed reactor (FXB) biological treatment systems, perchlorate removal to concentrations less than the laboratory detection limit was achieved in the FXB system using only organisms indigenous to the Saugus Formation. The FBR system did not achieve perchlorate removal to concentrations below the detection limit over a period greater than eight days. Although the present worth costs of ion exchange treatment systems and biological treatment systems are very similar, the ion exchange alternative ranks very high in the implementability criteria. Ion exchange systems represent a physiochemical process that can be controlled and monitored more easily than biological treatment systems. In general, biological water treatment systems are more subject to upset than are physiochemical treatment systems. Initial startup or restoring a biological treatment system following an upset event requires significant operator attention. In addition, the California Department of Health Services (DHS) has only issued conditional acceptance of biological treatment using FBR to remove perchlorate from drinking water at another site while ion exchange treatment is a DHS-approved technology for drinking water applications.
Following treatment by ion exchange, the groundwater would be disinfected. If biological treatment were selected, the groundwater would require filtration and disinfection prior to pumping into the distribution system. This filtration step could be provided at CLWA's existing Rio Vista Water Treatment Plant, but treating groundwater would displace capacity needed for treatment of imported surface water. It would also add an ongoing operational cost to the biological treatment alternative.

<u>Comment 1b</u>: In the ion exchange process no mention is made of what happens to the perchlorate exchanged.

a. Where would the exchanged perchlorate go?
b. What will happen to it?

<u>Response</u>: In the ion exchange process, perchlorate is captured by the resin within the exchange vessels. The spent resin will be managed as a solid waste and will require periodic removal, replacement, and offsite incineration. During incineration, the resin and the perchlorate ion are completely destroyed, eliminating the possibility of generating a new waste stream.

<u>Comment 1c</u>: What is your rationale for choosing non-destructional exchange over destruction?

We feel that money (if this is a consideration) should be no object when considering public safety – Sue Whittaker, the Defense Dept. and Federal government if necessary – But do it right the first time!!

<u>Response</u>: The "non-destructional" treatment (ion exchange) method can be operated and monitored more easily than the "destructional" (biological) method. As mentioned above, the present worth costs to implement and maintain are similar. Also, the perchlorate captured by the ion exchange resin will be destroyed via incineration at an offsite location. Finally, the ion exchange treatment is expected to be more readily approved by DHS and accepted by the community.

Comment from Ms. Stephanie Young, 25552 Penbrook Place, Santa Clarita, CA 91350

<u>Comment 2a:</u> "Having read the summary, it seems that the chosen option #2 is the best option. Please proceed".

<u>Response</u>: Thank you for your comment.

Comment from Mr. Tom Carver, 27845 Crookshank Drive, Saugus, CA 91350

<u>Comment 3a</u>: We appreciate receiving information concerning toxic substances. In the future, would you mail this information to Tom Carver at the same address, 27845 Crookshank Drive, Saugus, CA 91350. Toby Carver is our son and previous homeowner. Thanks**.**

<u>Response</u>: Thank you for your interest in the project, your name has been added to our mailing list.

Comment from Dr. Gary Ordog, (1) Santa Clarita Water Conditioning, (2) Medical Toxicology, 23206 Lyons Avenue #103, Santa Clarita, CA 91321

<u>Comment 4a</u>: High volume water purification may not continuously remove all the perchlorate and associated contaminants from our homes.

I recommend a whole house water purification installed by Santa Clarita Water Conditioning, Inc.

It has 5 stages including hepa, antimicrobial, hydromagnetic, granular activated carbon, quartz, and reverse osmosis.

As most toxics are absorbed from non-drinking water exposure in the house, whole house filtration is required. I believe our system is the best commercially available for this purpose.

I believe your agency should agree, and endorse such a system.

Response: The mission of the Department of Toxic Substances Control (DTSC) is to protect human health and the environment by cleaning sites where releases of hazardous substances have occurred or will potentially occur. The individually installed treatment systems cannot be monitored by DTSC and therefore cannot replace the treatment method proposed in the IRAP.

Comment from Ms. Valerie Thomas, P.O. Box 220907, Newhall, CA 91322

Comment 5a: It's been a long battle to get to this point. Please emphasize even more strongly how the community will be as well protected under DTSC procedures as we would be under a full EIR. Please also discuss more about the choice of alternative 2 – that it has been employed successfully in other communities and that the other alternatives would require more time to get Health Dept. approval and make Santa Clarita, in effect, a guinea pig.

Thank you for your patience and hard work on our behalf.

Response: The Castaic Lake Water Agency (CLWA) prepared an Initial Study for the proposed containment and restoration plan as required by the California Environmental Quality Act (CEQA) and determined that any potential impacts associated with implementing the proposed containment and restoration can and will be readily mitigated. The proposed mitigation measures are described in the Draft Mitigated Negative Declaration. On this basis, the impact of this project is not of the magnitude that requires preparation of an Environmental Impact Report (EIR) under CEQA. In summary, the project is not expected to create any unmitigated adverse ecological or human health impacts; to the contrary, it is expected to prevent a plume of perchlorate in groundwater from contaminating other water supplies in the area and posing unacceptable risks to human and/or ecological receptors. CLWA is the lead agency for the CEQA process and its Board of Directors will be responsible for certifying the CEQA documents.

Ion exchange treatment systems are currently being used to remove perchlorate from the water supply in several California communities, including: the West Valley Water

Company in West San Bernardino, the Lincoln Avenue Water Company in Pasadena, the City of Morgan Hill, the San Gabriel Water Company B-6 Well in Baldwin Park, the Fontana Water Company in Fontana and the City of Riverside. The DHS has issued permits to operate these ion exchange systems and the operating data indicate ion exchange is successfully removing perchlorate. In contrast, biological treatment has been used in fewer locations for removal of perchlorate from the water supply, and there is less regulatory and community acceptance of this type of water treatment system. Although evaluated as a technology, membrane filtration has not yet been tested at a full-scale perchlorate removal water treatment system. For all of these reasons, the ion exchange perchlorate removal process was considered the most likely to promptly gain regulatory approval and public acceptance, as well as the treatment method that would most reliably and cost-effectively remove perchlorate.

Comment from Ed and Joan Dunn, 15414 Rhododendron Drive, Canyon Country, CA 91387

(Letter dated September 22, 2005).

<u>Comment 6a</u>: We oppose the cleanup plan as proposed. In the early stages, a totally different and apparently more economical clean-up plan was proposed. That plan would utilize a central location to manifold the contaminated wells, including Newhall County Water District (NCWD) well #11, for treatment at one nearby location. The location and project would probably only require a negative declaration. The output of that treatment facility would be connected to near-by existing mains. Evidently, that plan was scrapped because it would not bring the output water to Castaic Lake Water Agency (CLWA) for their total control. That plan appears to be much more economical than alternative #2 that apparently has been amended to include piping the water a long distance to CLWA's pumping station facility. It is to be noted that alternative #2 suddenly left NCWD's well #11 out completely. We believe NCWD's well #11 can effectively be treated at the wellhead. NCWD's well #11 is located in close proximity to NCWD's wells #12 and #10. There is sufficient NCWD property available for a treatment facility at those well locations. The output of the treatment facility would discharge into NCWD's wells #12 and #10. There is sufficient NCWD property available for a treatment facility at those well locations. The output of the treatment facility would discharge into NCWD's large main pipe in the nearby San Fernando Road. All three NCWD's wells #11, #12, and #10 are already connected to NCWD's main. If the Department of Health Services desired, the output of the treatment facility could be discharged into the adjacent South Fork of the Santa Clara River. In addition, due to NCWD's location south-west of the plume's travel, we believe that the pollution level and length of time to clear the pollution will be greatly reduced.

<u>Response</u>*: During the development of alternatives, well-head treatment for NCWD's Well NC-11 was considered. Subsequently, the groundwater modeling performed by CH2MHill indicated that continual pumping of groundwater at Saugus Wells 1 and 2 should limit the flow of groundwater containing perchlorate toward the NCWD*

production wells NC-11, NC-12 and NC-13. This predicted result will be confirmed through additional groundwater monitoring and evaluation of the resulting data once Saugus Wells 1 and 2 are restored to service. The potential for future installation of well-head treatment for NCWD Well NC-11 has not been ruled out. Given that the groundwater is currently used for water supply purposes, and its continued use is an important component of the water supply plans for Santa Clarita Valley, it is unlikely that the treated groundwater would be discharged to the river system.

<u>Comment 6b</u>: We suggest that an unbiased, independent engineering firm study all honest options for this cleanup project. We do not have confidence in engineering data or reports that come from Kennedy/Jenks Engineering Company. In our opinion, Kennedy/Jenks tailors their reports to meet the desires of CLWA. CLWA by their actions and statements indicate they wish to control all water resources in the Santa Clarita Valley. We believe that this is what is driving the design of this cleanup.

<u>Response</u>: DTSC does not participate in consultant selection for parties who have entered into a Voluntary Cleanup Agreement. Kennedy/Jenks is CLWA's engineering consultant and the IRAP meets DTSC's requirements.

<u>Comment 6c</u>: It is interesting to note that CLWA indicates that multiple new wells will be drilled far west of the Saugus wells # 1 and # 2. The new location is in the Valencia Water Company's (VWC) service territory adjacent to or at the large, new "Newhall Ranch Project". It is our understanding that VWC had already received approval from the Public Utilities Commission (PUC) to install these wells for the Newhall Ranch Project. It is also our understanding that the location and the expense of these wells is for the purpose of serving the Newhall Ranch Project and was to be paid for by VWC. We question how the drilling of these new wells becomes part of the perchlorate cleanup. We suggest any new wells that are to replace poisoned wells be in the proximity of the area that the poisoned wells were serving.

<u>Response</u>: Installation of replacement water supply wells is not within the scope of the IRAP for this project. Under the proposed containment plan, Saugus Wells 1 and 2 will be pumped continually, but at rates less than their pumping capacities, potentially leaving a groundwater supply gap during drought or other water supply shortage. Replacement Saugus Formation wells are proposed to be consistent with the water supply plans for the Santa Clarita Valley and to fully restore the lost Saugus Formation production capacity. The locations of the two proposed replacement water supply wells were selected based upon hydrogeologic evaluation and with the interest in locating the wells outside of the area of potential impact by perchlorate.

<u>Comment 6d</u>: The plan commandeers a valuable potable main water main for the purpose of transporting polluted water to CLWA's facility. We do not understand how CLWA can legally transport polluted water through a pipe that is not purple in color, as required by law. To compensate for the loss of the potable water main, CLWA is planning to install additional larger potable pipes. We also believe that installing new potable water pipes, and transporting polluted water through previous potable water pipes located in the streets etc., require a complete EIR.

<u>Response</u>: *Approval of proposed modifications to the existing water distribution systems does not fall within DTSC's jurisdiction. CLWA is the lead agency for CEQA and your comment should be forwarded to them.*

<u>Comment 6e</u>: We oppose a negative declaration for this disruptive project of piping great distances to transport water to CLWA's pumping station facility and that a complete EIR should be required. We suggest DTSC reject the present plan by CWLA.

Please include and enter into the record, our letter of September 22, 2005 addressed to Ms. Sara Amir on this same subject.

<u>Response</u>: *CLWA is the lead agency for CEQA issues. Comments regarding the Mitigated Negative Declaration should be forwarded to CLWA.*

Letter dated September 23, 2005

<u>Comment 6f</u>: On September 7, 2005, in a community meeting at Santa Clarita, we voiced our concerns about how we believed this plan was a "done deal". (We videotape all Castaic Lake Water Agency (CLWA) meetings, including committee meetings). To back up our statements we are supplying a tape of two meetings of CLWA.

After a presentation of the remedy piping system on May 26, 2005, at a planning and engineering committee meeting, Mr. Masnada, General Manager of CLWA, says, "The other aspect is, we're proceeding ahead with the containment and treatment regardless of what happens…".

At the second meeting on June 8, 2005, a regular meeting of CLWA, after the same presentation, Mr. Masnada says "As I recall, there's 23 and a half million in the budget for this…"! "We are moving ahead right now to implement the remedy...".

Both of these meetings occurred before your meeting September 7th 2005, where you state that it is not a "done deal". We understand that you believed that it was not a "done deal", but you were unaware of CLWA's position.

<u>Response</u>: *No decisions were made by DTSC prior to the comment period which ended on September 23, 2005.*

<u>Comment 6g</u>: We have a concern about Newhall County Water District's (NCWD) well #11. NCWD's well has been out of service since 1997 and there seems to be little or no activity to solve the loss of the water problem of this well. Well #11 has sufficient NCWD property nearby to install wellhead treatment equipment. There also is a large NCWD water pipe main connected to well #11 that could accommodate the output of the treatment system. Furthermore, well #11 appears to be out of the mainstream area of the contaminant plume. We believe that well #11 would not require treatment for a long period of time, thus reducing the total cost of clean-up. We also believe the output of the treatment system, if desired, could be varied by the hydrogeologist as desired.

We believe CLWA is intentionally ignoring NCWD's well #11 with the intent to have the well destroyed and/or get complete control of the well. We do not know of any study, such as test wells around well #11, to check for perchlorate flow or any engineering data showing restoration of well #11.

Response: Please see the response to Comment 6a. Whittaker has installed several groundwater monitoring wells upgradient (east) of Well NC-11. NCWD's recent request for additional investigation of groundwater in this area is being currently discussed with Whittaker and DTSC.

Comment 6h: We do not have confidence in engineering data or reports that come from the Kennedy-Jenks Engineering Company. It is our opinion, Kennedy/Jenks tailors their reports to meet the desires of CLWA. CLWA has made it clear they desire to get control of all water in our community.

Response: See response to Comment 6b.

Comment 6i: Please enter this writing and tape as additional comments to the Interim Remedial Action Plan.

Response: The response to comments will be included in an appendix of the IRAP.

Comment from Ms. Pat Saletore, Santa Clarita Organization for Planning the Environment, P. O. Box 1182, Canyon Country, CA 91386

Comment 7a: We believe that a mitigated negative declaration is not a sufficient document for the preferred alternative project. Such a document might be considered sufficient for the alternatives that propose clean up only at the well head, but the extensive piping and centralization of water supply by the preferred alternative are not adequately addressed by a mitigated negative declaration. Should this alternative continue to be considered, we request that the DTCS address the following issues in a full or focused environmental impact report:

1. There will be substantial impacts to the Santa Clara River from the piping. Impacts to the river and its habitat were not addressed. These should be fully mitigated by restoration or public acquisition of additional wetland areas.

2. The pipes to pump and distribute remediated water are over-sized for the clean-up needs and therefore will accommodate new growth. This should be addressed as a growth inducing impact.

Response: CLWA is the lead agency on the CEQA documents. Comments on the CEQA documents should be directed to CLWA.

Comment 7b: Further, we concur with the Sierra Club comments and believe the containment plan is deficient in the following areas. These areas should be redressed before the plan is approved.

1. There are additional contaminants in the pollution plume that will not be removed or treated by the proposed plan. How will these pollutants including TCE, PCE and NDMA be removed? Some of these are known carcinogens.

2. There is no proposal to remove any pollution at the source, yet there are pollution hot spots registering as high as 58,000 ppb on the site. Without a source/site clean-up plan, large quantities of pollution will continue to emanate from the site. We cannot understand why ONLY well head treatment is being proposed and not source clean-up. This may indicate that the water agencies feel not reducing supply is far more important than solving the problem at the source. Failure to address source clean-up is an area in which we feel that policy may be driven by developer water supply concerns rather than good long-term public policy that protects the community's health.

3. The containment wells may very well not work. The whole proposal is based on existing wells so that the water districts can continue to pump. The hydrology is simulated and may not be accurate when the plan is implemented. The CLWA proposal utilizes existing wells that may not capture the plume as planned. What alternative is proposed to address a deficiency of this containment plan?

4. The proposal to pump everything into CLWA for clean-up will give CLWA a monopoly over water supply in the Santa Clarita Valley. This will also centralize water supply in the Santa Clarita Valley. Upon review of the recent energy crisis and the solutions now being suggested to the energy problem, we believe it is best to have decentralized sources that can be coordinated, rather than one centralized source. Decentralization will ensure efficiency, equity, and public oversight for water supply in an area where there is great concern about the adequacy of this public resource. It will also reduce disruption in the case of an earthquake because supply will continue to be available from multiple sources.

Response: 1. In addition to perchlorate, other contaminants, including volatile organic compounds (VOCs) are present in groundwater in some areas within the Whittaker-Bermite site. Water quality in all groundwater production wells is routinely monitored. The available data from Saugus Wells 1 and 2 do not indicate that contaminants other than perchlorate are present at concentrations requiring treatment. As required by DHS, the proposed plan includes the concept of "sentinel" groundwater monitoring wells to be installed upgradient of Saugus Wells 1 and 2. These sentinel wells will be monitored on a regular basis to evaluate the concentrations of perchlorate and other potential *contaminants in groundwater flowing toward the production wells. If contaminants other than perchlorate are found at concentrations of concern in samples from these sentinel wells, the groundwater treatment system can be modified to add the necessary components to treat the additional contaminants.*

2. Addressing the sources of contamination is critical, however, investigation and cleanup of the onsite source areas is being conducted by Whittaker under the oversight of DTSC. The groundwater containment plan proposed by CLWA will serve as a component of the overall remedy, but is not the complete remedy. CLWA's project provides containment for the groundwater contamination that has already migrated away from the Whittaker-Bermite site.

3. & 4. The proposed pumping plan will capture Saugus Formation groundwater containing perchlorate. Following start up of pumping from the Saugus Wells 1 and 2, groundwater monitoring will be performed to evaluate the effectiveness of capture. Depending upon the resulting data and its evaluation, it is possible that the pumping rates for Wells Saugus 1 and 2 will be modified to achieve the desired containment of groundwater. The decision to decentralize the water supply in the Santa Clarita Valley is not under DTSC's jurisdiction. Please contact CLWA directly with these concerns.

Comment from Connie Worden-Roberts, Chairman, CAG, 25709 Rye Canyon Road, Suite 105 Valencia, CA, 91355

Comment 8a: While it is my intention to write a more substantial response as the Chairperson of the Citizens Advisory Group, circumstances have precluded my plans. However, I would be remiss not to sincerely thank the Department of Toxic Substances Control for the professionalism and thoroughness you have evidenced throughout the past years. You have been responsive to CAG's inquiries, attentive to the magnitude of toxics present in the 996 acre site, and have worked closely with the water agencies to assure the delivery of safe water to the citizens as well as developing a plan for complete clean-up of the entire area. Your work with the Army Corps of Engineers in mapping the entire water system is commendable. Your geologic and environmental studies added greatly in obtaining a comprehensive understanding of the whole area.

On behalf of the CAG, I want to thank you for working with the Water Agencies to assure that potable water would be delivered to the citizens of Santa Clarita. (That is the reason I originally petitioned the State to permit the formation of the CAG.) It is also the reason I am sending you an article from the Daily News which states that the groundwater plan is inadequate. While groups may decry the plan, in the main they have not been in attendance of Multi-jurisdictional or Citizen Advisory Meeting over the years, and assume things which are not true.

I, as well as other sincerely concerned citizens, look forward to continuing to work with DTSC until the entire project is cleansed of any and all pollutants. We are grateful the owners of Bermite Whittaker Corporation have stepped up to their responsibility to pay for the clean-up, that I recognize is costly. Returning this vital portion of the Valley to a thoroughly clean and productive state is paramount.

Thank you for all of your assistance, may we all be proud of the progress on the clean-up!

Response: Thank you for your comments and especially, for your continued participation in the Citizens Advisory Group.

Comment from Ms. Rachel Myers, Conservation Coordinator, Sierra Club, 3435 Wilshire Blvd, Suite 320, Los Angeles, CA 90010-1904

Comment 9a: The Sierra Club has consistently commented on the ammonium perchlorate pollution plume in the Santa Clarita Valley for many years and before many agencies. These include comments on project approvals granted before remediation facilities are operating, inclusion of polluted water in water plans as though it were available and concerns regarding continued spread of the plume. We litigated the issue of inclusion of the polluted water in CLWA's Urban Water Management plan. That Plan was set aside by the 2nd Appellate Court in a published decision last November over these concerns.

We would like to preface this comment letter with a short paragraph addressing the water agencies' (and others') accusations that the environmental community is "just trying to stop growth". That is NOT the basis of our concern, although we realize that ultimately, if the pollution problem is not solved, that may indeed be a needed short term solution. Instead, our goal is to protect public health, especially the health of children. The Sierra Club has been active in many pollution issues on a national level including lead paint, arsenic, and other pollutants that affect children particularly, as well as air pollution contaminants that cause asthma, again affecting children in particular. We therefore request that you ignore and dismiss any such disingenuous accusations and accept these comments as they are intended to be, i.e., legitimate concerns for public health in the Santa Clarita Valley.

Comment 9b: We believe that the containment plan is deficient in the following areas. These areas should be redressed before the plan is approved.

1. There are additional contaminants in the pollution plume that will not be removed or treated by the proposed plan. How will these pollutants, including TCE, PCE and NDMA be removed? Some of these are known carcinogens.
2. There is no proposal to remove any pollution at the source, yet there are pollution hot spots registering as high as 58,000 ppb on the site. Without a source/site clean-up plan, large quantities of pollution will continue to emanate from the site. We cannot understand why ONLY well head treatment is being proposed and not source clean-up. This indicates to us that the water agencies feel not reducing supply is far more important than solving the problem. Failure to address source

clean-up is the area in which we feel that policy may be driven by developer water supply concerns rather than good long-term public policy that protects the community's health.

3. The containment wells may very well not work. The whole proposal is based on existing wells so that the water districts can continue to pump. The hydrology is simulated and may not be accurate when the plan is implemented. The consultants working on the simulation are all controlled through Valencia Water Co., wholly owned by Lennar/Newhall Corporation. This may create a conflict in goals due to Valencia Water Co.'s parent company development plans.
4. This plan is not a proposal like the one in the San Gabriel Valley where granite or non-porous material occurs on each side of the river, funneling the contaminated water into a particular area. That plan strategically placed NEW wells to catch the contamination. The CLWA proposal utilizes existing wells that somehow remarkably occur in exactly the right place to capture the pollution plume. What alternative is proposed to address the failure of this containment plan?
5. The pipes to pump and distribute remediated water are over-sized for the clean-up needs and therefore will accommodate new growth. This should be addressed as a growth inducing impact.
6. There will be substantial impacts to the Santa Clara River from the piping. Impacts to the river and its habitat were not addressed. These should be mitigated.

<u>Response</u>: 1. Please see response to comment 7b, 1 above.

2. Please see response to comment 7b, 2 above.

3. Please see response to comments 7b, 3 and 4 above.

4. Please see response to comments 7b, 3 and 4 above. Also note that the final cleanup strategy has not been completed for the Whittaker-Bermite site. The proposed pumping of groundwater from Saugus Wells 1 and 2 is an interim measure relative to measures that will be required to address all of the contamination originating at the Whittaker-Bermite site. Pumping from Saugus Wells 1 and 2 is proposed at this time to limit potential future impacts to the Valley's groundwater resources.

5. Please see the response to comment 7a. above.

6. Please see the response to comment 7a. above.

<u>Comment 9c</u>: Further, the proposal to pump everything into CLWA for clean-up will give CLWA a monopoly over water supply in the Santa Clarita Valley. The Sierra Club wishes to express its concern regarding this idea. Looking at what occurred in the energy recent crisis and the solutions now being suggested to the energy problem, we believe it is best to have decentralized sources that can be coordinated. That will ensure efficiency, equity, and public oversight for water supply in an area where there is great concern about the adequacy of this public resource.

Response: Please see the response to comments 7b, 3 and 4.

Comment from Ms. Cam Noltemeyer, 25936 Sardinia Court, Valencia, CA 91355

Comment 10a: Why are only the two production wells Saugus 1 and Saugus 2 addressed in this IRAP?

Response: The IRAP addresses the Saugus Formation production wells that have been impacted by perchlorate. Based on the results of the alluvium and Saugus Formation investigation and groundwater modeling performed by the U.S. Army Corp of Engineers, pumping of these two wells will contribute to containing the plume of perchlorate-impacted groundwater.

Comment 10b: Why aren't the contaminated wells in the Newhall County Water District and Valencia Water Company addressed in this IRAP?

Response: As discussed above in the response for Comment 10a, the groundwater modeling performed to date indicates that operation of Wells Saugus 1 and 2 should limit the flow of groundwater containing perchlorate toward NCWD's Well NC-11. If future groundwater monitoring results indicate that NCWD's production wells are threatened, installation of well-head treatment for these wells will be considered.

Comment 10c: Why hasn't there been any public meeting regarding the Valencia Water Company treatment of contaminated water that it intends to dump into the water supply? Their treatment systems are already operating.

Response: DHS is the agency providing oversight and approval of the ion exchange perchlorate removal system for Well Q-2. Please contact this agency with your questions or concerns.

Comment 10d: Why are all the environmental impact reports for the Whittaker-Bermite project being done in a piece meal manner?

Response: There are numerous areas at the Whittaker-Bermite site where chemical releases have impacted soil and groundwater. For ease of management, the site has been administratively divided into Operable Units and the response actions are frequently different and scheduled separately for these Operable Units. Areas where the chemical impact has been characterized can be moved more quickly forward into the remediation phase, while other areas are still being characterized. It does mean that remediation for some areas proceeds faster than others, but the benefits of initiating remediation more rapidly where possible outweigh the drawbacks of waiting for characterization and remediation planning to be complete for the entire site. The proposed pumping of Saugus

Wells 1 and 2 is one of those actions that can be implemented now, without waiting for completion of other activities at the Whittaker-Bermite site.

Comment 10e: Alternative 2, aboveground ion exchange system being used to remove perchlorate from the groundwater pumped from the Saugus 1 and 2 wells will exchange the perchlorate for chloride. How is the chloride removed from the water? How safe is chloride in drinking water?

Response: DHS regulates chlorides in drinking water as a secondary drinking water standard. The long term maximum contaminant level for chloride established by DHS for community water supplies is 250 parts per million (ppm). The chloride level in water produced by the Saugus Formation is between 20 and 40 ppm, well below the secondary drinking water standard. The treatment process is estimated to add less than 1 ppm of chloride to the treated water. Therefore, the concentration of chloride introduced by ion exchange treatment is not expected to be a water quality concern and removal of chlorides from the water is not planned.

Comment 10f: Why isn't the water treated with the ion exchange system returned to the ground water rather than being pumped into our drinking water?

Response: The Saugus Wells 1 and 2 were used for water supply prior to the discovery of perchlorate in samples from these wells. This water is necessary for CLWA to restore the groundwater production capacity that was lost due to perchlorate contamination. CLWA and the other purveyors are responsible for maintaining and providing a safe, sufficient and reliable water supply in the Valley. CLWA will routinely test the water under DHS oversight to ensure that is safe for distribution and consumption.

Comment 10g: Please provide a list of other communities where the ion exchange systems have been used to put perchlorate-contaminated water directly back into the drinking water.

Response: Please see the response to question 5a.

Comment 10h: The ion exchange systems only addressed perchlorate. How are the other two primaries COIs in the groundwater, trichloroethylene (TCE), and tetrachloroethylene (PCE) being treated before putting this water directly into the water supply?

Response: Please see the response to question 7b, 1.

Comment 10i: How are all the other trace amounts of COIs, potential COPCs, VOCs, SVOCs, nitroaromatics and nitroamines (explosive compounds) and nitrosamines being treated before putting this water directly into the water supply?

Response: Please see the response to question 7b, 1.

<u>Comment 10j</u>: Will the pumping of Saugus 1 and Saugus 2 wells contain the toxic plume in the deep Saugus Formation or will it cause the plume to spread?

<u>Response:</u> The groundwater modeling performed to date indicates that the proposed pumping of Saugus Wells 1 and 2 will serve to contain the plume of perchlorate in the Saugus Formation. The modeling results will be re-evaluated using monitoring data obtained after the two production wells are returned to service. As necessary to provide adequate containment of the perchlorate in the Saugus Formation, the proposed groundwater pumping rate may be modified. It is not expected that pumping these wells will cause the plume to spread, and instead the pumping will curtail spreading of the plume.

<u>Comment 10k</u>: It appears that the only reason for this Interim Remedial Action Plan that only covers two of the contaminated wells is the desperate need for the Castaic Lake Water Agency to include this contaminated water as available in their 2005 Urban Water Management Plan. Newhall Land needs proof of water availability to get approval of their 2,200 home West Creek subdivision slated for 990 acres in unincorporated Northern Valencia. Water to be provided by Valencia Water Company that is owned by Newhall Land. Newhall Land also needs water for their 1,089 home Riverpark subdivision. Water to be provided by the Santa Clarita Water Company that is owned by the Castaic Lake Water Agency. It appears that the Castaic Lake Water Agency and the DTSC are more interested in accommodating the greed of developers than protecting the water supply that the public has to drink. Is the purpose of this plan to provide quantity of water without regard to the quality of the water?

<u>Response</u>: The purpose of this plan is to provide containment of the impacted groundwater and to restore the groundwater production capacity that was lost due to the presence of perchlorate. Use of groundwater in the Santa Clarita Valley is an important component of the overall reliability of the water supply, especially during drought conditions or other circumstances where the delivery of imported surface water may be reduced. Prior to the discovery of perchlorate, groundwater from the Saugus Wells 1 and 2 was used for water supply; other than the presence of perchlorate (which will be removed through the proposed ion exchange process), the quality of the Saugus Formation water is unchanged.

<u>Comment 10l</u>: I strongly object to having contaminated water from Saugus 1 and Saugus 2 Wells are any other contaminated well being placed directly back into our drinking water supply. If the Valencia Water Company Well V-157 and Newhall County Water District Well NC-11 in the Saugus Formation can be destroyed and replaced with new wells with clean water why can't Santa Clarita Water Company do the same?

<u>Response</u>: Please see response to comment 10f.

Comment from Mr. Joe Weiss, 20305 Gray Lane, Santa Clarita, CA 91351

<u>Comment 1</u>: Excellent explanation – although quite technical. Go for it!

Response: Thank you for your support.

<u>Mailing List:</u>

Chris Shoemaker
22483 Circle J Ranch Rd.
Santa Clarita, CA 91350

Tom Carver
27845 Crookshank Drive
Saugus, CA 91350

Appendix H

Administrative Record

Table H-1: Administrative Record

Document Title	Date	Author/Company	Document Type
Superfund Exposure Assessment Manual	April 1988	U. S. Environmental Protection Agency	Agency guidance document
Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A) Interim Final	December 1989	U. S. Environmental Protection Agency	Agency guidance document
Policy Memo 97-005 Policy Guidance for Direct Domestic Use of Extremely Impaired Sources	5 November 1997	California Department of Health Services	Agency policy document
2001 Update Report – Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems.	July 2002	Richard C. Slade & Associates for the Santa Clarita Valley Water Purveyors	Technical report
Environmental Oversight Agreement between DTSC and the Water Purveyors	March 2003	California Department of Toxic Substances Control and Santa Clarita Water Purveyors	Agreement
Bench-Scale Studies of Perchlorate Rejection by High-Pressure Membranes and Brine Stream Treatment by Chemical and Biological Processes	June 2004	University of Colorado for Castaic Lake Water Agency	Technical report
Perchlorate Contamination Treatment Alternatives	January 2004	California Department of Toxic Substances Control	Agency publication
Treatment of Perchlorate Contaminated Groundwater from the Saugus Aquifer. Technical Memorandum No. 3. Bench and Pilot Test Results.	February 2004	Carollo Engineers for Castaic Lake Water Agency	Technical report
Public Health Goal for Perchlorate in Drinking Water	March 2004	California Office of Environmental Health Hazard Assessment	Agency publication
Regional Groundwater Flow Model for the Santa Clarita Valley: Model Development and Calibration	April 2004	CH2M HILL for the Upper Basin Water Purveyors	Technical report
Analysis of Perchlorate Containment in Groundwater Near the Whittaker-Bermite Property, Santa Clarita, California	December 2004	CH2M HILL for the Upper Basin Water Purveyors	Technical report

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Document Title	Date	Author/Company	Document Type
Circular A94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.	January 2005	U. S. Office of Management and Budget	Agency publication
Eastern Santa Clara Subbasin Groundwater Study, Santa Clarita, California. Conceptual Hydrogeology Technical Memorandum	January 2005	CH2M HILL for the U. S. Army Corps of Engineers	Technical report
Draft Interim Feasibility Study	May 2005	Kennedy/Jenks for CLWA	Technical report
Draft Interim Remedial Action Plan	May 2005	Kennedy/Jenks for CLWA	Technical report
Final Draft Interim Feasibility Study	12 August 2005	Kennedy/Jenks for CLWA	Technical report
Final Draft Interim Remedial Action Plan	12 August 2005	Kennedy/Jenks for CLWA	Technical report
Final Draft Interim Remedial Action Plan, Castaic Lake Water Agency	18 August 2005	California Department of Toxic Substances Control	Agency correspondence
Notice of Public Comment Period – Interim Remedial Action Plan, Santa Clarita Valley Water Suppliers Saugus Wells	August 2005	California Department of Toxic Substances Control	Agency Public Notice
Public Meeting Fact Sheet – Proposed Containment and Restoration Plan	August 2005	California Department of Toxic Substances Control	Agency Fact Sheet