United States
Department of Defense

Report to the Congress

Perchlorate
in the
Southwestern United States

Submitted by:

The Office of the Secretary of Defense
Under Secretary of Defense
(Acquisition, Technology & Logistics)

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Report to Congress:
Perchlorate in the Southwestern United States

Executive Summary

This Report to Congress is submitted in response to a Congressional request for information on perchlorate groundwater contamination in and around the Colorado River, Southern California, Arizona, and Nevada. This request was made by the House Appropriations Committee in House Report 108-187:

> *"The Committee is aware of the controversy surrounding the evaluation of perchlorate contamination of groundwater in Southern California and other areas across the country. The Committee directs the Department to conduct a joint study with the Environmental Protection Agency of perchlorate groundwater contamination, to be completed within 180 days of the enactment of this Bill. This report will examine in detail perchlorate groundwater pollution in and around the Colorado River, San Bernardino County, the [Coachella] Valley, Santa Clara River and the Imperial Valley that threatens drinking and irrigation water supplies in Southern California, Arizona and Nevada. This report will assess the breath and scope of contamination and make preliminary recommendations that will, at a minimum, include:*
>
> *1. Recommendations for the establishment of a national standard for acceptable levels of perchlorate groundwater contamination;*
>
> *2. Determination of the military/defense industry sources that have contributed to perchlorate contamination; and*
>
> *3. Outline appropriate steps to be taken to mitigate or clean up those areas that are deemed to be the government's responsibility."*

Background on Perchlorate

Historically, a substantial portion of the annual production of certain perchlorate compounds has been for defense activities and the aerospace industry. Ammonium perchlorate (NH_4ClO_4 or AP), potassium perchlorate ($KClO_4$ or KP), magnesium perchlorate ($MgClO_4$ or MgP) and other perchlorate salts are used by the Department of Defense (DoD or the Department) in some military munitions items, and by the Department and the National Aeronautics and Space Administration (NASA) in certain solid fuel rocket motor applications. Perchlorate compounds are also used in a number of commercial items and applications, including fireworks and other explosives, air bag inflators, highway flares, human pharmaceuticals, and analytical chemistry.

Perchlorate is also sometimes naturally occurring in arid environments, is sometimes associated with nitrate deposits, and is a constituent of Chilean nitrate fertilizers imported for use in the United States. Large quantities of nitrate fertilizer were exported from Chile to the United States from the late 1800s to the 1950s, although the amount is substantially lower due to advances in commercializing synthetic nitrate fertilizers. While there have been environmentally-significant releases of perchlorate, the overall extent that manufacturing processes and commercial uses have made are not defined, nor is it known to what extent naturally-occurring perchlorate has contributed to widespread low-level detections.

Under the leadership of the Executive Office of the President (Office of Management and Budget (OMB), the Office of Science and Technology Policy (OSTP), and the Council on Environmental Quality (CEQ)), the Department of Defense (DoD), the Environmental Protection Agency (EPA), the National Aeronautics and Space Administration (NASA), and the Department of Energy (DOE) formed an Interagency Working Group (IWG) on Perchlorate to address perchlorate science issues. DoD, EPA, NASA, and DOE funded and co-sponsored a National Academies of Science (NAS) review of perchlorate science. Appendix A contains the charge to the NAS. Other agencies that later joined the IWG include the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), the Department of the Interior (DOI), and Health and Human Services (HHS.)

Currently, there is no Federal drinking water standard for perchlorate. The NAS published a recommended oral reference dose (RfD) of 0.0007 mg/kg-day (roughly equivalent to 25 parts per billion (ppb)) in its January 2005 report. On February 18, 2005 EPA formally revised the agency's Integrated Risk Information System (IRIS) to reflect the NAS-recommended value.[1] Although none of the three states in the study area have established regulatory drinking water standards for perchlorate, Arizona, Nevada and California have established guidance levels for perchlorate in drinking water (14 ppb, 18 ppb, and 6 ppb, respectively). Generally, these are advisory levels which represent levels of a contaminant in drinking water at which it is recommend that certain notifications be made. It is expected that officials from all three states will revisit their values based upon the NAS report and EPA's subsequent IRIS actions. While indicating their intent to revisit the PHG, California officials have also committed to establishing a state drinking water standard in 2005.

As of October 2004, perchlorate has been detected at some level in over 320 drinking water wells and reservoir intakes in the study area, primarily in the California counties of Los

[1] *An RfD serves as the foundation, along with other considerations, upon which regulatory and cleanup decisions are made. In the absence of a final RfD or Federal regulatory standards for perchlorate , EPA had issued interim assessment guidance for site remediation based on a provisional draft perchlorate RfD of 0.0001 – 0.0005 mg/kg-day. States often use the RfD in developing their guidance and regulations.*

Angeles, San Bernardino, and Riverside. Perchlorate is also present in the waters drawn from the Lower Colorado River used for drinking water and agricultural purposes at concentrations that typically average 4 to 5 ppb.[2]

Summary of Findings

The Department of Defense has proactively dealt with the perchlorate challenge since 1996, and has a long history of cooperation with the U.S. Environmental Protection Agency (EPA), state regulators, and other perchlorate stakeholders. Many DoD facilities have sampled for perchlorate under the Department's *Interim Policy on Sampling for Perchlorate*; the Defense Environmental Restoration Program (DERP); and in accordance with the Unregulated Contaminant Monitoring Rule (UCMR) at DoD drinking water systems.

Charge: Examine Perchlorate Groundwater Pollution

This report uses available sampling data to examine perchlorate contamination of groundwater in the Southern California, Arizona, and Nevada counties identified in Section 1.1 (the tri-state study area). Perchlorate sampling data were obtained from the databases listed in Section 1.3. The information represents the most comprehensive data available on perchlorate contamination in the study area at the time this study was being drafted.

Sections 2 and 4 and Appendices B and C present information on perchlorate detections at non-DoD industrial facilities and at Department of Defense facilities located in the tri-state study area. Information regarding where water samples have been analyzed for perchlorate and not detected was generally not available for non-DoD facilities through the data sources used for this report, and so non-detect information for non-DoD industrial facilities is generally not included in this report. In contrast, all reported results for analysis of perchlorate are presented for all sampled DoD facilities in the area covered by this report, therefore the ranges for DoD facilities will commonly include a range from non-detect to a positive finding. In some cases, where no perchlorate is anticipated based on past activities, sampling of DoD facilities also reveals that no perchlorate was detectable. For the purposes of this report, the term Department of Defense "facility" refers to active, realigned or closed military installations, associated sites such as test and training ranges, laboratories, etc., and Formerly Used Defense Sites (FUDS) to which the U.S. has access. Data reported by sources other than DoD has not been verified by DoD, and the reader is cautioned against making unwarranted assumptions regarding its accuracy. In addition, the reader should understand that the process of combining data collected from different sources is fraught with difficulty, and is cautioned against making general assumptions based on the reported data. Data analysis and presentation issues are discussed in more detail in Section 1.3 and 2.1.

[2] *California Department of Health Services, www.dhs.ca.gov/ps/ddwem/chemicals/perchl/monitoringupdate.htm.*

Non-Department of Defense Industrial Sites

Environmental releases associated with operations at the Kerr-McGee Chemical Company (KMCC) plant and the former Pacific Engineering and Production Company (PEPCON) facility in Henderson, Nevada, resulted in significant perchlorate contamination of Lake Mead, the lower Colorado River, and those areas that use Colorado River water for drinking and agricultural purposes. The groundwater plume associated with KMCC operations is the largest known release of perchlorate in the country.[3]

A total of 10 industrial facilities (nine industrial and one governmental other than DoD) in the tri-state study area counties are reported to have sampled for and detected perchlorate in groundwater, soil, or drinking water supplies. Of these 10 facilities, three are located in Arizona, five are located in California, and two are located in Nevada.

Arizona – Three industrial facilities

- Drinking water sampling data for two facilities indicate perchlorate detected at concentrations ranging from 2 to 65 ppb.
- Groundwater sampling data for three facilities indicate perchlorate detected at concentrations ranging from 18 ppb to 130 ppb.

California – Four industrial facilities and one NASA facility

- Drinking water sampling data indicates perchlorate at all four industrial facilities in concentrations ranging from 2.1 to 811 ppb.
- Two industrial facilities (the Stringfellow site and Whittaker Bermite) have perchlorate sampling data indicating contamination of groundwater at concentrations ranging from 290,000 to 682,000 ppb.
- The Whittaker Bermite facility is identified as having perchlorate contamination of soil at a maximum concentration of 1,500,000 ppb.
- Perchlorate sampling at NASA's Jet Propulsion Laboratory (JPL) indicates a maximum groundwater concentration of 1,500 ppb and a maximum concentration of 31 ppb in an off-site drinking water well.[4]

Nevada – Two industrial facilities (Kerr-McGee and PEPCON)

- Groundwater sampling indicates perchlorate contamination ranging from 110,000 to 1,500,000 ppb.

[3] *State of Nevada Division of Environmental Protection website: http://ndep.nv.gov/ADMIN/epa_award03.htm.*
[4] *NASA is funding a treatment system for this water. More information can be found on page 25 of this Report.*

Department of Defense Facilities

Of the 28 active, realigned or closed DoD facilities in the study area, 22 reported perchlorate sampling data. Five are located in Arizona and 17 are located in California study areas.[5] The remainder of these DoD facilities have not sampled for perchlorate because DoD believes that there is no reason to suspect an environmental release attributable to DoD activities or that a complete human exposure pathway is not likely to exist. Working collaboratively, the U.S. Army Corps of Engineers (USACE) and California state regulators have also identified 13 FUDS in the Southern California study that require a more in-depth records search to assess for the potential of an environmental release of perchlorate while under the jurisdiction of DoD. The records search is on-going, with results expected in October 2005.

Arizona

- Three facilities (Davis-Monthan Air Force Base (AFB), Air Force Plant 44, and Yuma Proving Ground) sampled for perchlorate in drinking water. Two sites (Davis-Monthan AFB and Air Force Plant 44) reported only non-detects, and one facility (Yuma Proving Ground) reported perchlorate concentrations ranging from 4 to 31.9 ppb.
- Four facilities (Davis-Monthan AFB, Marine Corps Air Station (MCAS) Yuma, the western segment of the Barry M. Goldwater Range (BMGR), and Air Force Plant 44) sampled for perchlorate in groundwater. Two sites (BMGR and MCAS Yuma) reported concentrations from non-detect to 4 ppb, and the two remaining sites reported only non-detects.
- Two facilities (MCAS Yuma and Yuma Proving Ground) sampled for perchlorate in surface water and reported 4.6 to 5 ppb in water supplied by the Colorado River.
- Two facilities (Barry M. Goldwater Range West and Davis-Monthan AFB) sampled for perchlorate in soil and reported perchlorate concentrations ranging from non-detect to 150 and 28,000 ppb respectively.

California

- Ten facilities tested drinking water for perchlorate. Nine reported only non-detects, and one (MCAS Yuma Chocolate Mountains) reported concentrations ranging from non-detect to 4.2 ppb from Colorado River water. Six facilities reported not sampling drinking water either because of no drinking water supply wells are located on the facility, or because drinking water is provided by a local purveyor.
- Ten facilities reported sampling for groundwater. Five reported only non-detects; three reported concentrations that ranged from non-detect to 398 ppb; and the two

[5] *Based on a review of the types of activities carried out at Nellis AFB, Nevada, it was determined by DOD that the potential for perchlorate releases on the base was negligible, and sampling for perchlorate was unnecessary by DOD. DoD has asked the Military Services to develop plans to address potential migration of munitions constituents such as perchlorate on operational ranges. A basic range assessment at the boundaries of the nearby Nevada Test and Training Range was conducted in 2004 by DOD, but the results are not yet available.*

remaining facilities (with a history of producing and testing of solid propellant, Naval Air Warfare Center Weapons Division (NAWC/WD) at China Lake and Edwards AFB) reported the highest perchlorate detections, with perchlorate concentrations ranging from non-detect to 30,700 ppb.

- One facility (Navy Outlying Landing Facility (NOLF) San Nicolas Island) reported perchlorate in surface water at concentrations ranging from non-detect to 20 ppb.
- Four facilities conducted soil sampling. Three (NOLF San Nicolas Island, former MCAS El Toro, and Edwards AFB) reported concentrations ranging from 1.7 to 2,100,000 ppb. One facility (MCAS Yuma Chocolate Mountains) reported only non-detect values for perchlorate in soil. Edwards AFB, which has a history of propellant production and testing, reported concentrations ranging from 700 ppb to 2,100,000 ppb.

Nevada

- A basic range assessment was conducted at the boundaries of the Nevada Test and Training Range in 2004. The results are not yet available.

Charge: Recommendations for a National Standard for Perchlorate

Currently there is no Federal drinking water standard for perchlorate. With the January 2005 release of the NAS report and the subsequent adoption of the NAS-proposed RfD for perchlorate, EPA will now begin evaluating the appropriateness of establishing a drinking water standard for perchlorate under the Safe Drinking Water Act (SDWA). If EPA decides to develop a drinking water regulation, it will consider the RfD along with other factors described in the SDWA section 1423(b) (e.g., exposure, analytical methods, efficacy, and cost-effectiveness of treatment technology.) The promulgation of a drinking water standard for perchlorate based on the RfD will be an open and transparent process, subject to scientific peer review and public and agency comment. As would typically occur, EPA will consult with DoD and other Federal agency stakeholders in an open manner in the promulgation of a Maximum Contaminant Level Goal and MCL so the impact to each agency's operations from the standard is fully considered. DoD and other IWG members will provide information during this process so that EPA understands the national security and other government agency and policy implications for the standards being contemplated. A final RfD will also be considered for risk management decisions under the Defense Environmental Restoration Program (DERP) and the Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA.)

Charge: Department of Defense Action Plan

The Department's current remediation action plan reflects its commitment to the protection of public health and the environment from releases of perchlorate from DoD activities. This plan reflects a multifaceted approach that includes:

- Assessing current and historical activities that could release or may have already released perchlorate
- Sampling for perchlorate presence[6]
- Establishing priorities for sampling and monitoring that reflect the most sensitive exposure pathways[7,8]
- Monitoring and determining appropriate actions to prevent migration of perchlorate into drinking water supplies[9]
- Incorporating applicable or relevant and appropriate Federal or state regulatory standards, whichever are more stringent, into DoD's cleanup program once standards are established for perchlorate[10]
- Preventing pollution and investing in finding substitutes for the various military uses of perchlorate that will have fewer public health and environmental concerns.[11]

The Department of Defense continues to play a leadership role in perchlorate science and technology. Over the last decade, DoD has invested approximately $59 million on perchlorate science and technology initiatives. These initiatives include investigations into perchlorate sampling and analysis, identifying and evaluating innovative and cost-effective remediation technologies, applying pollution prevention principles to minimize and eliminate perchlorate waste streams, and finding potential alternatives to perchlorate in munitions items.

In the absence of otherwise properly promulgated and applicable state or Federal standards, the Department will continue to evaluate the extent of perchlorate contamination at installations and address sources of contamination that present an unacceptable risk to public health, safety, or the environment, in consultation with Federal, state, and local authorities using available sampling data and related information. Such responses will occur on a case-by-case basis, reflecting the individual circumstances of sites where perchlorate contamination is found. When a standard for perchlorate is promulgated, the Department is poised to effectively address perchlorate contamination attributable to DoD activities.

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[6] *Interim Policy on Perchlorate Sampling, Philip W. Grone, Principal Assistant Deputy Under Secretary of Defense (Installations and Environment), September 29, 2003.*
[7] *ibid.*
[8] *Prioritization Protocol for Perchlorate Impacts to Drinking Water from DoD Facilities in California, Alex Beehler, Assistant Deputy Under Secretary of Defense (Environment, Safety, and Occupational Health), September 23, 2004.*
[9] *DoD Instruction 4715.6, Environmental Compliance.*
[10] *DoD Instruction 4715.7, Environmental Restoration Program.*
[11] *Executive Order 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition, September 14, 1998.*

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1.0 Introduction

This Report to Congress is submitted in response to a Congressional request for information on perchlorate groundwater contamination in and around the Colorado River, Southern California, Arizona, and Nevada. This request was made by the House Appropriations Committee in House Report (H. Rept.) 108-187:

> *"The Committee is aware of the controversy surrounding the evaluation of perchlorate contamination of groundwater in Southern California and other areas across the country. The Committee directs the Department to conduct a joint study with the Environmental Protection Agency of perchlorate groundwater contamination, to be completed within 180 days of the enactment of this Bill. This report will examine in detail perchlorate groundwater pollution in and around the Colorado River, San Bernardino County, the [Coachella] Valley, Santa Clara River and the Imperial Valley that threatens drinking and irrigation water supplies in Southern California, Arizona and Nevada. This report will assess the breadth and scope of contamination and make preliminary recommendations that will, at a minimum, include:*
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This report addresses the information currently known about the extent of perchlorate in ground and surface waters within a study area that includes parts of Southern California, Arizona, and Nevada, and provides three preliminary recommendations as requested in H.Rept.108-187. Where the term "the Department or DoD" is used in this report, it refers to the Department of Defense.

The Department of Defense has been proactively addressing the perchlorate challenge since before 1996. Our perchlorate goals have always been, and continue to be:

- To ensure that an open, transparent, and inclusive process uses defensible science as the basis for establishing health- and environmental protection-based standards;
- To make sure that decisions carefully weigh the scientific evidence, as well as the benefits and impacts, where appropriate; and
- To quickly and effectively remediate perchlorate contamination that poses an unacceptable risk to public health, safety, or the environment, applying applicable or relevant and appropriate requirements.

DoD has a long history of cooperation with EPA on perchlorate, including initial research into the biological degradation of perchlorate in water, joint participation in an interlaboratory validation study of the analytical method that resulted in EPA Method 314.0 (EPA's only currently published analytical detection method for perchlorate), and critical scientific studies of human and ecological risk from perchlorate exposure. DoD and the Military Services continue a proactive approach to identify and evaluate potential alternatives for perchlorate compounds.[12]

Under the leadership of the Executive Office of the President (the Office of Management and Budget (OMB), the Office of Science and Technology Policy (OSTP), and the Council on Environmental Quality (CEQ)), the Department of Defense (DoD), the Environmental Protection Agency (EPA), the National Aeronautics and Space Administration (NASA), and the Department of Energy (DOE) formed an Interagency Working Group (IWG) on Perchlorate to address perchlorate science issues. Other agencies that later joined the IWG include the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), the Department of the Interior (DOI), and Health and Human Services (HHS). These discussions led to an agreement to ask the National Academies of Science (NAS) National Research Council to establish an independent committee to provide an evaluation of the key studies underlying EPA's 2002 draft perchlorate health risk assessment, and identify any other key studies that should be considered by EPA in their finalization of the health risk assessment. DoD, EPA, NASA, and DOE agreed to fund and co-sponsor the NAS review. The National Academies released its report in January 2005.

1.1 Study Methodology

To ensure a thorough reporting to Congress, this report was developed as a cooperative effort between DoD and EPA. While the final text and conclusions of the Report are those of the Department, EPA assisted DoD with defining the scope

[12] *See the Strategic Environmental Research and Development Program (SERDP),Pollution Prevention Projects, Green Energetics, http://www.serdp.org/research/Prevention.html*

of the study area, provided data and text for parts of the report, and commented on drafts of the Report.

In response to the Congressional directive to evaluate the nature and extent of perchlorate groundwater pollution in portions of Southern California, Arizona, and Nevada, it was necessary to delineate the boundaries of the study area. The Department and EPA determined that the study include and pay close attention to areas that draw upon water from the lower Colorado River system south of Lake Mead for drinking water, irrigation, and groundwater recharge purposes. This attention is important because of the influence that perchlorate contamination of the Las Vegas Wash has on perchlorate concentrations in Lake Mead and the downstream lower Colorado River system. These criteria ensure that the counties, municipalities, water purveyors, agricultural interests, and tribal lands that use water drawn from Lake Mead, the Colorado River, the Central Arizona Project, the Colorado River Aqueduct, the Coachella Canal, and the All-American Canal are addressed in the study (Figure 1). States and counties in the study area that draw upon the lower Colorado River are:

- Nevada — Clark County
- Arizona — Mohave, La Paz, Yuma, Pima, Pinal, and Maricopa Counties
- California — Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego Counties, and portions of Ventura County.

Figure 1 – Study Area

1.2 Background on Perchlorate

The perchlorate anion contains a chlorine atom bonded to four oxygen molecules (ClO4-). It is an oxygen-rich, non-volatile, water soluble anion that forms from the aqueous dissociation of ammonium, potassium, magnesium, lithium, sodium perchlorate salts, or perchloric acid. Perchlorate is mobile in typical groundwater and surface water conditions, and is stable in the environment.

DoD uses ammonium perchlorate (AP), potassium perchlorate (KP), and other perchlorate salts in some military munitions items, and DoD and NASA use AP in certain solid fuel rocket motor applications. Compared to alternative oxidizers, perchlorate compounds provide the extra oxygen needed for combustion and high-level performance of these systems, and are intrinsically more stable and insensitive to heat, shock, and other external stimuli that pose an explosive safety hazard. As a critical element in many solid rocket motors used by DoD and NASA, AP is integral to the Nation's strategic defense system and space exploration. Perchlorate compounds are also used in a variety of other commercial products and industries, and are known to occur naturally in regions with climatic conditions similar to the study area.

Widespread detection of perchlorate in drinking water sources emerged as an environmental issue of national interest in 1997 when advances in analytical detection technology lowered the detection limit of perchlorate in drinking water from a concentration of 400 ppb to 4 ppb. This improved analytical methodology resulted in perchlorate detections in groundwater and surface water supplies in California, Nevada, Arizona and elsewhere across the country. This improved analytical methodology resulted in perchlorate detections in groundwater and surface water supplies in California, Nevada, and Arizona.[13] Detection at the new lower analytical level prompted concerns in the regulatory community and the public regarding the importance and relevance of these detections and the environmental occurrence of perchlorate. Concerns include uncertainties in the following areas:

- Human health effects from chronic, low-level perchlorate exposure in drinking water[14];

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[13] *Detections in groundwater and surface water supplies were also found in other states, including AL, AR, CO, IA, IL, IN, MA, MD, MN, MO, NJ, NM, OH, OK, OR, SC, SD, TN, TX, UT, VA, WA, WV, KS, NE, NY]*

[14] *The human health risks associated with environmental exposures to perchlorate are the subject of an NAS review. Information on the status of the NAS review is available from the NAS website at http://www4.nas.edu/webcr.nsf/5c50571a75df494485256a95007a091e/4c13dcaf6487bb0f85256d640064525b?OpenDocument. DoD perchlorate information is located at https://www.denix.osd.mil/denix/Public/Library/Water/Perchlorate/perchlorate.html and http://www.perchlorateinfo.net. EPA information is located at http://www.epa.gov/ncea and http://www.epa.gov/swerffrr/documents/perchlorate.htm.*

- Extent of the occurrence of perchlorate in ground and surface waters;
- How ecological factors (such as transport and transformation phenomena) in various environmental media affect contaminant concentrations and forms;
- Ecological effects; and
- Efficacy of different treatment technologies for alternative water uses (e.g., drinking water and agricultural application).

Historically, a substantial portion of the annual production of perchlorate compounds has been for defense activities and the aerospace industry. The Department investigated the potential use of perchlorates in munitions items in the early part of World War II, and DoD first used perchlorate in 1945 as the war was drawing to a close.

Past and present activities at DoD industry facilities that may have contributed to environmental releases of perchlorate include, but are not limited to:

- Chemical manufacture of perchlorate materials;
- Manufacture and maintenance of missiles, rockets, and munitions items containing perchlorate;
- Open burning and open detonation (OB/OD) of munitions items;
- The use of perchlorate-containing munitions for weapon system testing and military training (e.g., smoke grenades);
- Ordnance testing and development;
- Rocket motor maintenance and testing; and
- Demilitarization of perchlorate-containing munitions items using techniques such as high-pressure water jet washout (or "hog-out") of rockets and missiles containing solid propellant.

Perchlorate compounds are not used exclusively for defense purposes. Perchlorate compounds have been or are being used in a variety of other commercial products and industries, and are known to occur naturally in regions with climatic conditions similar to the study area. Past or present industrial and commercial items and processes that may have contributed to environmental releases of perchlorate include, but are not limited to:[15,16]

- Fireworks;

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[15] *Contaminant Focus – Perchlorate, EPA Technology Innovation Office, http://clu-in.com/contaminantfocus/default.focus/sec/perchlorate/cat/Overview/.*
[16] *Perchlorate Fact Sheet: Perchlorate Questions and Answers, U.S. Food Drug Administration, http://vm.cfsan.fda.gov/~dms/clo4qa.html.*

- Highway flares;
- Blasting agents;
- Manufacture of matches;
- Airbag inflators;
- Electroplating;
- Aluminum refinishing;
- Textile dye fixing;
- Analytical chemistry; and
- Pharmaceuticals.

Perchlorate is also found as an incidental component of other products, including fertilizers derived from Chilean nitrate deposits and possibly fertilizers using potash from New Mexico and Saskatchewan.[17,18] Large quantities of nitrate fertilizer were exported from Chile to the United States from the late 1800s to the 1950s. By 1950, advances in commercializing synthetic nitrate fertilizers has reduced the consumption of Chilean nitrate fertilizers in the United States. Recently, the Santa Ana Regional Water Quality Board acknowledged that Chilean fertilizers may have been widely used in portions of the study area, particularly in areas that produced citrus crops.[19] Because of climatic similarities between areas in Chile where nitrates known to contain perchlorates are mined and some areas of the desert southwest, the U.S. Geological Survey (USGS) and the Air Force are cooperating on studies that investigate the nature and extent to which naturally-occurring perchlorate may exist in the desert southwest.[20] Additional information on the natural occurrence of perchlorate can be found at Section 3.3.3.

Although there have been environmentally significant releases of perchlorate, the overall extent that defense activities, manufacturing processes and commercial uses have contributed to this are not defined. Nor is it known to what extent naturally-occurring perchlorate has contributed to widespread low-level detections.

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[17] *Environmental Pollution 112 (2001) 299-302, "Perchlorate Levels in Samples of Nitrate Fertilizer Derived from Chilean Caliche," Urbansky, et. al., EPA National Risk Management Research Lab, Cincinnati, OH.*

[18] *USGS studies are underway investigating the significance of this source.*

[19] *Gerard Thibeault, California Regional Water Quality Board Santa Ana Region, presentation to California Senate Select Committee on Perchlorate Contamination, February 27, 2004. http://www.swrcb.ca.gov/rwqcb8/perchlorate/2004_Feb_27_Senate_Hearing.pdf.*

[20] *Orris, G.; Harvey G. Preliminary Analyses for Perchlorate in Selected Natural Materials and Their Derivative Products; USGS 03-314, 2003.*

1.3 Data Analysis

The following data sources are used in this study:

- EPA Region 9 perchlorate database;
- EPA perchlorate detection database (including information collected under EPA's UCMR);
- Data collected by DoD under the September 2003 interim policy on perchlorate sampling and other DoD initiatives; and
- State public drinking water system data.

National drinking water system data collected by EPA under the UCMR, including DoD UCMR and other drinking water data, are included in recognition that Colorado River water is used in different hydrological basins in the study area to recharge groundwater and augment available surface water supplies. The use of water that is "imported" from one area and introduced into surface and groundwater in another area can affect water quality in the receiving area.[21]

Data on perchlorate from these sources were collected for a number of different purposes. For example, UCMR data used to survey the concentration of perchlorate in finished drinking water supplies are not necessarily collected and analyzed with the same methods or objectives as site investigation samples designed to characterize a contaminant plume. Data generated and reported by sources other than DoD cannot be verified by DoD. The reader should also understand that the process of combining data collected from different sources is fraught with difficulty. Such data may not be collected with the same methods or objectives, and there are often different protocols for confirming or validating data. Further complicating data presentation and interpretation is that data and sampling results exist in different forms (e.g., some results were reported as a single concentration while in other instances, facilities reported multiple perchlorate sampling data for distinct and separate sites). For these reasons, the reader is cautioned from making general assumptions based on the reported data.

Where available, data on contaminated soil are also included because of the hydrogeological linkage between contaminated soil and groundwater. Contaminated soil may contribute to ground and/or surface water contamination over time and under certain conditions. High risk factors for perchlorate contamination in water include distance to surface waters, depth to groundwater, and soil permeability.

[21] *It is important to note that while neither UCMR data nor public water supply system data were designed to monitor individual sources, they may be useful in assisting regulators in delineating the extent of plume migration in cases where a perchlorate release can be definitively linked to a specific point source.*

The following technical terms are used in this report:

- **Reference Dose (RfD):** An estimate of the amount of a non-carcinogenic chemical that a person can be exposed to on a daily basis that is not anticipated to cause adverse health effects over a person's lifetime. In RfD calculations, sensitive subgroups are included, and uncertainty may span an order of magnitude. RfDs are generally used in EPA's non-cancer health assessments.
- **Drinking Water Equivalent Level (DWEL):** Conversion of the RfD into the allowable concentration in drinking water. The DWEL conversion assumes that drinking water is the only exposure route. The RfD is multiplied by typical adult body weight (70 kg) and divided by daily water consumption (2 liters) to calculate the DWEL in units such as ug/l.
- **Maximum Contaminant Level (MCL):** Maximum permissible level of a contaminant in water which is delivered to any user of a public water system.
- **Action Level:** Health-based advisory level for chemicals in drinking water that are established for chemicals for which there are no MCLs. When chemicals are found at concentrations greater than their action levels, water purveyors are typically required to take actions, such as informing local regulatory agencies of the presence and amount of that chemical in water and informing consumers.
- **Public Health Goal (PHG) or Health-Based Guidance Level (HBGL):** Advisory levels set by state public health officials that represent the level of a chemical contaminant in drinking water that do not pose a significant risk. A California PHG is not a regulatory standard, but regulatory standards must be set as close to the PHG as economically and technically feasible. HBGLs represent concentrations of contaminants in drinking water that are protective of public health during long-term exposure. They are not enforceable drinking water standards, but rather are advisory levels identifying the threshold where a contaminant can be present in drinking water and is considered safe for human consumption.

1.4 Regulatory Environment

Currently, there is no Federal drinking water standard for perchlorate. The NAS published a recommended RfD of 0.0007 mg/kg-day (roughly equivalent to 25 parts per billion (ppb)) in its January 2005 report. On February 18, 2005 EPA formally revised the agency's Integrated Risk Information System (IRIS) to reflect the NAS-recommended value.

The RfD represents a scientific estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to a human population, including sensitive subgroups, which is likely to be without appreciable risk of adverse health effects. The RfD serves as the foundation (along with other considerations such as analytical methods, treatment technology, and cost) upon which regulatory decisions under the SDWA, and cleanup and risk management decisions under DERP and CERCLA, are made. If EPA decides to develop a drinking water regulation for perchlorate, it will consider the RfD along with other factors described in the SDWA section 1312(b) (e.g., feasibility, costs, and benefits).

Although none of the three states in the study area have established regulatory drinking water or cleanup standards for perchlorate, California has indicated its intent to establish a drinking water standard within calendar year 2005. In the meantime, all three states have established state-specific guidance or action levels to assist water purveyors in responding to perchlorate detections.

- Arizona – In December 2004 Arizona released the results of a recently completed perchlorate occurrence survey. Over 100 water samples were collected and analyzed to determine the extent to which perchlorate has impacted Arizona water resources. Sampling locations included surface waters, groundwater, agriculture irrigation water, groundwater recharge facilities, wastewater treatment plant effluent and man-made water impoundments. The task force collected 41 surface water samples, 35 groundwater samples, and 16 groundwater recharge facility samples. The results indicate the concentrations in water bodies not associated with industrial sites are generally well below the Arizona HBGL of 14 ppb, and generally reflect perchlorate concentrations ranging from non-detect to 7.4 ppb. An HBGL is an advisory level established by Arizona Department of Health Services (ADHS) that reflects a maximum concentration of perchlorate in drinking water that can be consumed without resulting in adverse health effects. The 35 groundwater samples were collected from wells used for domestic and municipal water supplies along the Colorado River, wells in areas utilizing Central Arizona Project water for irrigation/livestock watering, and wells near concentrated animal feed operations. Of the groundwater samples, four had results above 2 ppb, with a single reported high of 15 ppb.

- California – As of October 2004, perchlorate has been detected in over 350 drinking water sources across the state, primarily in the counties of Los Angeles, San Bernardino, and Riverside. In March 2004, California established a PHG of 6 ppb for perchlorate in drinking water, and is expected to establish a state drinking water Maximum Contaminant Level (MCL) for perchlorate that is mandated by state law to be as close as possible to the PHG in 2005. State regulations require water system operators to notify local government agencies should levels reach 6 ppb in drinking water supplies; if perchlorate is found at levels equivalent to or greater than 10 times the PHG, the state recommends that the source be removed from service. The state also recommends that consumers be notified if drinking water concentrations reach the PHG.

- Nevada – Lake Mead, which is the source of approximately 90% of Southern Nevada's drinking water, contains low perchlorate concentrations. During 2004, concentrations in the treated water supply have averaged 5.6 ppb. The state established 18 ppb of perchlorate as a provisional action

level (PAL) for use in characterization and remediation efforts. The Southern Nevada Water Authority (SNWA) notifies various government agencies and consumers if perchlorate concentrations in drinking water exceed the PAL. A cleanup level of 18 ppb has been established for Kerr McGee.

1.5 Department of Defense Perchlorate Policies and Practices

The Department established an *Interim Policy on Perchlorate Sampling* on 29 September 2003.[22] The policy requires the Military Services to monitor for perchlorate in compliance with EPA's UCMR, monitor surface water discharges under the Clean Water Act as required by National Pollutant Discharge Elimination System (NPDES) permits or state requirements for the control and abatement of water pollution, and collect perchlorate data at DERP sites (under conditions discussed below).

The policy also directs the Military Services to sample for the presence of perchlorate at any previously unexamined site where DoD believes there is a reasonable basis to suspect that a perchlorate release has occurred as a result of DoD activities, and where a complete human exposure pathway is likely to exist. The Department will continue to execute its sampling policy, will make additional information available to the public, and will continue working with EPA and state regulators to prioritize site action.

The remainder of this report presents summaries of perchlorate contamination data on a regional basis, followed by descriptions of facilities in the study area in later sections.

- Section 2 presents the methodology used in this report to summarize and present the data collected from various sources; an introduction to the history and issues surrounding the analytical method for perchlorate; and summary data tables based on information provided by state agencies, DoD, and EPA.

- Section 3 provides site-by-site descriptions and discussions of perchlorate-related industrial activity, sampling, contamination, and remediation actions, where applicable.

[22] *Interim Policy on Perchlorate Sampling, Philip W. Grone, Principal Assistant Deputy Under Secretary of Defense (Installations and Environment), 29 September 2003, https://www.denix.osd.mil/denix/Public/Library/Water/Perchlorate/perchlorate.html*

- Section 4 describes the process for developing a national health standard for perchlorate and presents the Department's recommendations related to this process.

- Section 5 discusses the Department's current strategy for perchlorate and appropriate steps for addressing government sources of perchlorate, including an approach for addressing immediate threats, plans for future remediation, and an overview of DoD investments and pollution prevention technologies for perchlorate.

2.0 Data Presentation and Analysis

This section details how data from the various sources were summarized in the report; describes the history and issues of the methods used to analyze for perchlorate; and, provides an overview of state activities to characterize the extent of perchlorate contamination in and around drinking water sources.

2.1 Data Presentation

The reader should understand that the process of combining data collected from different sources (i.e., data collected from finished drinking water supplies, groundwater site characterization wells, surface water intakes, etc.) is fraught with difficulty. Such data may not be collected with the same methods or objectives, and there are often different protocols for confirming or validating data, particularly when positive sampling results may, in fact, be false positives caused by analytical limitations, and the results have not been replicated over time. For these reasons the reader is cautioned from making general assumptions based on the compiled data.

Further complicating data presentation and interpretation is that data sources and sampling results exist in different forms. For example, some results were reported as a single concentration representing the highest concentration detected at that location over several years. In other instances, facilities reported multiple perchlorate sampling data for distinct and separate sites or for whole areas on a facility. These sites include active and inactive groundwater wells, monitoring locations, treated effluent discharge locations, and raw water influent.

Where possible, data contained in multiple line item entries from a common source category or location were consolidated into a single line item, with the range of perchlorate concentrations presented. For example, data in Appendix C from Marine Corps Air Station Yuma (MCAS Yuma) has been consolidated into distinct line items representing perchlorate detections in groundwater on the facility, at training ranges associated with the installation, and at the main water system source. Likewise, when a California water purveyor (such as Redlands City Municipal Utilities District) reported perchlorate sampling data for multiple drinking water wells, the data were consolidated into a single line item and reported as a range of concentrations for drinking water wells (in as much as those wells were identified in a consistent manner (e.g., Well #1, #2, #3, etc.). EPA UCMR drinking water data sampled and reported over a multiyear period were also consolidated and presented as a range of values.

Appendix B contains the complete set of monitoring data from DoD, EPA, and other sources covering groundwater, surface water, EPA UCMR drinking water

data, and available DoD soil concentrations. Appendix C presents summary data consolidated using the process described above. Because this table is a compilation and summary of data obtained from several sources, the reader is advised to refer to the detailed sampling data in Appendix B before drawing conclusions from the summary data. Unless specifically stated in the data, sources are presumed to have used EPA Method 314.0 for sample analysis (see the discussion on analytical detection of perchlorate below).

2.2 Analytical Detection of Perchlorate

EPA Method 314.0 has been the only EPA-published method for detecting and analyzing for perchlorate since 1997. Based on ion chromatography (IC) technology, the method was developed for application to finished drinking water supplies to support sampling required under EPA's UCMR. Because the method is not specific to perchlorate, a detection must be subsequently confirmed to be perchlorate.

Environmental samples such as groundwater, surface water, soils and some drinking water may cause methodological interferences due to the presence of dissolved solids, competing anions, and other compounds. These interferences are known to cause more false positives (falsely detecting the presence of perchlorate) than false negatives (failure to detect the presence of perchlorate).

Publication of EPA Method 314.0 included quality assurance and quality control (QA/QC) steps that can produce greater confidence in the results. While competent operators may achieve limits of less than 4 ppb provided QA/QC procedures are carefully followed, when such procedures are not carefully adhered to, the reliability of sampling results reported near or below the Method Reporting Limit (MRL) of 4 ppb may be called into question. As with most analytical methods, the method detection limit (and subsequently, the MRL) is determined based on statistical analyses of laboratory standard samples, the reliability of analytical results reported near or below a MRL have a statistically greater probability of error.

Given EPA Method 314.0's intended use for analysis of finished drinking water supplies; the potential for false positives; and the need to verify results by alternate, definitive performance-based methods, the DoD Environmental Data Quality Workgroup (EDQW) developed guidance issued through the Department of the Navy as Executive Agent for Data Quality on behalf of DoD.[23] The guidance strongly encourages facilities to confirm positive perchlorate detections

[23] *Interim Guidance on Sampling and Testing for Perchlorate, Donald Schregardus, Deputy Assistant Secretary of the Navy (Environment), 4 February 2004.*

with mass spectrometry (MS)-based analytical methods capable of detecting perchlorate in more complex environmental media.

DoD and EPA scientists continue to cooperate on resolving perchlorate analytical issues. Collaborative efforts are currently underway between DoD, EPA, and industry scientists to modify and improve upon EPA Method 314.0 and develop alternative methods. In October 2003, as part of the EPA Region VI 13th Annual Quality Assurance Conference, the Intergovernmental Data Quality Task Force (IDQTF) sponsored an all-day session discussing analytical issues surrounding EPA Method 314.0, areas for improvement, and promising alternatives to the method.[24] The IDQTF, chaired by EPA's Federal Facilities Restoration and Reuse Office (FFRRO), was established in 1997 to address data quality issues of concern identified by an EPA Office of Inspector General (OIG) Report to EPA, DoD and other Federal organizations.

EPA plans to publish three new methods in 2005 to more accurately assess for perchlorate in water and other media, including EPA Method 314.1, an updated version of EPA Method 314.0.[25] EPA Method 314.1 is expected to provide better performance in samples with high levels of total dissolved solids (TDS). EPA Methods 331 and 332 are two new methods based on MS. The EPA Office of Solid Waste (OSW) is also refining EPA Method 9058, which should be analogous to EPA Method 314.1. OSW has also received a Method proposal for the liquid chromatography/mass spectrometry analysis of water, saline water, soil, and biota that has been assigned the number EPA Method 6850.

2.3 Sampling Data for Industrial and Department of Defense Facilities

This section summarizes perchlorate sampling data gathered by DoD and EPA for industrial and military facilities, and drinking water systems within the study area in California, Arizona, and Nevada. The information represents the most comprehensive data available on perchlorate contamination in the study area at the time the study was being drafted.

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[24] Navy Environmental Sampling and Testing Programs http://www.navylabs.navy.mil/Perchlorate.htm.

[25] EPA is currently developing and assessing several new methods. The methods under development offer both significantly improved sensitivity and much more reliable identification of perchlorate. Specifically the Office of Water has two methods in peer review. Method 332 using Ion Chromatography with both Mass Spectrometric and dual stage Mass Spectrometric detection (IC/MS and IC/MS/MS). Method 331 is very similar to Method 332, but uses Liquid Chromatography coupled with Mass Spectrometric detection (LC/MS and LC/MS/MS). OW is also developing Method 314.1, an improvement over the original method, 314.0. EPA's Office of Solid Waste (OSW) is developing Method 9058, similar to Method 314.1 and Method 6850, which is an LC/MS method. OW Method 331 was published in March 2005. Method 314.1 should be finalized by summer 2005. Completion of OSWER Methods 9058, 6850, and 332 are expected in late 2005.

The reader is advised to bear in mind methodological limitations of EPA Method 314.0, the current lack of approved methodologies for media other than drinking water, and to refer to the detailed sampling data in Appendix B before drawing conclusions from the summary data.

Non-DoD Industrial and Other Facilities

EPA data representing reported perchlorate concentrations at non-DoD industrial and other governmental facilities are summarized in Tables 1, 2, and 3 below.

Table 1 – Industrial/Other Facility Detections Based on EPA Data – California

California					
County	**Facility**	**Range of Detections (ppb)**			
		Drinking Water	**Groundwater**	**Surface Water**	**Soil**
Riverside	Stringfellow	2.1-67	682,000	NP	NP
Los Angeles	Whittaker Bermite	5.9-50	290,000	NP	1,500,000
Los Angeles	Jet Propulsion Laboratory (JPL) (NASA)	31[26]	0–1,500	NP	NP
San Bernardino	City of Rialto*	811	NP	NP	NP
San Bernardino	Lockheed Propulsion Company - Redlands	87	NP	NP	NP

* City of Rialto has identified numerous potentially responsible parties, including DoD, for this perchlorate contamination. The Department disputes this claim.

ND – sampling was conducted and perchlorate was not detected
NP – no information was provided on whether sampling has been conducted
NSa – sampling of drinking water supplies was not conducted because of the lack of drinking water supply wells and/or drinking water is obtained from a local water purveyor

[26] *Although a level of 24 ppb has been detected in an offsite well that is used as one source for a water supply system, that level was not served to customers. As part of an ongoing CERCLA cleanup of volatile organic compounds, NASA is funding a treatment system for this water that also removes the perchlorate before the water is purveyed.*

Table 2 – Industrial/Other Facility Detections Based on EPA Data - Arizona

Arizona					
County	Facility	Reported Detections (ppb)			
		Drinking Water	Groundwater	Surface Water	Soil
Maricopa	Aerodyne Corp	NP	18	NP	NP
Maricopa	Unidynamics/Goodyear	8.4-65	NP	NP	NP
Maricopa	Universal Propulsion Company	2	43-130	NP	NP

ND – sampling was conducted and perchlorate was not detected
NP – no information was provided on whether sampling has been conducted
NSa – sampling of drinking water supplies was not conducted because of the lack of drinking water supply wells and/or drinking water is obtained from a local water purveyor

Table 3 – Industrial/Other Facility Detections Based on EPA Data - Nevada

Nevada					
County	Facility	Range of Detections (ppb)			
		Drinking Water	Groundwater	Surface Water	Soil
Clark	Kerr-McGee	NP	1,300,000 – 1,500,000 above slurry wall [27] (110,000 to 130,000 below slurry wall)	NP	NP
Clark	PEPCON	NP	600,000	NP	NP

ND – sampling was conducted and perchlorate was not detected
NP – no information was provided on whether sampling has been conducted
NSa – sampling of drinking water supplies was not conducted because of the lack of drinking water supply wells and/or drinking water is obtained from a local water purveyor

DoD Facilities

The Department, based on its September 2003 *Interim Policy on Perchlorate Sampling*[28], has collected perchlorate sampling data on active installations and Base Realignment and Closure (BRAC) and Formerly Used Defense Sites (FUDS) properties to which the U.S. has access. Implementation of the sampling policy is a work in progress, and more sites/data may be forthcoming based on case-by-case

[27] *USEPA, Region 9. Perchlorate Monitoring Results. Henderson, Nevada to the Lower Colorado River. December 2004 Report.*
[28] *Interim Policy on Perchlorate Sampling, Philip W. Grone, Principal Assistant Deputy Under Secretary of Defense (Installations and Environment), 29 September 2003, https://www.denix.osd.mil/denix/Public/Library/Water/Perchlorate/perchlorate.html.*

assessments by DoD. As the Military Services continue to implement this policy, DoD will be able to develop a more complete picture of where and which defense activities involving perchlorate may have generated a release to the environment. DoD will continue to execute its sampling policy and will make additional information available to the public.

A summary analysis of DoD data collected under the Department's 29 September 2003 and other earlier voluntary perchlorate sampling initiatives is presented in Tables 4 and 5. This section also presents descriptions of DoD facilities in the study area, their missions, and perchlorate sampling initiatives. For the purposes of this report, the term Department of Defense "facility" refers to active, realigned or closed military installations, associated sites such as test and training ranges, laboratories, etc., and FUDS properties to which the U.S. has access. Where multiple data points are available, a range of detections is provided. In other cases, only a single data point was available.

Table 4 – Department of Defense Facility Data - California

California					
County	**Facility**	**Range of Detections (ppb)**			
		Drinking Water	**Groundwater**	**Surface Water**	**Soil**
Imperial	Marine Corps Air Station (MCAS) Yuma Chocolate Mountains	4.2[29]	NP	NP	ND
Imperial	Naval Air Facility (NAF) El Centro	ND[30]	NP	NP	NP
Orange	Former MCAS El Toro	NSa	ND – 398	NP	320
Orange	Former MCAS Tustin	NSa	ND	NP	NP
Orange	Naval Weapons Station (NWS) Seal Beach	NSa	ND	NP	NP
Los Angeles	Air Force Plant 42	NP	ND	NP	NP
Los Angeles	Morris Dam	NSa	ND – 52	NP	NP
Ventura	Navy Outlying Landing Facility (NOLF) San Nicolas Island	ND	2.3	ND - 20[31]	1.7-266
Ventura	Naval Base Ventura/ Port Hueneme	NSa	ND	NP	NP
San Bernardino	Marine Corps Logistics Base (MCLB) Barstow	ND	NP	NP	NP
San Bernardino	Marine Corps Air Ground Combat Center (MCAGCC) 29 Palms	ND	NP	NP	NP
San Bernardino[32]	Naval Air Warfare Center Weapons Division (NAWC/WD) China Lake	ND	15-720	NP	NP
Kern[33]	Edwards Air Force Base	ND	ND – 30,700	NP	700 – 2,100,000
San Diego	Marine Corps Base (MCB) Camp Pendleton	ND	NP	NP	NP
San Diego	Naval Air Station (NAS) North Island/ Coronado Naval Base	NSa	ND	NP	NP
San Diego	Warner Springs SERE	ND	NP	NP	NP
San Bernardino[34]	Naval Training Center (NTC) Fort Irwin	NP	NP	NP	NP

ND – sampling was conducted and perchlorate was not detected
NP – no information was provided on whether sampling has been conducted
NSa – sampling of drinking water supplies was not conducted because of the lack of drinking water supply wells and/or drinking water is obtained from a local water purveyor

[29] *Drinking water is obtained from a Colorado River source with typical ambient perchlorate concentrations ranging from 4 to 5 ppb.*
[30] *Drinking water is obtained from a Colorado River source.*
[31] *Perchlorate was detected in two surface springs that were previously tied into the drinking water system used on San Nicolas Island. These water sources are no longer used in the drinking water system.*
[32] *NAWS China Lake is located in three counties—San Bernardino, Kern, and Inyo. The perchlorate data in this table reflects the installation as a whole, therefore, some of the results may be from areas outside the study area.*

Table 5 – Department of Defense Facility Data - Arizona

Arizona					
County	**Facility**	**Reported Detections (ppb)**			
		Drinking Water	**Groundwater**	**Surface Water[35]**	**Soil**
Pima	Davis-Monthan AFB	ND	ND	NP	ND-28,000
Yuma	MCAS Yuma	NSa[36]	3.3 - 4[37]	4.6 – 5	NP
Yuma	Barry M. Goldwater Range (BMGR), West	NSa	ND	NP	ND-150
Yuma	Yuma Proving Grounds	4 – 31.9[38]	NP	5	NP
Pima	AF Plant 44	ND	ND	NP	NP

ND – sampling was conducted and perchlorate was not detected
NP – no information was provided on whether sampling has been conducted
NSa – sampling of drinking water supplies was not conducted because of the lack of drinking water supply wells and/or drinking water is obtained from a local water purveyor

2.4 Sampling Data for Southern California Drinking Water Systems

This section summarizes data gathered by the California Department of Health Services on perchlorate detections in public drinking water systems in the Southern California study area counties as of October 2004.

As indicated in Table 6, as of October 2004, perchlorate has been detected in over 320 drinking water wells and reservoir intakes in the study area, primarily in the counties of Los Angeles, San Bernardino, and Riverside. Perchlorate is also

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[33] Edwards AFB is located in Los Angeles, San Bernardino, and Kern counties, with the majority of the base in Kern County.
[34] Drinking water wells within the base have been recently sampled for perchlorate, and base staff are awaiting results. The potential for drinking water impacts from perchlorate at Fort Irwin are currently being cooperatively assessed by DoD and California regulators through the California Perchlorate Prioritization Protocol."
[35] The Colorado River is the primary surface water feature and is the source of the perchlorate detections.
[36] Drinking water is provided by Colorado River surface water.
[37] The Colorado River provides groundwater recharge in this area and is believed to be the source of these Arizona perchlorate detections in groundwater.
[38] See Section 3.2.1 for additional information on the maximum reported concentration.

present in the waters drawn from the Colorado River used for drinking water and agricultural purposes at concentrations that typically average 4 to 5 ppb.[39]

[39] *California Department of Health Services, www.dhs.ca.gov/ps/ddwem/chemicals/perchl/monitoringupdate.htm.*

Table 6 – Drinking Water System Detections - Southern California

County	# of Detections		# of Detections > 6 ppb		Peak Concentration (ppb)
	DW Supply Sources	DW Systems	DW Supply Sources	DW Systems	
Los Angeles	136	37	104	33	159
San Bernardino	82	17	62	13	820
Riverside	66	8	51	6	65
Orange	33	10	10	4	10.7
Ventura	2	1	2	1	20
San Diego	1	1	0	0	4.7
Total	**320**	**74**	**229**	**57**	

3.0 Military, Industry and Other Sources of Perchlorate Contamination

This section summarizes data gathered by DoD and EPA on perchlorate detections reported for industrial and military uses of perchlorate, and on perchlorate detections at facilities in California, Arizona, and Nevada within the study area. The information represents the most comprehensive data available on perchlorate contamination in the study area at the time the study was being drafted. The reader is advised to refer to the detailed sampling data in Appendix B before drawing conclusions from the summary data. DoD perchlorate sampling data are regularly updated and available to the public at *www.DoDperchloratеinfo.net* and *www.denix.osd.mil/denix/library/water/perchlorate/perchlorate.html.*

3.1 Non-Department of Defense Industrial Facilities

While some industrial facility perchlorate releases in the study area have been associated with the chemical manufacture of perchlorate compounds for defense products, perchlorate compounds are not used exclusively for military defense purposes and are used in a variety of other commercial products and industries.

3.1.1 California

Stringfellow Site

The Stringfellow site is located near the community of Glen Avon, in Riverside County, California. It was listed on the final Superfund National Priorities List (NPL) in 1983. From 1955 until 1972, the 17-acre site was operated as a state-permitted hazardous waste disposal facility. More than 35 million gallons of industrial waste, primarily from metal finishing, electroplating, and pesticide production, were deposited in various pits at the site, resulting in a contaminated groundwater plume. Cleanup efforts have focused on controlling the waste sources and capturing the contaminated plume.

In May 2001, California officials detected perchlorate in groundwater throughout the site, including parts of the aquifer beyond the existing plume capture area. Sampling results indicate the maximum perchlorate concentration in groundwater to be 87,000 ppb at the source, and 67 ppb in private wells. The plume has affected approximately 30 private wells in concentrations ranging from 2.1 to 67 ppb. State officials recently finalized a work plan to conduct a remedial investigation and feasibility study in response to the perchlorate contamination.

Whittaker Bermite[40]

The Whittaker Corporation Bermite facility is a 1,000-acre site in the Santa Clarita Valley. The site lies on the Saugus Formation, an 85 square mile aquifer, which is one of several drinking water sources for the area. Between 1934 and 1987, approximately 50 acres of the site were used by various companies to manufacture, store, and test explosives such as dynamite, fireworks, flares, and ammunition items. Whittaker Bermite operated the facility for the last 20 years of this period, from 1967 through 1987, when manufacturing operations stopped.

Since 1987, the property has operated 14 hazardous waste treatment, storage and disposal units under permits issued in 1981 in compliance with the Resource Conservation and Recovery Act (RCRA); 13 were certified closed and one remains under cleanup. Testing and analysis has revealed that both the shallow alluvial aquifer and the main Saugus Formation aquifer are affected with contamination from the industrial processes that were carried out at the site. Contaminants include solvents, volatile organic compounds (VOCs), heavy metals, and other chemicals, including perchlorate.

Five of the eight Saugus aquifer production wells are presently closed due to perchlorate contamination at concentrations that range from 5.9 to 50 ppb. The maximum perchlorate detection in groundwater is 290,000 ppb, with shallow soil samples indicating up to 1,500,000 ppb from three feet below grade surface.

In April 2002, a formal Cost Sharing Agreement between USACE and the Castaic Lake Water Agency (CLWA) was signed to fund, plan, and implement a comprehensive groundwater study in the vicinity of the site. USACE participation is through an authorized civil works project to provide support to the local public water provider, not a result of DoD CERCLA liability at the site.

Under the agreement, USACE will fund 50 percent of the project, while CLWA will provide a 50 percent cash contribution and in-kind services toward the Feasibility Study. The USACE/CLWA effort will serve to:

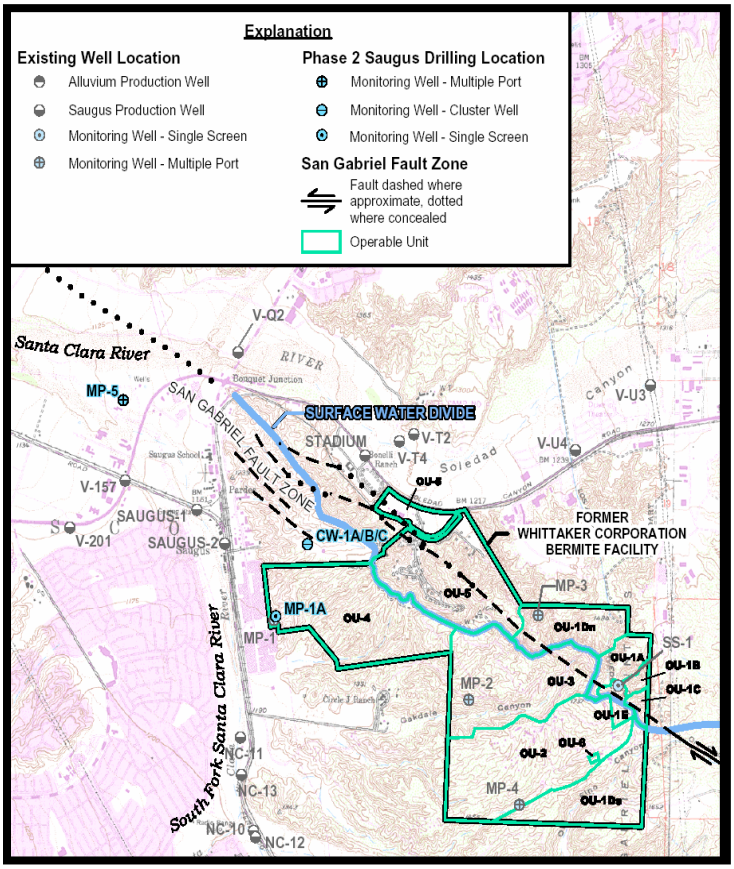
- Characterize the pathways of contamination impacting the original four production wells in order to restore a portion of lost capacity (up to 5,000 acre-feet per year, roughly equivalent to a one-year water supply for over 8,000 families)
- Arrest potential contamination down-gradient of the affected production wells
- Address potential contamination in the eastern portion of the study area (east of the San Gabriel Fault Zone)

[40] *California EPA Santa Ana Regional Water Quality Board website, Perchlorate Enforcement Orders available at http://www.swrcb.ca.gov/rwqcb8/html/perchlorate13267.html.*

- Act as the basis for a subsequent engineering Feasibility Study that will evaluate long-term cleanup solutions to address the affected groundwater beneath the former Whittaker Corporation Bermite facility and off-site areas within the Santa Clarita city limits.

USACE is currently implementing the site characterization phase of the groundwater study in accordance with procedures set forth in CERCLA (or Superfund) for site cleanup studies. The project study area (Figure 2) is located in the eastern Santa Clara Valley, near the confluence of the Santa Clara River and the South Fork of the Santa Clara River. USACE contractors are drilling wells up to 1,650 feet deep on a 1,000-acre parcel of land to acquire test samples of soil and water.

Figure 2 - USACE Eastern Santa Clara Sub-Basin Groundwater Study



USACE has completed the first two phases of work, and is planning for the third phase of work. Based on results available to date, the preliminary findings of the project suggest groundwater is affected by perchlorate and other chemicals beneath the former Whittaker Corporation Bermite facility and as far as one mile west of site boundaries. EPA has recently reported that another facility adjacent to

the Whittaker Corporation Bermite facility is also being investigated by the state of California for perchlorate releases.

City of Rialto[41]

Perchlorate was first detected in the Rialto and Colton groundwater sub-basins in 1997. Two wells were shut down due to perchlorate concentrations above the previous 18 ppb California Department of Health Services (DHS) action level. When DHS lowered its action level to 6 ppb in March 2004, additional wells were taken out of service. These wells are down gradient from an industrial area of Rialto that historically housed multiple explosives and pyrotechnics manufacturing and storage facilities. Perchlorate detections range up to 811 ppb.

Assertions that the former Rialto Ammunition Storage Point (ASP), a FUDS property used as a temporary storage point for ordnance-loaded railcars, was a possible source of the perchlorate in production wells used by the Inland Empire Utilities Agency are not supported from a review of the history of DoD activities on the property. In 1945, the War Department, the predecessor to the Department of Defense, declared Rialto ASP excess and the depot was transferred to the Farm Credit Administration in 1946. USACE conducted a review of archived documents on Rialto ASP and determined there is no evidence that any perchlorate releases occurred during the time that it was under jurisdiction of DoD (i.e., there were no perchlorate releases during the time that the facility existed as Rialto ASP). The matter is currently in litigation.

Evaluation of activities conducted on the property by subsequent owners, however, disclosed activities (such as the manufacture of fireworks and other pyrotechnic devices) that involved the use of perchlorate compounds as an integral part of business operations. Several accidents involving these products have been documented at the site. Subsequent owners have included West Coast Loading Corporation, B.F. Goodrich Corp., Red Devil Fireworks, BROCO Explosives Company (later BROCO Environmental), Denova Environmental, and San Bernardino County (Mid-Valley Landfill).

The Rialto plume itself is quite large, affecting 20 drinking water wells in Rialto, Colton, Fontana, and West San Bernardino. It is also worth noting that the County of San Bernardino operates the Mid-Valley sanitary landfill in the vicinity of Rialto ASP. Portions of the landfill are on the former Rialto ASP and another portion is immediately adjacent. Given the history of other operations on the property, it is possible that wastes bearing perchlorate from industrial operations were disposed of at the landfill.

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[41] *California EPA Santa Ana Regional Water Quality Board website, Perchlorate Enforcement Orders available at http://www.swrcb.ca.gov/rwqcb8/html/perchlorate13267.html.*

Lockheed Martin (Redlands Facility)[42]

Lockheed Martin manufactured solid rocket fuel rockets and propellant from 1961 to 1974 at its 400-acre Mentone facility east of Redlands, California. Prior to 1961, the Grand Central Rocket Company manufactured, tested, and disposed of solid rocket propellant at the Redlands site. Waste disposal from these operations led to chemical contamination, including perchlorate, and resulted in a groundwater plume approximately seven square miles in size.

In 1997, perchlorate was discovered in a number of domestic water supply wells that serve several water purveyors throughout San Bernardino and Riverside counties. The perchlorate groundwater plume originating from the Lockheed Martin site also affects drinking water wells that serve Loma Linda. The Redlands area has been extensively sampled for perchlorate, including sampling at the former Norton AFB. Monitoring wells at the former Norton AFB have been used to assist Lockheed and the Regional Water Quality Board in delineating the plume. Preliminary sampling indicates no on-site perchlorate contamination sources, with limited further sampling to be performed. Perchlorate is currently present in 46 municipal wells, with the highest concentration in the wells being 87 ppb.

Lockheed Martin is working closely with the Regional Water Quality Control Board and local water purveyors to address local water supplies affected by perchlorate. The company has been replacing contaminated wells and at one well has implemented ion-exchange treatment system.

Lockheed Martin Beaumont Site

In the 1950s, the Grand Central Rocket Company purchased land and began remote testing facility operations at the Lockheed Martin Beaumont site for space and defense programs. The Lockheed Propulsion Company purchased the property in 1960, and began operations at the testing facility in 1963. The Beaumont facility is comprised of two sites. Site #1 consists of approximately 9,100 acres and is the area where the majority of the testing activities were conducted. Site #2, consisting of 2,500 acres, is located approximately 5 miles from Site #1. The two sites were used for the processing, testing, and disposal of solid rocket propellant, among other products, in the 1960s and early 1970s. Operations at the facility ceased in 1974.

An initial sampling program conducted by Radian in 1986, confirmed the presence of solvents used to clean and remove grease from metals in the upper groundwater aquifer. The solvents include dichloroethylene (DCE), dichloroethane (DCA), trichloroethane (TCA), TCE, 1,2 - DCA, and 1,2 - DCE. This relatively small

[42] *Agency for Toxic Substances and Disease Registry, Public Health Assessment, Lockheed Propulsion Company, http://www.atsdr.cdc.gov/HAC/PHA/lockheed/loc_p1.html.*

reservoir of groundwater, which is used only for dust control and fire protection, is thought to be separated from the deeper aquifer by a layer of rock, so it is unlikely that the chemicals have entered the deeper aquifer. In 2002, California EPA's Department of Toxic Substances Control (DTSC) identified perchlorate in groundwater. Groundwater underlying the burn pit area has been impacted with perchlorate. Perchlorate concentrations up to 141 ppm were detected in groundwater. Perchlorate was also detected in surface water at concentrations up to 256 ppb. Maximum soil concentrations detected at the site went up to 1,260 ppm. No water supply wells exist within five miles of this former facility and the impacted groundwater is limited to a portion of the site.

NASA Jet Propulsion Laboratory

The NASA Jet Propulsion Laboratory (JPL) is located in Pasadena, California, northeast of Interstate 210. Established shortly before World War II by DoD, the facility has been under the jurisdiction of NASA since 1958. Activities at JPL currently focus on automated exploration of the solar system and deep space. The California Institute of Technology currently operates and maintains the facility under a contract with NASA.

JPL was placed on the NPL in 1992 after several solvents were found in downgradient drinking water wells. Perchlorate was first discovered at the same downgradient wells in 1996. Subsequent on-site and off-site investigations have identified an on-site source area with levels of perchlorate in groundwater around 1,500 parts per billion (ppb). The off-site portion of the plume has levels up to 200 ppb, and the plume has caused four water supply wells (with a maximum perchlorate concentration of 31 ppb) to be taken out of service. In July 2004, NASA paid for the installation of an ion exchange and carbon treatment system at the Lincoln Avenue Water Company. The system is currently treating approximately three million gallons per day. The water is then distributed for public consumption after treatment. An on-site treatment system has been constructed and is treating approximately 150 gallons per minute from the source area. The treated water is then injected back into the aquifer. Negotiations and design are currently underway to install an ion exchange system on wells owned by the City of Pasadena. Final treatment systems on-site and off-site should be completed by mid-2007.

The San Gabriel Valley

The San Gabriel Valley contains EPA Superfund NPL sites, including multiple areas of contaminated groundwater in the San Gabriel Basin aquifer, a critical source of drinking water for Southern California. Approximately 30 square miles of the 170 square mile San Gabriel Valley are contaminated with a variety of VOCs, nitrate, and perchlorate. Using sampling results, historical state and local records, responses to information requests, and other information sources, regulators have determined that approximately 165 parties in the San Gabriel

Valley have significantly contributed to the groundwater contamination. Forty-five different water suppliers operate in the basin of the San Gabriel Valley and provide water to more than 1,000,000 people.

There are four operable units in the San Gabriel Valley area that have sites reporting perchlorate contamination. The El Monte Operable Unit (OU) includes parts of the cities of El Monte, Rosemead, and Temple City. The South El Monte OU includes parts of the cities of South El Monte, El Monte, and Rosemead. The Baldwin Park Operable Unit extends through the cities of Azusa, Irwindale, Baldwin Park, West Covina, La Puente, and City of Industry. The Puente Valley OU includes most of the City of Industry and parts of the city of La Puente. Perchlorate has been detected in the Baldwin Park Operable Unit in groundwater at a maximum concentration of 2,180 ppb and in drinking water at a maximum concentration of 189 ppb.

In 2000, Congress established the San Gabriel Basin Restoration Fund, and authorized the appropriation of up to $85 million for the fund.[43] The fund is administered by the Secretary of the Army (through USACE), in cooperation with the San Gabriel Basin Water Quality Authority, and provides funding for studies, testing, investigation, cleanup, and restoration of perchlorate contamination in the San Gabriel Basin in California and other areas. Under a cost-sharing provision, the San Gabriel Basin Water Quality Authority is required to provide 35 percent of the funding from non-Federal sources, such as states, localities, and private entities.

In January 2001, the Aerojet-General Corporation (Aerojet) joined six other companies in signing an agreement with the Main San Gabriel Basin Watermaster, the San Gabriel Basin Water Authority, and other water purveyors in the area to implement a major groundwater cleanup project in the Baldwin Park Operable Unit. The agreement addresses multiple, commingled plumes of contaminated groundwater that have resulted in an area of contamination over a mile wide and eight miles long. The cleanup is proceeding using a treatment technology train that consists of ultraviolet radiation and an oxidation system for the treatment of organic compounds, and ion exchange technology for the treatment of perchlorate.

The Chino Basin

The Chino Basin is one of the largest groundwater basins in Southern California. It consists of approximately 235 square miles of the upper Santa Ana River watershed and lies within portions of San Bernardino, Riverside, and Los Angeles counties. Water management in the basin is the responsibility of the Chino Basin Watermaster, a consensus-based organization facilitating development and utilization of the Chino Groundwater Basin. The Chino Basin Watermaster

[43] *PL 106 554*

consists of various entities pumping water from the basin, including cities, water districts, water companies, agricultural, commercial, and other private entities. The basin's ongoing groundwater monitoring program addresses a variety of known groundwater contaminants including VOCs, arsenic, nitrates and perchlorate.

With respect to the perchlorate contamination, widespread detections in groundwater were observed during the 1999 through 2001 sampling program, and all groundwater wells in the basin have recently been tested for perchlorate. Citing State of California drinking water monitoring data, EPA reports that perchlorate was detected in West Chino Basin drinking water at a maximum concentration of 29 ppb, and in Central Chino Basin drinking water at a maximum concentration of 9 ppb.

In a summary of activities covering September through November 2003, it is reported that the Chino Basin Watermaster was asked by its member organizations to investigate the historic extent to which Colorado River Aqueduct water was recharged into the groundwater basin and was a possible source of perchlorate contamination.[44] No further information on the status of the tasking is available.

3.1.2 Arizona

Aerodyne Corporation

The limited amount of information available on the Aerodyne Corporation's use of perchlorate compounds indicates that the company has conducted propellant testing at the Gila River Indian Reservation outside of Chandler, Arizona. Available information indicates a groundwater plume with perchlorate concentrations up to 18 ppb is associated with Aerodyne operations.

Unidynamics

Since 1963, Unidynamics engaged in the research, development, and manufacturing of ordnance, electronic electrochemical components, and devices for weapons and weapon systems at an industrial facility north of the municipal airport in the City of Goodyear, Arizona. From 1963 to 1974, waste was generated and disposed on the Unidynamics property. The ADHS first discovered contaminated groundwater in the vicinity of the Unidynamics property in 1981. The Phoenix-Goodyear Airport property was added the Superfund National Priorities List in 1983 after solvent and metal contamination was found in the soil and groundwater. Operations on the property ceased in 1990.

[44] *Chino Basin Watermaster Status Report No. 9, http://www.cbwm.org/docs/statreps/Status%20Report%20No.%209.pdf*.

Available information indicates that a contaminated groundwater plume extends two miles to the north of the Unidynamics site and includes solvents, metals, and perchlorate, with perchlorate concentrations up to 80 ppb. Regulatory authorities do not consider the plume to be under control. Southeast of the former Unidynamics facility, a second plume is migrating towards the City of Goodyear municipal water supply wells and a private water supply well. Perchlorate has reportedly been detected in the private well at concentrations ranging from 8.4 to 65 ppb.

Unidynamics is currently conducting groundwater monitoring and cleanup and soil cleanup. A total of six groundwater extraction wells are used to extract groundwater contaminated with VOCs, and are expected to be modified and optimized to address perchlorate. Unidynamics also maintains 24 groundwater monitoring wells, 11 of which are located on the former Unidynamics property.

Universal Propulsion

The Universal Propulsion Company (UPCO) facility has developed and manufactured perchlorate-containing items at its Phoenix, Arizona facility since the late 1960s. UPCO (now a subsidiary of Goodrich Corporation) develops, manufactures, and tests solid propellant actuated devices, aircraft ejection seats, aircrew escape systems, stun grenades, gas generators, and other products.

UPCO installed two groundwater monitoring wells at its Phoenix site as a result of cleanup actions required by the Arizona Department of Environmental Quality (ADEQ) under its RCRA and other authorities. Preliminary sampling results from March 2004 indicated perchlorate groundwater concentrations from 43 to 130 ppb at the UPCO facility.[45] As a consequence of the preliminary sampling results, ADEQ and UPCO jointly tested a total of 50 neighboring wells. Of the 66 individual samples collected, none reported elevated perchlorate concentrations. EPA reports drinking water concentrations of 2 ppb.[46]

UPCO has been directed by ADEQ to further investigate and define the extent and degree of perchlorate in the groundwater, and is in the process of obtaining the necessary permits to install four additional monitoring wells at the facility and two monitoring wells south of the facility. Data collected from these wells will help determine the extent and distribution of the perchlorate in the groundwater and the direction of groundwater flow in the vicinity. UPCO has also been directed to conduct additional soil sampling to characterize the extent of soil potentially affected by perchlorate. Once the extent and degree of contamination is

[45] *Goodrich UPCO Perchlorate Update, Testing and Analysis, Arizona Department of Environmental Quality, http://www.azdeq.gov/download/upcofacts.pdf.*

[46] *EPA Occurrence, Response, and Potential Sources of Perchlorate Releases to the Environment, September 2004.*

determined and hydrological data is collected, UPCO will propose a remediation plan for ADEQ to review.

3.1.3 Nevada

The Las Vegas Wash, Lake Mead, and the Lower Colorado River

To understand the nature and extent of perchlorate contamination in surface and groundwater in the study area, it is necessary to recognize that while several point source releases in Southern California have been linked to the closure of a significant number of drinking water wells in the area, industrial activities and production of perchlorate compounds appear to have impacted the entirety of the Lower Colorado River system, and hence the study region.

Operations at the former Kerr-McGee Chemical Company (now known as Kerr McGee Chemical LLC (KM)), and the former PEPCON facility in Henderson, Nevada have released perchlorate to soils and groundwater over an extended period of time. [47] Groundwater contaminated with perchlorate releases from the Kerr-McGee facility discharges to the Las Vegas Wash area and subsequently to Lake Mead. This contamination extends to some extent to the lower Colorado River and those areas that use Colorado River water for drinking and agricultural purposes.

Historically, KMCC and PEPCON operations involved the decades-long production of several perchlorate compounds, including sodium perchlorate (NaP), KP, AP, and MgP. KMCC also produced large quantities of sodium chlorate for commercial purposes, including for use as a non-selective contact herbicide (defoliant) in cotton fields and other agricultural applications, and as a bleaching agent in the pulp and paper industry. A review of material safety data sheet information for sodium chlorate indicates that perchlorate is actually produced during the electrolytic production of chlorates, and is present in the finished product in an expected range of approximately 17,000 to 22,000 ppb.[48]

Decades of producing perchlorate and chlorate compounds, and the 1988 explosion and destruction of the PEPCON facility, have been linked to two perchlorate-contaminated plumes. These plumes flow north approximately three miles to the Las Vegas Wash and, subsequently, downstream into Lake Mead and the Colorado River.

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[47] *Kerr-McGee sued the United States for contribution under CERCLA based primarily on the United States' ownership of certain parcels of real property and some production equipment before 1963. This matter is currently in litigation.*

[48] *Sodium Chlorate Material Safety Data Sheet, Kerr-McGee Chemical LLC, http://www.kerr-mcgee.com/businesses/chemicals/msds/SiteObjects/files/b5012.pdf.*

The Southern Nevada Water Authority (SNWA) recently investigated possible additional sources of perchlorate upstream in the Colorado River not attributable to Kerr-McGee and PEPCON operations in the Las Vegas Wash area. Sampling conducted at seven locations upstream of Lake Mead in Nevada, Utah, and Colorado during April, July, September, and November 2003 resulted in low-level detections of perchlorate. SNWA concluded that while the preliminary data indicates that perchlorate may always be detectable at very low concentrations throughout the Colorado River system, additional sampling will be required to determine if concentrations of perchlorate in the upper Colorado River system affect the concentration of perchlorate below Lake Mead.[49]

Kerr-McGee Chemical LLC

KM is actively capturing and treating perchlorate-contaminated groundwater originating on its site. It captures perchlorate-contaminated groundwater at the following locations:

- On KM property (on-site) at the KM down-gradient property boundary since 1999;
- Under Athens Road, midway between the KM property and the Las Vegas Wash since October 2002; and
- The seep area immediately upstream of the Las Vegas Wash since November 1999.

The perchlorate contamination in the KM plume has been measured at concentrations that range from 110,000 ppb to 1,500,000 ppb. Prior to controls, the KM plume released an average of 900 pounds per day to the Las Vegas Wash. Beginning in 1999 perchlorate-contaminated groundwater was treated using a one-pass ion-exchange technology. Kerr-McGee attempted to implement a long-term system to treat water from all three areas using ion-exchange to remove perchlorate from the water, followed by resin regeneration and catalytic destruction of the removed perchlorate, but that system failed to function properly and was abandoned in favor of biological treatment.

In 2003 KM constructed a fluidized bed reactor (FBR) system consisting of two individual bioreactors connected in series to replace the costly ion-exchange units. The FBR system was in start-up and shakedown mode for most of 2004. During October/November 2004 the plant successfully completed a 30-Day Performance Test and is now fully operational. It has replaced the ion-exchange units. The system treats all of the water pumped from the various groundwater and surface water collection systems, as well as water stored in an on-site lined impoundment. Because the FBR system physically destroys the perchlorate molecule instead of

[49] *Low Level Perchlorate Sampling Results in the Colorado River System and Lake Mead, Peggy Roefer, Southern Nevada Water Authority Regional Water Quality Supervisor, 13 February 2004.*

concentrating it on an exchange resin that will become contaminated and requires subsequent treatment, the perchlorate discharge concentration and mass released from the treatment plant are substantially less than from the ion-exchange units.

Data from the KM contaminated groundwater plume indicate the concentrations of perchlorate entering the Las Vegas Wash have declined as a result of the engineering controls. The groundwater extraction wells and treatment facilities permanently remove approximately 1,700 to 2,000 pounds of perchlorate per day from the KM plume, with 1,546 tons of perchlorate removed through March 2005.[50,51,52]

PEPCON

The perchlorate-contaminated PEPCON plume, while still significant, is smaller and less concentrated than the KM plume. PEPCON has conducted a remediation pilot study that successfully demonstrated that in-situ biodegradation of perchlorate-contaminated groundwater is possible provided that site-specific geochemical and environmental parameters are carefully considered in system design and operation. A field test of the in-situ technology has reduced perchlorate concentrations in a small area of the PEPCON plume from approximately 600,000 ppb in the plume to less than 2 ppb in approximately 160 days. The Nevada Department of Environmental Protection (NDEP) is requiring that PEPCON install a remediation system at the leading edge of its plume in 2005 to intercept the plume to prevent future potential impacts to the Las Vegas Wash and protect deeper groundwater resources from further perchlorate impact.

Efforts to Reduce Perchlorate Mass Loading to the Colorado River

The effectiveness of the implemented engineering controls is documented in KM and PEPCON site monitoring data, as well as from monitoring stations located at Lake Mead and downstream locations on the Lower Colorado River.

Monitoring data from stations located at Las Vegas Bay, Saddle Island on Lake Mead, the Colorado River at Willow Beach (below the Hoover Dam), and at the Colorado River Aqueduct intake indicate that perchlorate concentrations entering Lake Mead and in the Lower Colorado River have been significantly reduced since the 1999 implementation of engineering controls by Kerr-McGee. These concentrations continue to decline. The most current EPA monitoring data on perchlorate concentrations from Henderson, Nevada, to the lower Colorado River

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[50] *Perchlorate Monitoring Results Henderson, Nevada to the Lower Colorado River, December 2004 report. Compiled by EPA Region 9 Waste Management Division, based on monitoring data from Nevada Division of Environmental Protection, Southern Nevada Water Authority, Metropolitan Water District of Southern California, and Kerr McGee Chemical Company, January 25, 2005.*

[51] *Overview of Las Vegas Valley Perchlorate Remedial Efforts, National Research Council Committee to Assess the Health Implications of Perchlorate Ingestion, Todd Croft, NDEP December 12-13, 2003.*

[52] *Perchlorate in Henderson NV – Significant Controls are Operating, July 2004, EPA Region 9.*

that is available to the public is in a report dated December 2004. [53] The report indicates that monitoring at Parker Dam near the Colorado River Aqueduct, the point where the Metropolitan Water District (MWD) of Southern California diverts water for domestic and agricultural purposes, showed the average perchlorate concentration in 2003 at the Colorado River Aqueduct was 4.8 ppb; data collected by Arizona during 2004 show the concentration has declined further to 3.5 ppb.[54] Recent NDEP modeling using the monitoring data, hydrogeological information such as ground and surface water travel times, and system flushing times show that the perchlorate mass loading at the North Shore Road monitoring station in the Las Vegas Wash is expected to continue to decline, dropping from approximately 260 pounds per day in November 2003 to less than 130 pounds per day during 2005.

The same data sets indicate that, as a consequence, perchlorate concentrations in the Lower Colorado River will also continue to decline. The model suggests that perchlorate concentrations measured at the intake to the Colorado River Aqueduct are expected to decline to 2 ppb by mid-to-late 2005.[55]

3.2 Department of Defense Facilities

Parts of DoD facilities used historically for storage of munitions items are not expected to have contributed to an environmental release of perchlorate. Rubberized binder systems and external casing reduce stabilizer depletion and make munitions items less sensitive to shock and other external stimuli. In addition, storage facilities are designed to maintain stable temperature and humidity conditions inside the storage areas. These factors serve to reduce the possibility of material leaching out of a munitions item, and the unexpected ignition of the munitions items themselves, making it highly unlikely that a release of perchlorate could occur during storage.

Other past and present activities, such as the manufacture and disposal of perchlorate compounds, propellant production, OB/OD of munitions items, ordnance and rocket motor maintenance and testing, training, and demilitarization represent potential sources of perchlorate release to the environment. Some facilities used for live fire test and evaluation purposes have reported detections of perchlorate in groundwater and soil, generally at lower concentrations. Facilities historically involved in the production, maintenance, and testing of solid

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[53] *Perchlorate Monitoring Results Henderson, Nevada to the Lower Colorado River, December 2004 report. Compiled by EPA Region 9 Waste Management Division, based on monitoring data from Nevada Division of Environmental Protection, Southern Nevada Water Authority, Metropolitan Water District of Southern California, and Kerr McGee Chemical Company, January 25, 2005 .*

[54] *Arizona Department of Environmental Quality, Perchlorate in Arizona, Occurrence Study of 2004, December 2004 http://www.azdeq.gov/function/about/download/perch1201.pdf*

[55] *Ibid*

propellant for rocket or missile motors, such as Edwards Air Force Base (AFB), California, and Naval Air Warfare Center Weapons Division (NAWC/WD), China Lake, California, reported higher perchlorate concentrations.

3.2.1 Arizona

Davis-Monthan AFB

Davis-Monthan AFB, located in Tucson, Arizona, is approximately 10,763 acres in size. Groundwater beneath Davis-Monthan AFB is more than 350 feet below ground surface, and the nearest tributary to the Colorado River (the Santa Cruz River which flows only when it rains) is seven miles away.

Since its inception in 1925, DoD has conducted a variety of military aviation missions at Davis-Monthan AFB. Since the end of World War II, the base has been used for a variety of purposes, including aircraft storage and preservation. Davis-Monthan AFB also hosts a variety of aircraft from Air National Guard units, Germany, and England that fly to Arizona for training purposes.

Three soil samples were collected from craters at the Explosive Ordnance Disposal (EOD) Range Open Burn/Open Detonation Facility immediately after detonation activities. The results were non-detect (at a detection limit of 40 ppb for soil), 510, and 28,000 ppb. Fifteen samples were collected in September and October 2003, in conjunction with the RCRA closure of the EOD range, and included samples collected at the bottom of old munitions residue burial pits, samples from the open detonation range surface (one foot below surface), and samples in drainage swales where rainwater pools. Results ranged from non-detect (at detection limits between 42 and 48 ppb for soil) to 840 ppb.

Sampling for perchlorate has also been conducted in conjunction with routine SDWA sampling. Davis-Monthan AFB relies exclusively on groundwater for drinking water supplies. Five discreet groundwater samples were collected from different points of entry, which represented groundwater from eight different production wells. Perchlorate was not detected in any of the drinking water samples. Based on the local hydrology and the perchlorate concentrations in the soil, it was determined by DoD that additional sampling is not warranted.

Marine Corps Air Station Yuma (MCAS Yuma)

MCAS Yuma is one of the Marine Corps' premier aviation training bases. With access to 2.8 million acres of bombing and aviation training ranges collectively referred to as the Yuma Training Range Complex, MCAS Yuma is the busiest air station in the Marine Corps. It supports 80 percent of the Corps' air-to-ground aviation training, and each year the air station hosts numerous units and aircraft from U.S. and North Atlantic Treaty Organization forces.

The Yuma Training Range Complex is a military aviation training facility composed of airspace and lands located in southwestern Arizona and southeastern California. The range complex includes the Chocolate Mountain Aerial Bombing and Gunnery Range and approximately 5,000 square miles of airspace designated for military use in California. It also includes approximately 5,000 square miles of airspace in the Barry M. Goldwater Range (BMGR) designated for military use in Arizona. As the scheduling authority for the Yuma Training Range Complex, MCAS Yuma provides fleet squadrons with access to this special-use airspace designated for military aviation training and the underlying land reserved as aerial bombing and gunnery ranges. Collectively, this complex is the largest tactical aviation training range used by the Marine Corps.

Groundwater samples were collected at locations both up gradient of MCAS Yuma and down gradient of areas where perchlorate-containing munitions have been used or stored on the facility. Perchlorate was found at concentrations of approximately 3.3 ppb up gradient of MCAS Yuma in the lower coarse gravel zone. This zone is considered the second water-bearing unit and lies beneath the upper fine zone from which it receives recharge of Colorado River water via vertical percolation. Groundwater samples obtained from a groundwater monitoring well that is located down gradient from an area where perchlorate-containing munitions were stored or maintained detected perchlorate at a maximum concentration of approximately 4 ppb. Both samples from MCAS Yuma are consistent with perchlorate concentrations averaging 4 to 5 ppb from Colorado River water samples at the Imperial Dam north of Yuma. Drinking water was not sampled on the base because it is pulled directly from the Colorado River. The data indicate that MCAS Yuma is not contributing to perchlorate contamination in the groundwater.

Barry M. Goldwater Range (BMGR)

The BMGR is located in southwest Arizona, and is officially divided into Eastern and Western sections. MCAS Yuma administers the western section, and Luke AFB administers the eastern section.

The nearly 2 million acre range is cooperatively managed by the Air Force and the Marine Corps. The management of the natural resources of the range is the responsibility of the Air Force and the Marine Corps under a withdrawal that puts the military mission first and precludes such uses as grazing and mining.

The Western segment serves the U.S. Air Force and the U.S. Marine Corps as an armament and high-hazard testing area; a training area for aerial gunnery, rocketry, electronic warfare, and tactical maneuvering and air support; and a place to develop equipment and tactics. About 95 percent of all fighter pilots in the Persian Gulf War trained on this range. The range is roughly 20 miles wide by 120 miles long, extending from Yuma to approximately 25 miles east of Gila

Bend, Arizona, and from Interstate Highway 8 south to the Cabeza Prieta National Wildlife Refuge and the U.S./Mexican border.

The Eastern segment serves mainly as an Air Force air-to-air and air-to-ground combat training site. Several nearby bases, including Luke and Davis-Monthan Air Force bases, use the east side of the range for air training. In addition, the Army National Guard conducts helicopter training in this airspace. Compared to the range's west side, very little land activity is conducted. No perchlorate sampling was conducted on the East segment of the range.

Groundwater samples were collected from two deep water supply wells within the West segment of the range. Water from these wells is not affected by irrigation, but underflows the active gunnery ranges towards the Colorado River. Perchlorate was not identified in concentrations above the reporting limit. In addition, more than a dozen soil samples were obtained from three locations. One sample collected immediately adjacent to several small spent rocket motors resulted in a detection of 34.6 ppb; one sample obtained from a missile impact crater resulted in a detection of 93.9 ppb; and one sample obtained from a shothole resulted in a detection of 150 ppb.[56] There are no drinking water supply wells on the range.

Yuma Proving Grounds

Yuma Proving Ground is located near the Arizona-California border, adjacent to the Colorado River, approximately 24 miles north of the city of Yuma, Arizona.

The principal mission of Yuma Proving Ground is to plan, conduct, analyze, and report the results of military material tests in development and production phases; review plans and monitor developmental testing; conduct operational testing and troop training exercises; and provide technical support and guidance to other Military Services and Federal agencies. Recent projects have included munitions and weapons testing (artillery pieces, smart munitions, mines, and mortars), tank and automotive testing, natural environment testing, aviation system testing, and specialized forces training. Yuma Proving Grounds is one of three installations in the study area that operates an active OB/OD facility.

Water drawn from a series of 11 wells is used for both potable and non-potable uses, and water is also pumped from the Colorado River for storage. The Colorado and Yuma Rivers replenish the groundwater in the Yuma region. The installation conducted perchlorate sampling at its six drinking water systems. Results indicate that of the approximately 94 samples taken during that period, perchlorate concentrations ranged from less than 4 ppb to a single anomalous high

[56] *A shothole is a hole dug into the soil in which munitions items are placed for safe demilitarization. Placing munitions items below grade while demilitarizing munitions items provides an extra margin of safety for EOD team members during detonation and serves to contain the resulting detonation.*

detection of 31.9 ppb. Over 90 percent of the samples taken were within the 4 to 5 ppb range, consistent with Colorado River concentrations; 97 percent of the samples were below 10 ppb.

Luke AFB

Luke AFB is approximately 4,200 acres in size and is located adjacent to the Phoenix, Arizona, metropolitan area in a basin and range region of the Sonoran Desert.

Established in 1941, Luke AFB is dedicated to training F-16 pilots. With more than 200 aircraft, Luke has the largest fighter-training wing in the United States. Since opening, the base has trained more than 51,000 pilots from 41 nations. It is currently responsible for providing technical, medical, field, and flight training for 1,000 new pilots each year. To accomplish the base's training mission, the majority of the flight operations are conducted at the nearby BMGR.

Based on the mission of Luke AFB and the use of the nearby BMGR for training operations, DoD believes an environmental release of perchlorate is not expected on Luke AFB, and sampling for perchlorate was not conducted.

Williams AFB

Williams AFB, located in Mesa, Arizona, approximately 30 miles southeast of Phoenix is approximately 4,059-acres in size. The base was commissioned in 1941 and operated a flight training school until the base closed on September 30, 1993. Activities at the base included training programs for bombardiers, bomber pilots, instrument bombing specialists, and fighter gunnery; maintenance of aircraft; and firefighter training.

After the base was decommissioned in 1993 it was converted into a civilian airport (Williams Gateway Airport). Approximately 18.74 acres of Williams AFB remains under DoD control for continued military use; 10.74 acres of the base is retained by the U.S. Army Reserves and 8 acres is reserved for the Air Force.

Based on the historic mission of Williams AFB, DoD believes that an environmental release of perchlorate from DoD activities is not expected, and sampling for perchlorate has not been conducted.

3.2.2 California

MCAS Yuma Chocolate Mountains

The Chocolate Mountains range is an unattended/non-instrumented ordnance range located in southeastern California approximately 60 nautical miles northwest of MCAS Yuma.

The Chocolate Mountains range provides a variety of air-to-surface weapons training, air-to-air gunnery, and air combat maneuvering to Marine Corps and other DoD aircrews. The Chocolate Mountain Impact Area provides large land and airspace areas for air tactics; close air support missions; laser system operations; and air-to-ground bombing, rocket, and strafing exercises. Drinking water supplies obtained from the Colorado River were sampled for perchlorate, with perchlorate detected at concentrations ranging from non-detect to 4.2 ppb.

Soil samples obtained from spent munitions collection areas associated with aerial gunnery and bombing ranges were not found to contain perchlorate above detection levels.

Former MCAS El Toro

The former MCAS El Toro consists of approximately 4,700 acres in central Orange County. It is located in a semi-urban agricultural area about eight miles southeast of Santa Ana, California, and 12 miles northeast of Laguna Beach, California. Most of the land northwest of MCAS El Toro is used to grow oranges and other agricultural crops, while land to the south and northwest of the station has been developed as commercial, light industrial, and residential. The facility was officially closed in 1999.

The former MCAS El Toro was a master jet air station supporting the operations and combat readiness of Pacific Fleet forces and aviation activities of the United States Marine Corps. In 1997, perchlorate was initially identified at low concentrations in groundwater near MCAS El Toro during sampling conducted by the Orange County Water District (OCWD) in a groundwater monitoring well 100 feet west of the MCAS El Toro boundary. Of the OCWD samples collected at multiple depths at this well, two had concentrations above the detection limit of 4 ppb, with a maximum detected concentration of 7.6 ppb.

In 1998, the Department of the Navy collected additional groundwater samples and analyzed for perchlorate in conjunction with ongoing sampling activities for VOCs being conducted at the western corner of the facility. Twenty-eight samples were collected at seven locations up gradient from the off-station OCWD well. Perchlorate was detected in 27 of the 28 samples at concentrations ranging from 4 to 23 ppb. Because California's action level for perchlorate in 1999 was 18 ppb, a station-wide investigation was conducted during October 1998 to evaluate the presence and concentrations of perchlorate in groundwater at MCAS El Toro.

A total of 50 sampling locations were identified, including:

- Monitoring wells located at Installation Restoration Program (IRP) Site 1, the EOD Range, where rocket motors and missiles containing solid propellant are known to have been burned or destroyed

- The four on-station inactive landfills (IRP Sites 2, 3, 5, and 17)
- Sites adjacent to two former burn pits used for firefighter training exercises (IRP Sites 9 and 16)
- Areas near runways, taxiways, and aircraft parking areas
- Sites within on- and off-station VOC plumes (IRP Sites 18 and 24)
- On- and off-station background monitoring well locations.

Perchlorate was detected in groundwater at 15 of the 50 locations sampled, including several background wells both on- and off-station. Detected concentrations ranged from non-detect to 398 ppb; however, the concentration of all but two of the detections ranged between non-detect and 16 ppb. The only two samples with a concentration above California's action level were collected at IRP Sites 1 and 2, the EOD Range (398 ppb) and the landfill area down gradient from IRP Site 1 (sample concentration of 20.7 ppb).

The results indicate that low concentrations of perchlorate are present in groundwater at scattered locations throughout the station and in off-station wells. These scattered, low concentrations are consistent with off-station groundwater well data obtained by OCWD. The surrounding area has a history of agricultural use, including citrus production, and it possible that some of the low-level perchlorate detections in on- and off-base groundwater may be related to the past application of nitrate fertilizers or other agricultural products containing perchlorate. Sampling for perchlorate was not conducted on drinking water supplies because there are no drinking water supply wells on the facility. A local purveyor provides drinking water for the area.

Additional station-wide sampling for perchlorate is performed periodically as part of an existing groundwater monitoring program. Results from these sampling events are consistent with the original findings (i.e., low concentrations at scattered locations both on-station and off-station, with perchlorate concentrations ranging from non-detect to 9.9 ppb for groundwater sampling performed between 2000 and 2002). In 2002, sampling of IRP Sites 3 and 5 resulted in non-detects. In addition, vadose zone sampling at Building 165, an ammunition storage facility, did not detect perchlorate. These results, coupled with low concentrations, the lack of increasing concentration trends, and similar findings off-station, support the premise that with the exception of IRP Sites 1 and 2, there are no other sources of perchlorate at MCAS El Toro.

In 1999 and 2000, a perchlorate verification study was conducted at IRP Site 1 to provide information pertaining to the nature and extent of perchlorate in groundwater, to supply supplemental data regarding local hydrogeologic conditions, and to evaluate potential perchlorate presence in soil. Results of the investigation confirmed that perchlorate was present in groundwater at Site 1, with the highest concentrations localized in the central portion of Site 1 and

significantly lower concentrations elsewhere. Perchlorate was reported in the soil at a concentration of 320 ppb. The extent of perchlorate in groundwater at Site 1 is currently being evaluated as part of the Site 1 remedial investigation.

MCB Camp Pendleton

Marine Corps Base (MCB) Camp Pendleton is located 38 miles north of downtown San Diego, California. It is over 250,000 acres in size and covers approximately 200 square miles of terrain. With approximately 17.1 miles of undeveloped shoreline, the base is one of DoD's busiest training facilities.

The base's varied topography and training opportunities offer maximum flexibility for Marine Air Ground Task Forces and other Military Service units that require a realistic combat training environment. Camp Pendleton's training mission has expanded over the years and includes firing ranges, amphibious landing beaches, parachute drop zones, aircraft bombing and strafing ranges, mock urban warfare towns, and large maneuver areas for training tactical units.

MCB Camp Pendleton conducted UCMR sampling of the base's drinking water supply throughout 2002 and 2003. Of the more than 110 samples collected at 12 individual drinking water supply wells, no perchlorate detections were reported.

Former MCAS Tustin

The former MCAS Tustin occupies 1,383 acres of land in Orange County, California. Approximately 30 percent of the land bordering the facility is currently used for agriculture although for many years agricultural lands nearly surrounded the facility. MCAS Tustin was slated for closure in the 1991 BRAC Act, with operational closure occurring in 1999.

The former MCAS Tustin has a NPDES permit requirement for weekly sampling for methyl tertiary butyl ether (MTBE) at underground storage tank (UST) Site 222. Sampling for perchlorate was conducted during MTBE sampling. No detections of perchlorate are reported as a result of the sampling. Sampling for perchlorate was not conducted on drinking water supplies because there are no drinking water supply wells on the facility. A local purveyor provides drinking water for the area.

NWS Seal Beach

Naval Weapons Station (NWS) Seal Beach consists of approximately 5,000 acres located in the City of Seal Beach, California. NWS Seal Beach is one of several weapons support facilities on the west coast of the United States and stores, maintains, and provides fleet combatants with ready-for-use ordnance. Support activities include administrative support, waterfront loading and unloading operations, storage, and non-range ordnance testing.

The Navy sampled for perchlorate at Installation Restoration (IR) Sites 6 and 70 at NWS Seal Beach. Site 6 was used for open burning of waste ordnance from 1944 to 1971. Because of the past ordnance burning activities, perchlorate groundwater sampling was conducted at Site 6 as part of the Removal Site Evaluation Study. Of the five groundwater samples collected and analyzed for perchlorates, none had concentrations reported above detection limits.

IR Site 70 was used for research, testing, and evaluation (RT&E) of NASA's Saturn II Launch Vehicle for the Apollo Program. The RT&E activities at Site 70 did not include live firing of the rocket engines. However, as part of the waste discharge requirement for the aquifer-pumping test conducted at Site 70 in 2002, the Navy sampled for perchlorate in a groundwater monitoring well, with no perchlorate detected. Sampling for perchlorate was not conducted on drinking water supplies because there are no drinking water supply wells on the facility. A local purveyor provides drinking water for the area.

Air Force Plant 42

Air Force Plant 42 is located in the northeastern portion of Los Angeles County, California, within the Antelope Valley of the Mojave Desert, approximately 80 miles north of Los Angeles. It consists of over 6,600 acres and includes approximately 4.2 million square feet of floor space.

Plant 42 includes multiple high bay buildings, airfield access with flyaway capability, and one of the heaviest load-bearing runways in the world. Some of the plant's work involves production of spare parts for military aircraft, with other projects including maintenance and modification of aircraft. Plant 42 is also where all the individual parts, pieces, and systems of the Space Shuttle came together and were assembled and tested. Upon completion, the spacecraft was turned over to NASA for transport overland from Palmdale to Edwards AFB.

Perchlorate was not detected in samples taken from the 18 groundwater and monitoring wells at Plant 42.

Naval Ocean Systems Center Morris Dam (NOSC Morris Dam)

NOSC Morris Dam occupies 20 acres of leased land divided into two parcels. The first parcel is owned by the U.S. Department of Agriculture's Forest Service. The second parcel is owned by the MWD. The dam was constructed in the 1930s. Prior ownership of the land is unknown. The Navy first leased the land from MWD in 1945. The torpedo testing facility was constructed in 1943 and the California Institute of Technology (Caltech) operated the facility from 1943 to 1950 as an annex to NAWC/WD China Lake. The primary research concentrated on the hydrodynamic aspects of torpedoes and testing a sonar system for detecting underwater objects.

Recently discovered documents indicate that there may have been some explosives used the facility. As a result of these findings, three rounds of groundwater sampling have been conducted, with perchlorate detected in concentrations ranging from non-detect to 52 ppb. Sampling for perchlorate was not conducted on drinking water supplies because there are no drinking water supply wells on the facility.

Based on these results, the Navy is working with California regulators to develop a sampling plan to determine the nature and extent of perchlorate contamination at the site. This sampling effort will include the collection of soil and surface water samples to support the development of a conceptual site model and to assess the potential for drinking water impacts. As water from NOSC Morris Dam is used to recharge the San Gabriel Groundwater Basin, these studies will help determine the significant potential contributions, if any, of perchlorate from the dam.

Naval Base Coronado/NAS North Island

Naval Air Station (NAS) North Island occupies approximately 2,000 acres at the north end of the Coronado Peninsula in Coronado, California. NAS North Island is part of the largest aerospace-industrial complex in the Navy, the 57,000 acre Naval Base Coronado.

Commissioned as a Naval Air Station in 1917, the installation is responsible for maintenance and training of naval aircraft and aircraft carriers. It is host to 23 squadrons and 80 additional tenant commands and activities.

In October 2003, sampling of groundwater was conducted at the facility's IR Site 9 under the Department's interim sampling policy. Chosen because of its historical use for disposal of many waste streams generated from Navy operations, all five samples collected at IR Site 9 reported non-detect for perchlorate. Sampling for perchlorate was not conducted on drinking water supplies because there are no drinking water supply wells on the facility. A local purveyor provides drinking water for the area.

SERE Camp Warner Springs

Survival, Evasion, Resistance, and Escape (SERE) training is conducted at the Navy's Remote Training Site in northeastern San Diego County near the community of Warner Springs, California. The Camp consists of a headquarters area with an administrative building, several staff barracks buildings, a wastewater treatment plant, and a training compound.

SERE Camp depends on two wells for its water supply, and has no water supply connections with any other water systems. Both the main well (Well #1) and backup well (Well #2) have been sampled for perchlorate, with no detections reported.

NOLF San Nicolas Island

Navy Outlying Landing Field San Nicolas Island is the outermost of a group of islands known as the Channel Islands. The island has a surface area of about 22.3 square miles (14,300 acres).

The Navy acquired San Nicolas Island in 1933. The first naval facilities consisted of an emergency landing field and a radio and aerological station. From November 1942 to January 1947, the installation served as part of a coastal defense system with an established radar station, landing field, and more than 50 temporary and portable structures. NOLF San Nicolas Island has played a support role in missile testing and evaluation. Currently, the island is maintained by NAWS China Lake, California, and acts as an outlying landing field and missile testing range.

In 1998, perchlorate was detected in tests of NOLF San Nicolas Island's drinking water system. The perchlorate detections were traced to two surface water springs that were used to supplement the island's drinking water supply. These two springs (Zitnic and Windmill Springs) are located down gradient from an active launch area, but a specific perchlorate source was not identified. The wells are no longer used as drinking water sources; however, the perchlorate concentrations in these springs and all drinking water wells on the island continue to be monitored monthly. Perchlorate concentrations in the springs are variable, ranging between the detection level and 13 ppb. A third spring on the island never had detectable perchlorate.

Since the installation was one of the earlier DoD sites where perchlorate contamination had been detected, soil and groundwater samples were collected on NOLF San Nicolas Island in conjunction with a Treatability Study sponsored by DoD's Strategic Environmental Research and Development Program (SERDP). Soil samples collected from the EOD area of IR Site 18 were used to assess the applicability of in-situ bioremediation treatment technology on perchlorate-impacted subsurface environments. This was the only investigation of IR Site 18 that included the collection of environmental samples. Groundwater samples were also collected from an unlabeled well located approximately 8,000 feet to the southwest of the EOD sampling area; the well contained 2.3 ppb perchlorate. The perchlorate concentrations were initially measured by ion-selective electrode and confirmed by ion chromatorgraphy. Perchlorate concentrations in the 69 samples collected from surface and near-surface soils in the vicinity of the EOD area ranged from 1.7 to 266 ppb, with approximately half the samples less than 10 ppb.

A Preliminary Assessment of IR Site 18 was conducted and did not indicate the release or threat of release of a hazardous substance. Therefore, Site 18 is being closed under the IRP. Any future investigative activities will be handled under the proper compliance program for operational ranges.

NAWS China Lake

Naval Air Weapons Station China Lake is a 1.1 million acre facility located in the Mojave Desert approximately 150 miles northeast of Los Angeles on the edge of the China Lake playa, a dried lake bed.

The installation was established in 1943 to support the rocket development projects to test air-launched rocket weapons and to furnish primary training in the use of those weapons. The present mission is to be the Navy's full-spectrum research, development, test and evaluation, and in-service engineering center for weapons systems associated with air warfare, missiles, missile sub-systems, aircraft weapons integration, and assigned airborne electronic warfare systems. NAWS China Lake is one of three installations in the study area that operates an active OB/OD site.

NAWS China Lake is composed of two major areas—the approximately 950 square mile China Lake Complex located in Inyo, San Bernardino, and Kern Counties and the Randsburg Wash/Mojave B Complex. The China Lake Complex contains the majority of the range and test facilities, as well as NAWS China Lake headquarters and the China Lake community. The Randsburg Wash/Mojave B Complex, located about 25 miles southeast of the China Lake Complex boundary, contains additional ranges used for air warfare testing and training.

Groundwater immediately underlying NAWC/WD China Lake is briny and is not used for drinking water purposes. Groundwater located in an aquifer approximately 550 feet below ground surface, however, is potable and supplies drinking water to China Lake and the City of Ridgecrest. The drinking water aquifer is separated from the shallow aquifer by a thick clay aquitard, and is not hydraulically connected to other groundwater sources. The potable wells have been tested for perchlorate under EPA's UCMR with no detections reported.

Because of the nature of its current and historic mission, several China Lake Operable Units have been identified by the Regional Water Quality Control Board as being of potential concern and have been investigated for perchlorate releases:

- Michelson Laboratory - Site activities included weapons formulation, testing, and evaluation. From 1947 to 1980, an industrial waste collection system carried liquid wastewater from the laboratory to two unlined ditches on the northern side of the building. Groundwater from the shallow aquifer below the OU is not used for drinking water due to its extremely poor quality, and is underlain by a clay aquitard several hundred feet thick. Perchlorate has been detected in shallow groundwater wells at concentrations ranging from 19 to 720 ppb. No contamination has been detected in the deeper aquifer.
- Salt Wells/China Lake Propulsion Laboratories - Site activities included energetics formulation and missile production. The OU consists of drainage

channels in the Salt Wells Propulsion Laboratory complex and a drainage ditch from a rocket motor washing facility. From 1946 to 1981, wastewater from the labs was discharged to open drainage channels. In 1981, clay-lined evaporation ponds were constructed in place of the original unlined ponds. Perchlorate concentrations from 24.6 to 421 ppb were detected in five groundwater samples in the area of the drainage channels. This shallow aquifer does not meet EPA or California beneficial use standards because of high dissolved solids levels and is not used for drinking water.

- Area R - Site activities included warhead decommissioning and missile testing using rocket test stands. Between 1950 and 1980, the R Range Leach Field drained five septic tanks receiving sanitary wastewater, dilute solvents, and photographic laboratory wastes. The site included an evaporation pond. Static firing rocket test stands used to test fire liquid propellant rockets were also located at this OU. While liquid propellants do not contain perchlorate, sampling was conducted at the site because the leach field drained wastewater from an industrial sewer system for the warhead research area. A single detection of perchlorate at 15 ppb was detected in one well.

In support of USGS and Air Force investigations into the relationship between naturally-occurring perchlorate and playas and other geological formations in the desert southwest, NAWS China Lake has granted investigators access to the facility to conduct sampling in the targeted formations. Other playas in the area have also been tested and found to contain naturally-occurring perchlorate.

Marine Corps Logistics Base (MCLB) Barstow

MCLB Barstow is located 134 miles east of Los Angeles and 152 miles southwest of Las Vegas in the San Bernardino County High Desert. It was established in 1942 as a storage site for supplies and equipment needed for the Fleet Marine Forces in the Pacific theater during World War II.

As a logistics base, the mission of MCLB Barstow is to procure, maintain, repair, rebuild, store, and distribute supplies and equipment; conduct training and education; and perform other tasks in support of Marine Corps forces west of the Mississippi River and the Far East. It is a state-of-the-art facility that is used not only for traditional logistics and transportation purposes, but also for repairing and maintaining the "smart" weapons currently under development for future use by the Marine Corps and other Military Services.

Despite no known source of perchlorate on MCLB Barstow, sampling of the base's drinking water supply was conducted on several occasions from 2001 to 2003. Perchlorate was not detected during the sampling.

MCAGCC 29 Palms

Marine Corps Air Ground Combat Center (MCAGCC) 29 Palms is home to the world's largest Marine Corps Base. It occupies 932 square miles of the southern Mojave Desert, and supports live fire air/ground combined arms training that is essential to maintaining the operational readiness of DoD forces.

Each year, roughly one-third of the Fleet Marine Force and Marine Reserve units—some 50,000 Marines in all—participate in the base's training exercise program. These training exercises involve every weapons system in the Marine Corps arsenal, from small arms to attack aircraft.

MCAGCC 29 Palms conducted sampling of the base's drinking water supply wells at various times from 1997 to 2002. No perchlorate was detected during any of the more than 30 reported sampling activities.

Naval Base Ventura County (Port Hueneme/Point Mugu)

The Naval Construction Battalion Center (CBC), Port Hueneme, California, is the west coast homeport of the Navy's mobile construction force. The CBC also operates the 1,600-acre Naval Base Ventura located on the vast agricultural Oxnard Plain about 60 miles north of Los Angeles on the southern California coast. Officially established in 1942, the center was responsible for the staging and shipping of more construction supplies and equipment than any other port in the United States.

The CBC's mission is to support the Naval Construction Force, fleet units, and assigned organizational units deployed from or homeported at the CBC; support mobilization requirements of the Naval Construction Force; store, preserve, and ship advanced base mobilization stocks; and provide evaluation, in-service engineering, and integrated logistics support services for surface and mine warfare combat and weapons systems for the surface fleet. CBC is currently responsible for the procurement, storage, maintenance, and disposal of construction equipment and materials.

Sampling for perchlorate was conducted at multiple IR Site 14 9 (landfill) monitoring wells with no detectable perchlorate found. Sampling for perchlorate was not conducted on drinking water supplies because there are no drinking water supply wells on the facility. A local purveyor provides drinking water for the area.

Edwards AFB

Edwards AFB is situated in Kern, Los Angeles, and San Bernardino counties, approximately 100 miles north of the city of Los Angeles. The base occupies 470 square miles and contains approximately 301,000 acres of largely undeveloped or semi-improved land that is used predominantly for aircraft test ranges and maintained and unmaintained landing sites. It has two unique natural resources

that help make it the premier flight test facility in the world—Rogers and Rosamond dry lakebeds. Both lakebeds have been used for emergency and test landings of aircraft for more than 40 years.

Military activities began in the Edwards AFB area in 1933, when the Army Air Corps set up the Muroc Bombing and Gunnery Range on the eastern side of Rogers dry lakebed. In the early 1940s, troops were moved to an area across the lakebed, now known as South Base. The Army Air Corps used the range to the east of the lakebed to train fighter pilots and bomber crews during World War II. In 1948, the Muroc Army Airfield became an Air Force facility, and was named Edwards AFB in 1949. Edwards AFB is one of three installations in the study area with active OB/OD sites.

The JPL spent years at North Base developing and testing solid fuel propellants for use in rocket and missiles systems. The solid propellant testing that occurred in the 1950s and 1960s is suspected as the source of perchlorate contamination in groundwater at North Base. The Air Force Research Laboratory also conducted testing of solid rocket motors at several locations on the base not associated with the JPL sites. OUs 4, 5, and 9 all report perchlorate in groundwater, and OU 5 also reports soil perchlorate concentrations. Activities at OU 5 were associated with JPL propellant research. Over 375 samples have been taken under routine groundwater monitoring conditions, with groundwater concentrations at the various sites ranging from non-detect to a high of 30,700 ppb at Site 285 in OU 5. A majority of the detections reported range from non-detect to several hundred ppb.

The perchlorate contamination at the installation is found in shallow groundwater that already contains high levels of naturally-occurring TDS. No aquifers currently used for drinking water are threatened. To verify that no drinking water supplies have been affected by perchlorate, Edwards AFB has also collected over 30 samples from the drinking water system, with no perchlorate detections being reported.

Working closely with the local Restoration Advisory Board (RAB), Edwards AFB approved a Treatability Study at Site 285 in 2001. After receiving permission from the Deputy Assistant Secretary of the Air Force (Environment, Safety, and Occupational Health), Edwards AFB implemented the Treatability Study to evaluate the effectiveness of ion-exchange technology at removing perchlorate from contaminated Site 285 groundwater. The system has been operational since May 2003.[57]

[57] *Success Stories – Edwards AFB, http://www.dodperchlorateinfo.net/efforts/successes/air-force/edwards.html*

Former George AFB

The former George AFB is located in the southwestern portion of San Bernardino County, California, approximately 90 miles northeast of Los Angeles and adjacent to the cities of Adelanto and Victorville. The installation was selected for closure under the BRAC process in 1988 and was officially closed in December 1992. At closure, the installation consisted of 5,062 acres.

Established in 1941 as the Air Corp Advanced Flying School, the primary mission of the installation during World War II was flight training. In October 1945, all flying activities were discontinued and the base was placed on stand-by and temporary inactive status. With the outbreak of hostilities in Korea, the installation was reactivated in June 1950 as George AFB. George AFB was assigned to the Air Defense Command, and later to the Tactical Air Command in 1950. The primary mission of the installation changed to defense interception, although flight training continued. During the Vietnam conflict, George AFB was one of the major Air Force training bases for combat-ready fighter crews.

Based on a preliminary review of the historic flight training mission of George AFB, it was determined by DoD that the potential for perchlorate releases was negligible, and that sampling for perchlorate was unnecessary.

March Joint Reserve Base

March Joint Reserve Base is located on approximately 6,700 acres nine miles southeast of Riverside, California.

Established in 1918, March AFB (under various names) was the home for numerous bomber and tanker aircraft, an anti-aircraft training encampment, and a base for inactivating bomber groups. In October 1993, under the BRAC process, March AFB was designated to be realigned as an Air Force Reserve Base. March AFB was closed in March 1996, but 2,138 acres of the 6,606 acres were retained by DoD for establishment of March Air Reserve Base (now March Joint Reserve Base).

As part of the perchlorate prioritization protocol developed by DoD and California officials (see Section 5.1.3), state regulatory agencies and the Air Force will review available data and mutually determine if sampling for perchlorate on March Joint Reserve Base is required.

Fort Irwin

Fort Irwin, located approximately 37 miles northeast of Barstow, California, in the High Mojave Desert, encompasses more than 642,000 acres of training area, and is surrounded by desert hills and mountains. Its National Training Center (NTC) is the Army's premier heavy maneuver Combat Training Center and the only instrumented training facility in the world that is suitable for force-on-force and

live fire training of heavy brigade-sized military forces. Each month, Fort Irwin and the NTC provides 4,000 to 5,000 soldiers from other installations across the country with the essential training opportunities necessary to maintain and improve military readiness and promote national security.

Documented activity shows rocket propellant use and disposal in some areas of base. Site Investigation reports indicate perchlorate has not been sampled for at these sites. Drinking water wells within the base have been recently sampled for perchlorate, and base staff is awaiting results. Additionally, the potential for drinking water impacts from perchlorate at Fort Irwin are currently being assessed through the California Perchlorate Prioritization Protocol.

NS San Diego

Naval Station (NS) San Diego is located south of downtown San Diego and adjacent to National City. It is comprised of approximately 977 acres of land and 326 acres of water.

Acquired in 1921 as U.S. Destroyer Base San Diego, the base was renamed U.S. Naval Repair Base San Diego during World War II to reflect its role of training personnel for ship repair duties. After the war, the base's mission was changed to support the ships of the Pacific Fleet and it was renamed Naval Station San Diego.

NS San Diego is the homeport for 60 ships and supports 48,000 military and civilian personnel. The base also supports 50 separate commands, including Fleet Training Center, Naval Dental Center, Naval Legal Services Office, Naval School of Dental Assisting and Technology, Shore Intermediate Maintenance Activity, Navy Public Works Center, Supervisor of Shipbuilding, Conversion and Repair, Naval Education and Training Support Center, Naval Electronics Systems Engineering Center, Fleet Industrial Supply Center, and Naval Investigative Service.

Based on the past and current mission of NS San Diego, DoD believes there is no reason to suspect that an environmental release of perchlorate might have occurred. Therefore, sampling for perchlorate has not been conducted.

NAS Miramar

NAS Miramar is located in the northern suburbs of San Diego, and is approximately 24,000 acres in size.

The land that became NAS Miramar was purchased in 1917 when the Army established Camp Kearny. The camp was demobilized following the end of World War I. When the United States entered World War II, the military began construction of a number of runways for Navy and Marine Corps aircraft. After World War II, the military forces were combined and the base was renamed

Marine Corps Air Station Miramar. Marine Corps assets were subsequently moved to NAS El Toro in 1947.

During the Vietnam War, the base was revitalized and its new mission called Top Gun was to train fighter aircrews in air combat maneuvering and fleet air defense. In 1993, Navy's F-14 Tomcat and E-2 Hawkeye squadrons were relocated and the Marines from MCAS El Toro and Marine Corps Air Facility Tustin were realigned to Miramar. Currently, the base is home to over 250 aircraft and conducts over 20,000 training missions each year.

Based on the historic mission of NAS Miramar, DoD believes an environmental release of perchlorate is not expected, and sampling for perchlorate has not been conducted.

Naval Air Facility El Centro (NAF El Centro)

NAF El Centro is located 10 miles west of Imperial, California. The installation was established in 1946, and for the first 35 years its mission was devoted to aeronautical escape system testing, evaluation, and design. Through the years, Navy El Centro has had several names, including Naval Air Facility, Naval Auxiliary Landing Field, Naval Air Station, and the National Parachute Test Range.

NAF El Centro has been home to numerous experimental testing activities such as ejection seat testing for pilot escape from a high-speed jet at altitudes less than 1,000 feet, the Mercury Space Program parachute system, and the Apollo re-entry system.

The current mission of NAF El Centro is to provide realistic training to active and reserve aviation units and activities of the Navy's operating and training forces. Activities include touch and go landings, take-offs, ordinance delivery, air-to-ground bombing, rocket firing, strafing, dummy drops, and mobile land target training.

NAF El Centro has sampled for perchlorate in the outflow from its drinking water plant. While the influent into the plant is Colorado River water, perchlorate was not detected.

FUDS

The Sacramento District USACE has met with representatives from all of California's Regional Water Boards, State Water Board, and the California EPA's DTSC to review the 227 FUDS that fall within a one or five mile buffer of a perchlorate-contaminated drinking water well in California. Through a process that utilizes geographic information systems, well data from the California DHS database, historical site information, as well as proximity (distance) to a known

perchlorate-contaminated drinking water well, USACE personnel and state regulators identified 13 candidate properties within the study area for further review.[58]

Under the FUDS program, $1 million was set aside to support a task order to conduct additional reviews of records for the candidate sites. The 13 FUDS properties in the study area are being investigated to ascertain whether there exists a potential for a perchlorate release attributable to activities conducted by DoD. Upon receipt and review of the records, the FUDS program will meet again with state regulators to determine which, if any, sites should be prioritized and sampled for perchlorate outside of the regular schedule for FUDS remediation.

DoD has serious concerns regarding the validity of the original DHS well data that served as the basis for focusing on these 13 sites. The most serious of the data flaws is that most analyses with data indicating perchlorate detections were not performed using EPA Method 314.0, and there appears to be little or no quality control (sampling methodology, laboratory certification, etc.) to validate the data results. However, for lack of a more robust data set, it was seen as a reasonable starting point for a collaborative effort to identify potential FUDS of concern.

The 13 FUDS in the study area identified by USACE and state regulators are:

- Azusa Dump Site OWL 4X Plant - The Owl 4X Plant was leased from American Cyanamid Company to the Army Chemical Corps in 1943. The site was vacated in 1958. The facility was used to manufacture bombs containing white phosphorous, tear gas, or cyanogens chloride. It is suspected that bombs were cleaned with solvents at the site. This activity could be consistent with potential perchlorate use.
- Air Force Plant #16 (NASA) - The site is the primary site to the Vultee Aircraft Company and Vultee Training Field. The site was acquired by the Air Force between 1940 and 1953. In 1953, it became officially known as the Air Force Plant #16. The site was transferred to NASA on June 30, 1964. The site was used for pyrotechnic storage, a hazardous test laboratory, aircraft manufacture, and possibly rocket manufacture. Pyrotechnics and missile manufacture both indicate that perchlorate may have been used.
- Marquardt Ram Jet Development Facility - The site was used by the Air Force and Navy from June 1950 to approximately December 1977. A major activity was the design, development, and testing of jet engines and

[58] *A fourteenth property, the Porterville Army Air Field, is also located in California, but is outside of the study area boundaries.*

air-borne propulsive devices (e.g., missiles and rockets). These activities are consistent with potential perchlorate use.

- Lockheed Air Terminal D - The Lockheed Air Terminal D site was transferred to Air Force Plant # 14 on September 1, 1954. The site is similar to Air Force Plant #14, which is listed as a site having activities consistent with perchlorate use, therefore, perchlorate use is suspected.
- Norton AFB - The land for the Norton Air Force Base was acquired in the 1940s, and the base was established in 1950. The land disposal began in 1946 and was still undergoing disposal in 1986. The base was assigned support responsibilities for various missile and ballistic systems. Other activities included aircraft and engine maintenance and a gas turbine engine overhaul facility. Some of these activities are consistent with potential perchlorate use. The Norton AFB area has been extensively sampled for perchlorate. Preliminary sampling indicates no on-site perchlorate contamination sources, with limited further sampling to be performed. Perchlorate has, however, been detected and confirmed in industry monitoring wells located off-site.[59]
- Pomona Ordnance Depot - The Pomona Ordnance Depot site was acquired piecemeal by the War Department between 1942 and 1943, and it was disposed of in 1946. The area was the California-Arizona Maneuver Area Ordnance Supply and Service Base. Over 300 buildings were constructed by DoD, and the site was connected to several railroad spurs. Flares, pyrotechnics, and other munitions were stored and/or moved through this facility. While the simple storage of munitions items is not expected to result in an environmental release of perchlorate, a more detailed review of records is being conducted to assess whether the potential for an environmental release attributable to DoD operations exists.
- San Bernardino Chemical Warfare Service (CWS) site - The San Bernardino CWS site operated from approximately January 1942 to 1948. The area was used by the Western Stove Company as a bomb manufacturing plant until late 1943. In 1944, the Day and Night Flare Company began operations and manufactured incendiary bombs, reworked bomb clusters, and loaded bomb fuses and bombs. The possibility exists that perchlorate-containing items may have been present on site during DoD's jurisdiction could not be ruled out based on currently available information, so a detailed review of site historical information is being

[59] *The area has been extensively sampled for perchlorate and all confirmed perchlorate detections are in off-base monitoring wells. The multi-level wells with perchlorate detections are located down gradient of VOC-contaminated groundwater known to be associated with Norton AFB activities, and the Lockheed Martin monitoring wells are located at levels that are deeper than any of wells detecting VOC contamination from Norton AFB. Both on- and off-base sampling wells have been used to delineate the extent of the Redlands perchlorate plume, with EPA and state regulators concuring that sampling results rule out Norton AFB as the source.*

performed to determine whether the potential for a release of perchlorate to the environment exists as a result of DoD activities.

- Corona Annex - The Corona Annex site was mostly purchased by the government on December 9, 1941, and portions were disposed of periodically from 1949 until 1985. Additional portions were disposed after 1986. A 245.75-acre portion of the site was still owned by the Seal Beach Naval Weapons Station at the time of the Preliminary Assessment. It is not clear what exact activities were conducted on the FUDS property during the time of DoD's ownership. Improvements included a large hospital and supporting facilities, including an incinerator and landfill. Because it is unknown whether the Naval Ordnance Laboratory and/or the Naval Weapons Station utilized the incinerator or landfill, a detailed review of site historical information is being performed to determine whether the potential for a release of perchlorate to the environment exists as a result of DoD activities.
- Mira Loma Quartermaster Depot - The site was acquired in March 1942. Approximately 60 percent was disposed in September 1966, with the remainder disposed in June 1986. The property was used for warehousing military supplies, first by the Army until 1955, and subsequently by the Air Force. The area was also used for housing troops and some training activities. While there is no direct reference to items that would have contained perchlorate, it is possible that such material may have been stored at the site during DoD's jurisdiction. A detailed review of site historical information is being performed to determine whether the potential for a release of perchlorate to the environment exists as a result of DoD activities.
- Ontario Army Air Field - The site was acquired piecemeal by the Army between 1942 and 1944. The land was used for training P-38 fighter pilots, and DoD built extensive operations, maintenance, receiving, and other facilities. The Army Air Force stopped significant use of the airfield at the end of World War II, and the property and improvements were surplussed on November 15, 1945. The land was disposed to the City of Ontario in 1949. In subsequent years, there has been significant industrial and commercial expansion on leased land around the airport, so there could be multiple possible sources of perchlorate subsequent to DoD ownership. A detailed review of site historical information is being performed to determine whether the potential for a release of perchlorate to the environment exists as a result of DoD activities.
- Van Nuys Army Air Field - The site was acquired by the Army in December 1942. The land was then sold to the City of Los Angeles in December 1946. Shortly thereafter, 63 acres were re-acquired by the Federal government for use by the California Air National Guard. The

Army used the site as a complete air training facility, and approximately 200 buildings were built by DoD. Because preliminary information indicates munitions items were stored and used at the site, a detailed review of site historical information is being performed to determine whether the potential for a release of perchlorate to the environment exists as a result of DoD activities. This site is located in the San Fernando Valley which contains a large perchlorate plume that is already being investigated.

- Los Angeles Defense Area Nike Battery 96 - The site was used from April 11, 1962 to August 20, 1970, for construction, operation, and maintenance of anti-aircraft, surface-to-air missiles, and the NIKE Battery 96. NIKE Battery 96 deployed Hercules missiles. A preliminary review of site information indicates that while the solid rocket fuel boosters utilized by the missile contained no perchlorate, the sustainer motor contained perchlorate. A detailed review of site historical information is being performed to determine whether the potential for a release of perchlorate to the environment exists as a result of DoD activities.
- Nike Battery Los Pinetos - The site used Hercules missiles from December 1960 to June 1961. Hercules missiles utilized solid rocket fuel boosters that contained perchlorate; thus, the area is consistent with potential perchlorate use.

3.2.3 Nevada

Nellis AFB
Nellis AFB is located eight miles northeast of Las Vegas, Nevada, covering approximately 11,300 acres.

Nellis AFB is home to the largest and most demanding advanced air combat training in the world. The nearby Nevada Test and Training Range (NTTR) affiliated with Nellis AFB provides training for composite strike forces which include every type of aircraft in the U.S. Air Force inventory.

Based on a review of the types of activities carried out at Nellis AFB, it was determined by DoD that the potential for perchlorate releases on the base itself was negligible, and that sampling for perchlorate was unnecessary. Readiness activities at nearby training ranges, however, include the use of munitions items that may contain perchlorate. The Department has asked the Military Services to develop plans to address potential migration of munitions constituents such as perchlorate on operational ranges. A basic range assessment at the boundaries of the NTTR was conducted during 2004, but the results are not yet available.

3.3 Other Sources of Perchlorate

It is important to realize that sources of perchlorate other than those directly associated with the Department of Defense and industrial facilities may have contributed to the widespread nature of regional, low-level perchlorate contamination. Several such potential sources are briefly discussed below.

3.3.1 Perchlorate in Flares

While many of the known detections of perchlorate in California can be related to industrial, defense, or aerospace point sources, the use of perchlorate compounds in emergency flares has recently been recognized by the Santa Clara Valley Water District (SCVWD) as a potentially significant source of perchlorate releases into the environment. Based on inventory records from city, county, and state agencies (law enforcement, transportation maintenance, and emergency response units), the SCVWD estimates that over 40 metric tons of flares were used/burnt in Santa Clara County alone in 2002.[60]

The water district study is one of the first to examine the contribution differences between burnt and unburnt flares, and concluded that flares can be a significant source of ground and surface water contamination. Studies showed that one unburnt flare leached up to 243,000 ppb perchlorate when in contact with 15 liters of water for 3.5 hours. Theoretically, this is enough to contaminate up to 2.2 acre-feet of water to 4 ppb. Under similar circumstances, even flares that were "completely burnt" released perchlorate into the environment via the pyrotechnic residues at levels of up to 130 ppb per flare.[61] The SCVWD recommended that further studies be conducted on the non-point source discharge of perchlorate into the environment from road flares, and that regional management practices and policies be developed to minimize contamination resulting from safety flares.

3.3.2 Perchlorate in Agricultural Products

Chilean nitrate—historically a common ingredient in some fertilizers—has been a known natural source of perchlorate for more than a century. Large quantities of nitrate fertilizer were exported from Chile to the United States from the late 1800s to the 1950s. By 1950, Chilean nitrate accounted for approximately 15% of the world market for fixed nitrogen although that number is likely lower in the United States than in the world as a whole due to advances in commercializing synthetic

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[60] *Perchlorate in Highway Safety Flares, Brown Bag: Advancements in Emergency Lighting Systems - Are There Safer Alternatives? James S. Crowley – SCVWD, Thomas Mohr – SCVWD, Miguel A. Silva – SCVWD Kenneth S. Dueker – PA Police & CEO PowerFlare™, Santa Clara Valley Water District, 15 January 2004.*

[61] *Safety Flares Threaten Water Quality with Perchlorate, SCVWD, Miguel Silva, 29 July 2003.*

nitrate fertilizers.[62] Santa Ana Regional Water Quality Board officials have recently acknowledged that a major source of perchlorate pollution in some Southern California drinking water supplies may be the Chilean nitrate fertilizer that was applied to the region's citrus crops for decades into the early 20th century.[63] Water Quality Board officials estimate that every thousand pounds of the fertilizer contained up to two pounds of naturally-occurring perchlorate. Given the past economic prominence of the citrus industry in the region, the extensive historic use of Chilean nitrate fertilizers in the citrus and other agricultural industries cannot be dismissed as a contributing factor to widespread, low-level perchlorate detections experienced across the region, particularly in areas in which a defense or industry point source cannot be identified as having caused an environmental release. Wells that may have been contaminated by fertilizer have been identified in Fontana, East Highlands, Corona, Chino, Chino Hills, Ontario, and Rancho Cucamonga.[64]

The commercial use of sodium chlorate as a non-selective contact herbicide bleaching agent in the pulp and paper industry suggest that it, too, may also have contributed to environmental releases of perchlorate.

3.3.3 Naturally-Occurring Perchlorate

To date, most perchlorate found in ground and surface waters has been attributed to production and/or demilitarization processes associated with its major uses as an oxidizer in solid propellants for rockets, fireworks, and other explosives. Training activities may also result in releases. However, perchlorate found in the soils, surface water, and groundwater of some locations cannot be linked to an anthropogenic point source, suggesting naturally-occurring perchlorate may be more widespread than previously suspected.

Researchers from the USGS and the Air Force have previously documented the presence of perchlorate in a variety of items such as kelp, fishmeal, and potash.[65] Researchers have also begun investigations into the connection between the natural climatic and geochemical conditions of desert regions and the formation of compounds such as perchlorates and nitrates.[66,67] Researchers at Texas Tech University have routinely found perchlorate in precipitation at sub-ppb levels using an IC/MS/MS analytical method similar to that being developed by EPA,

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[62] *The Chilean Nitrate Deposit, American Scientist, Ericksen, G.E., Volume 71, 366-374, 1983*
[63] *Fertilizer Yields Perchlorate, The Press Enterprise Company, Riverside, CA, 28 February 2004.*
[64] *Ibid*
[65] *Preliminary Analyses for Perchlorate in Selected Natural Materials and Their Derivative Products, Orris, G.; Harvey G., USGS 03-314, 2003.*
[66] *Preliminary Analyses for Perchlorate in Selected Natural Materials and Their Derivative Products, Orris, G.; Harvey G., USGS 03-314, 2003.*
[67] *A Reservoir of Nitrate Beneath Desert Soils, Walvoord, M., et al, Science Magazine, Volume 302, November 2003.*

suggesting that an atmospheric mechanism of perchlorate formation may be operating.[68] The formation and concentration of nitrate deposits in Chile's Atacama Desert is also known to result in associated deposits of perchlorate. The same atmospheric phenomena responsible for generating the nitrate deposits may also be responsible for the widespread distribution of low levels of subsoil nitrates in hyper-arid, arid, and semi-arid regions throughout the world, including parts of the southwestern United States. Parts of the southwestern United States and the Atacama Desert have similar climatic and geological conditions, including natural nitrate occurrences and numerous playas. The climatic conditions in most of the southwestern United States are less extreme and have existed for shorter periods of time.

To demonstrate that perchlorate can occur naturally in arid regions in the United States, USGS and Air Force personnel have sampled playas, nitrate occurrences, caliche, and soils in California and Nevada to assess for the presence of perchlorate.[69] Using an IC/MS/MS analytical method that is more accurate than EPA Method 314.0 and is capable of accurately detecting low levels of perchlorate in soils, groundwater, and other complex environmental media, naturally-occurring perchlorate has been detected in playas in three southwestern states including California, suggesting the phenomenon of naturally-occurring perchlorate may be more widespread than previously suspected.[70]

Based on the sampling results, USGS and Air Force researchers found that naturally-occurring perchlorates are usually affiliated with nitrates, and are found in common desert materials in concentrations typically ranging from 1 ppb to 10 ppb, with local conditions leading to significantly higher concentrations that may reach several hundred parts per billion.[71] Researchers also found the presence of nitrate is an effective indicator of the presence of perchlorates (i.e., if nitrates were detected in field testing, there was a very high probability that perchlorate levels would also be detected).[72] It should be noted that perchlorate is much more resistant to microbial reduction than is nitrate[73,74], and that consequently there could be a significant number of samples found that could contain perchlorate and little or no nitrate.

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[68] *The Origin of Naturally Occuring Perchlorate: The Role of Atmospheric Processes, Dasgupta, P., et al, Environmental Science and Technology, In Press*

[69] *Samples have also been taken from New Mexico.*

[70] *Perchlorate in Natural Materials and Minerals, Quarterly Report, Orris, G, April 2004.*

[71] *Detection of Perchlorate in Arid Regions of the Southwestern U.S., American Chemical Society Orris, G., USGS, and Harvey, G, USAF, March 2004.*

[72] *Ibid*

[73] *Ubiquity and Diversity of Disimilatory Perchlorate Reducing Bacteria, Coates J.,, et al, Applied and Environmental Microbiology, Vol 65 No. 12, December 1999*

[74] *Environmental Factors That Control Microbial Perchlorate Reduction, Coates, J., et al, Applied and Environmental Microbiology, Vol 68 No. 9, September 2002*

4.0 Recommendations Regarding Establishment of a National Perchlorate Standard

The Department's efforts to address perchlorate reflect its long-standing commitment to the protection of public health. DoD remains committed to the protection of human health and the environment and supports the development of a scientifically supportable standard. The Department has taken significant steps to address the issues related to perchlorate, including investing in the fundamental science to be used in formulating a standard, funding and testing new treatment technologies, searching for possible substitutes for perchlorate, and implementing a perchlorate sampling policy in September 2003.[75]

The Department's goal has always been, and continues to be, strong support of a national process leading to promulgation of a regulatory standard for perchlorate based on sound science. Through the IWG process, DoD, EPA, NASA, and DOE funded and co-sponsored a National Academies of Science (NAS) National Research Council committee review of perchlorate science. Appendix A contains the tasking of the National Research Council to assess the health implications of perchlorate ingestion, as agreed upon by DoD, EPA, DOE and NASA as project co-sponsors.

The NAS report was released in January 2005, and recommended an RfD of 0.0007 mg/kg/day, a value that was adopted by EPA and posted on the agency's Integrated Risk Information System (IRIS) on February 18, 2005. The RfD represents a scientific estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to a human population, including sensitive subgroups, which is likely to be without appreciable risk of adverse health effects. The NAS noted that the proposed RfD was inherently protective of even sensitive populations.

Currently there is no Federal drinking water standard for perchlorate. EPA will now begin evaluating the appropriateness of establishing a drinking water standard for perchlorate. If EPA decides to develop a drinking water regulation, it will consider the RfD along with other factors described in the SDWA section 1423(b) (e.g., exposure, analytical methods, efficacy, and cost-effectiveness of treatment technology). The promulgation of a drinking water standard for perchlorate based on the RfD will be an open and transparent process, subject to scientific peer review and public and agency comment. As would typically occur, EPA will consult with DoD and other Federal agency stakeholders in an open manner in the promulgation of a Maximum Contaminant Level Goal and MCL so the impact to

[75] *Interim Policy on Perchlorate Sampling, Philip W. Grone, Principal Assistant Deputy Under Secretary of Defense (Installations and Environment), 29 September 2003.*

each agency's operations from the standard is fully considered. DoD and other IWG members will provide information during this process so that EPA understands the national security and other government agency and policy implications for the standards being contemplated.

The RfD for perchlorate may also be used to evaluate the site-specific human health risks that are considered when negotiating cleanup criteria under CERCLA. In the absence of a properly promulgated and applicable Federal or state regulatory standard, the Department will continue to address perchlorate contamination found to present an unacceptable risk to public health, safety, or the environment by DoD risk managers, and will work in consultation with Federal, State, and local authorities using available sampling data and related information. The RfD for perchlorate will be used to evaluate the site-specific human health risks that are considered when developing cleanup criteria under CERCLA. Responses will occur on a case-by-case basis, reflecting the individual circumstances of sites where perchlorate contamination is found.

Upon establishment of an applicable regulatory standard for perchlorate, the Department commits to integrating perchlorate remediation into established remediation programs. Perchlorate data gathered under the sampling policy and other site-specific information currently forms the foundation for DoD's remediation efforts. Remediation plans to address actionable levels of perchlorate contamination will be developed and integrated into the existing prioritization process for cleanup.

5.0 Appropriate Steps to Address Government Sources of Perchlorate

The Department of Defense and the Military Services continue to work cooperatively with EPA and state regulators to address perchlorate-related issues deemed to be the government's responsibility as they arise. Perchlorate data gathered under the DERP, the Department's interim perchlorate sampling plan, and other site-specific information will form the foundation for the Department's future perchlorate initiatives.

In the absence of a properly promulgated and applicable state or Federal regulatory standard, the Department will continue to address perchlorate contamination found by DoD risk managers to present an unacceptable risk to public health, safety, or the environment, and will work in consultation with Federal, state, Tribal, and local authorities using available sampling data and related information. Such responses will occur on a case-by-case basis, reflecting the individual circumstances of sites where perchlorate contamination is found.

5.1 Department of Defense Perchlorate Action Plan

The Department's current action plan reflects DoD's commitment to the protection of public health and the environment. This plan reflects a multi-faceted approach to perchlorate that uses both existing and emerging environmental program mechanisms, and includes:

- Sampling for perchlorate presence [76]
- Establishing priorities for sampling and monitoring that reflect the most sensitive exposure pathways [77,78]
- Monitoring and determining appropriate actions to prevent migration of perchlorate into drinking water supplies [79]
- Incorporating Federal or state regulatory standards, whichever are more stringent, into the Department's cleanup program once standards are established for perchlorate [80]
- Preventing pollution and investing in finding substitutes for the various military uses of perchlorate that will have less public health and environmental concerns. [81]

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[76] *Interim Policy on Perchlorate Sampling, Philip W. Grone, Principal Assistant Deputy Under Secretary of Defense (Installations and Environment), September 29, 2003.*
[77] *Ibid.*
[78] *Prioritization Protocol for Perchlorate Impacts to Drinking Water from DoD Facilities in California, Alex Beehler, Assistant Deputy Under Secretary of Defense (Environment, Safety, and Occupational Health), September 23, 2004.*
[79] *DoD Instruction 4715.6, Environmental Compliance, April 24, 1996.*
[80] *DoD Instruction 4715.7, Environmental Restoration Program.*

The Department's response to perchlorate contamination will depend in part on the location, nature, and timing of the release, which determines the appropriate program through which action will be taken.

- Legacy Sites – Sites where a perchlorate release has occurred due to past activities and previously accepted environmental management practices. Remediation will be initiated consistent with established regulatory standards for perchlorate and DoD's interim sampling policy. Programs addressing these sites include BRAC, DERP, and FUDS.
- Ongoing Activities – Sites where a perchlorate release may occur as a result of current operations. Steps to be taken include identifying, monitoring, and managing potential pathways through which perchlorate may be introduced into the environment. As necessary, sites will be remediated consistent with established regulatory standards and DoD policy. Maintenance operations will fund activities to address perchlorate contamination.
- Future Releases – The Department is taking proactive steps to minimize the likelihood of future perchlorate releases from military activities and operations through implementation of waste stream reduction techniques, finding substitutes for perchlorate in munitions items, and investigating how recovered and recycled perchlorate compounds might be used in weapon systems.

Upon the establishment of a regulatory standard for perchlorate, drinking water supplies with perchlorate detections attributable to DoD activities that are deemed to present an unacceptable risk to public health, safety, or the environment will be remediated by applying the Federal or state regulatory standard, whichever is more stringent. Once a standard is established, the Department commits to integrating perchlorate remediation using the standard into its existing remediation programs, (e.g., BRAC and DERP), munitions and range planning, and FUDS activities.

5.1.1 The Defense Environmental Restoration Program

As a responsible steward of public lands, the Department, through the DERP, restores property that has been environmentally impacted by past defense activities. To most effectively address the different types of contaminants likely to impact military installations and former properties, the Department organized the DERP into three program categories—the IRP, the Military Munitions Response Program (MMRP), and Building Demolition and Debris Removal (BD/DR).

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[81] *Executive Order 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition, September 14, 1998.*

Under these program categories, the Department addresses contamination at active installations, BRAC installations, and FUDS properties.

The FUDS element of the DERP seeks to reduce risk to human health and the environment resulting from past Department activities at properties that were formerly owned, leased, possessed by, or otherwise under the jurisdiction of the Department or its Components.[82]

IRP

The IRP category of the DERP addresses releases of hazardous substances, pollutants, or contaminants that pose toxicological risks. Used at installations for 18 years, this program category operates using well-established procedures to fulfill environmental restoration requirements. Since the inception of the IRP within the DERP, DoD has addressed environmental concerns associated with explosive contaminants at munitions manufacturing, processing, and demilitarization sites, as well as responses for military munitions incidental to IRP work.

MMRP

The MMRP category of the DERP addresses the remediation of unexploded ordnance (UXO), discarded military munitions, and munitions constituents (such as perchlorate) located on sites that are or were owned by, leased to, or otherwise possessed or used by DoD. Such sites do not include operational ranges, operating storage or manufacturing facilities, or facilities that are used for or were permitted for the treatment or disposal of military munitions. Sites within the MMRP category include those areas where the firing or disposal of munitions has occurred during training exercises and are not addressed under the IRP.

The creation of the MMRP category under the DERP builds on DoD's accomplishments under the IRP, and its objectives are similar to those for IRP sites. These objectives include:

- Identifying where, what kind, and to what extent UXO, discarded military munitions, and munitions constituents are present
- Determining explosive safety and toxicological hazards to human health and the environment
- Setting priorities for conducting munitions response actions

[82] *In addition to the previous discussion of California FUDS properties on page 51, the USACE-executed FUDS program has a separate project to determine the potential for perchlorate contamination at other properties in the program, including properties in Nevada, Arizona, and elsewhere in the nation. USACE project personnel will use the information gathered to identify and evaluate FUDS where the potential for perchlorate releases exist and where DoD and Army sampling policy criteria are met. The information can then be used to design appropriate sampling strategies to either eliminate or confirm the presence of perchlorate contamination.*

- Planning, programming, and budgeting to effectively resource MMRP requirements
- Developing and implementing effective response technologies and
- Conducting necessary munitions response actions.

BD/DR
The BD/DR category provides for the demolition and removal of unsafe buildings or structures. DoD conducts a small number of activities in this program category, primarily at FUDS properties.

5.1.2 Department of Defense Interim Policy on Perchlorate Sampling

As discussed on page 16, the Department adopted a perchlorate sampling policy in September 2003 that includes sampling on installations and BRAC and non-BRAC properties. The policy requires the Military Services to sample for the presence of perchlorate where there is a reasonable basis to suspect that a perchlorate release has occurred as a result of DoD activities and where a complete human exposure pathway is likely to exist. The Department will continue to execute its sampling policy and will make additional information available as it is developed.

In determining whether or not sampling for perchlorate is warranted, facilities follow a process of reviewing data and identifying conditions that may lead to a direct human exposure pathway.

Self-Evaluation and Data Review
The first step in executing the Department's perchlorate sampling policy is to determine whether a reasonable basis exists to suspect a potential release of perchlorate associated with activities that have been or are currently conducted on the site. This is accomplished by reviewing available historical information such as training, maintenance, and storage records and databases to determine if munitions containing perchlorate have been manufactured, used, stored, or disposed of on the site. Current and historical vegetation, landforms, soil, and groundwater information can be used to determine historical activities and to assess whether other munitions-related contamination is likely to be present at the site and the location and extent of such contamination. Likely locations for the potential release of perchlorate, such as munitions demilitarization and disposal sites, munitions maintenance areas, manufacturing or processing sites, and landfills, can then be determined.

Identification of Geographic and Environmental Conditions That May Lead to Human Exposure
The next step in executing the sampling policy is to determine if the public, including DoD personnel and their dependants, may encounter perchlorate in the

environment through direct exposure to contaminated drinking water. Site personnel work with regulators and the public to determine whether any drinking water systems, public or private supply wells, or other water supplies on or near the site are known to have perchlorate contamination, and to identify potential exposure scenarios and pathways.

Assessing Unacceptable Risks

At sites where there are no regulatory standards for chemicals, such as is the case for perchlorate, the Department conducts site-specific risk assessments based on EPA-published toxicity factors to establish acceptable exposure levels for a site once a standard is established. In the absence of otherwise properly promulgated and applicable state or Federal standards, the Department will continue to address perchlorate contamination found to present an unacceptable risk to public health, safety, or the environment by DoD risk managers using available sampling data in combination with site-specific risk assessments and related information. The RfD for perchlorate will be used to evaluate the site-specific human health risks that are considered when developing cleanup criteria under CERCLA. Responses will occur on a case-by-case basis, in consultation with Federal, state, and local regulatory agencies, and will reflect the individual circumstances of sites where perchlorate contamination is found.

5.1.3 California Perchlorate Prioritization Protocol

Over the last several months, DoD's Regional Environmental Coordinator for EPA Region 9 has led an effort to develop a prioritization protocol to assess perchlorate impacts to drinking water from DoD sites and FUDS properties in California.[83] The protocol was developed in collaboration with California state regulators, including the California Environmental Protection Agency, the DTSC, the State Water Resources Control Board, the Regional Water Quality Boards, and the Military Services.

The protocol outlines and provides a framework for planning, prioritization, investigation, sampling, and reporting of perchlorate activities to be undertaken by the Department and the Military Services, in coordination with state agencies, at DoD facilities and FUDS properties in California. DoD facilities in California are being prioritized for future perchlorate investigations based on the proximity of drinking water supply wells and sources with perchlorate detections at a concentration greater than or equal to 6 ppb to nearby (within one and five miles) of DoD sites or FUDS properties. The close proximity (within one mile) of an

[83] *Prioritization Protocol for Perchlorate Impacts to Drinking Water from DoD Facilities in California, Alex Beehler, Assistant Deputy Under Secretary of Defense (Environment, Safety, and Occupational Health), 23 September 2004.*

affected drinking water source to a known perchlorate release at a Department site or FUDS would warrant the highest priority for sampling.

Under the protocol, DoD facilities and FUDS properties will share available perchlorate sampling data, including any data obtained pursuant to the protocol, with state regulatory agencies. DoD and state regulatory agencies will jointly assess the threat of perchlorate contamination on California drinking water supplies from Department activities and prioritize future sampling activities.

5.1.4 Operational Range Assessments

The Department has directed the Military Services to assess the potential for munitions constituents, including perchlorate, to migrate off operational ranges and to identify impacts to human health and safety.[84] A specific objective of the assessments is to generate the consistent, comparable, and convincing evidence needed to determine whether a release of munitions constituents associated with training or testing poses an unacceptable risk to public health, safety, or the environment.

A common framework is being developed and will be used by each of the Military Services to develop an Operational Range Assessment Plan (Plan). Each Plan will detail Service- and range-specific assessment objectives and procedures. The assessment procedures in each Service's Plan will rely on both qualitative and quantitative scientific studies to determine if a release of munitions constituents from the range to off-range areas has occurred or is likely to occur. These studies will examine each operational range for:

- Potential sources of munitions constituents (including perchlorate) that could migrate off-range (e.g., the types of munitions used on the range, location of artillery impact areas, or target sites that have been used for a long time);
- Likely pathways by which munitions constituents could migrate off range (e.g., via streams or rivers or in groundwater); and
- Potential human and environmental receptors that could be affected if munitions constituents migrate off range (e.g., nearby residents, threatened or endangered species, or wetlands).

If an assessment finds a release or a substantial threat of a release of munitions constituents to off-range areas, the assessment and the documentation of that assessment will provide information vital to initiating a response under DoD's explosive safety authorities, the DERP, and CERCLA.

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[84] *Environmental and Explosives Safety Management on Operational Ranges Within the United States, Department of Defense Directive 4715.11, May 10, 2004.*

5.2 Overview of Regional Perchlorate Actions

Whether EPA, DoD, or another party is called upon to respond to an environmental release of a contaminant, existing Federal and state environmental laws, regulations, and risk values are usually sufficient to define the necessary steps required to protect human health and the environment. In the absence of toxicity data to evaluate risks, DoD, on a site-by-site basis and in consultation with Federal, state, and local authorities, determines whether a release poses an unacceptable risk to public health, safety, or the environment and if actions are necessary to mitigate the threat.

5.2.1 California

The Department of Defense has consistently communicated its commitment to work with the State of California to address perchlorate issues. A working group formed with California regulatory officials has cooperatively developed a protocol for prioritizing perchlorate sampling activities in that state. See earlier discussions of the protocol at Section 5.1.3 for additional details.

California regulators have extensively sampled drinking water systems for perchlorate. Drinking water data from California study area counties are presented in Table 6 and summarized below. California data are reported by the state as single highest historical detection, and may not be indicative of average or current perchlorate concentrations. As previously noted in Section 3.2.2 on page 48, DoD has serious concerns regarding the validity of the data.

Based on California data, as of October 2004:

- A total of 229 groundwater sources associated with 57 drinking water systems report detections above the state's 6 ppb PHG.
- A total of 318 groundwater sources associated with 74 drinking water systems in the California study area report detections of perchlorate, with peak concentrations ranging from 4.7 to 820 ppb.
- Approximately 88 percent of sources reporting detections are located in Los Angeles, Riverside, and San Bernardino counties.

5.2.2 Arizona

In May 2004, the Arizona Department of Environmental Quality (ADEQ) formed a task force of state agencies to investigate the extent of perchlorate occurrence in Arizona. The task force developed a detailed perchlorate sampling and analysis plan and initiated sampling during the summer of 2004. The sampling effort

involved the collection of both groundwater and surface water samples from approximately 100 locations throughout Arizona, including surface waters, canals, wells, underground storage facilities, animal feeding operations, and background locations. All samples were analyzed using modified EPA Method 314.

The results of the task force investigation were released in December 2004.[85] Sampling results indicate that while perchlorate is present in certain areas of the state, the concentrations in water bodies not associated with industrial sites are generally well below the Arizona HBGL of 14 ppb, and generally reflect perchlorate concentrations ranging from non-detection to 7.4 ppb. A HBGL is an advisory level that reflects a maximum concentration of perchlorate in drinking water that can be consumed without resulting in adverse health effects. The task force collected 41 surface water samples, 35 groundwater samples, and 16 groundwater recharge facility samples throughout the state. Surface water sampling results show perchlorate concentrations ranging from less than 2 ppb to 6 ppb. Groundwater sampling results show perchlorate concentrations ranging from less than 2 ppb to a high of 15 ppb in a single sample taken in a DoD groundwater monitoring well in Yuma. Groundwater recharge facility sampling results show perchlorate concentrations ranging from less than 2 ppb to 4.8 ppb. These results show an overall steady decline from perchlorate levels measured in 1999, which ranged from non-detection to 11 ppb. State officials have previously indicated their intent to revisit Arizona's HBGL, as necessary, upon finalization of the National Academies' perchlorate review and upon issuance of a final EPA RfD for perchlorate.

5.2.3 Nevada

Federal, state, and local agencies and industries are continuing their longstanding cooperative efforts to identify and clean up sources of perchlorate around the state. Since 1997, NDEP, EPA Region 9, SNWA, the Metropolitan Water District of Southern California, and KM have been working to reduce the mass loading of perchlorate from the Las Vegas Wash into Lake Mead as quickly as possible and measure the effectiveness of control technologies in the Las Vegas Wash area on downriver locations such as the intake to the Colorado River Aqueduct. The actions so far have successfully reduced the mass loading into Lake Mead and have reduced the concentration of perchlorate downstream in the Colorado River. The SNWA reports that during 2003, Lake Mead, which is the source of about 90 percent of Southern Nevada's drinking water, contained an average perchlorate concentration of 10 ppb[86], and that during 2004, perchlorate concentrations in the finished drinking water supply averaged 5.6 ppb. Downstream monitoring data

[85] *Arizona Department of Environmental Quality, Perchlorate in Arizona, Occurrence Study of 2004, December 2004 http://www.azdeq.gov/function/about/download/perch1201.pdf*
[86] *Southern Nevada Water Authority, Perchlorate Fact Sheet, http://www.snwa.com/html/wq_water_facts_perchlorate.html.*

and modeling predict a Colorado River perchlorate concentration of approximately 2 ppb may be achievable by the end of 2005.

5.3 Department of Defense Perchlorate Investment

The Department of Defense has played a leadership role in investing in perchlorate science and technology. Over the last decade, DoD has invested a total of approximately $59 million on perchlorate research. A majority of this expenditure has occurred since 1997 when analytical detection capabilities allowed for the low parts per billion level detection of perchlorate. The DoD investment of approximately $8.5 million on human health and ecotoxicity studies has contributed significantly to the development of the scientific understanding of perchlorate needed by EPA and state regulators before perchlorate can be regulated under environmental statutes. The Department's approximate $40 million treatment technology investment has improved the fundamental understanding of the chemical, physical, and biological processes related to perchlorate reduction across a wide range of hydrogeochemical conditions. In addition, the Department has invested approximately $8 million in initiatives designed to make military munitions items safer to handle and more environmentally benign.

In continuance of DoD's leadership role in perchlorate science and technology, DoD is funding a perchlorate isotopes forensics project being conducted by the USGS, DOE's Oak Ridge National Laboratory (ORNL), and other investigators. Using advanced analytical techniques that are capable of differentiating between oxygen isotopes in man-made and natural perchlorate, it may be possible to assess perchlorate detections and assign clean-up responsibilities.

To maximize the usefulness of the Department's perchlorate investment, DoD will adopt an integrated investment strategy that will simultaneously consider analytical detection, health effects, treatment technologies, and ecological effects. Such an integrated approach will ensure that as the risks associated with perchlorate exposure at environmentally-relevant concentrations are accurately characterized and as regulatory actions on perchlorate are initiated, appropriate risk management strategies and promising technologies will be available to both public and private sector entities.

5.3.1 Human Health and Ecotoxicity

DoD has invested approximately $8 million in human health and ecotoxicity studies to further the scientific understanding of the potential human health and environmental effects associated with low-level exposure to perchlorate. Most of these initiatives were conducted in full cooperation with EPA under the auspices

of the Interagency Perchlorate Steering Committee (IPSC), predecessor to the IWG.[87] Research areas include:

- Developmental and neurobehavioral studies
- The development of state-of-the-art physiologically based pharmacokinetic (PBPK) models
- The effect of perchlorate on iodine-deficient laboratory animal populations
- Whether borderline iodine deficient diets increase the susceptibility to perchlorate-induced hypothyroidism
- Perchlorate toxicity in metabolically-induced animals
- Biotransport of perchlorate in soils
- Lettuce uptake studies and
- The effects of perchlorate on avian species, reptiles, amphibians and fish.

5.3.2 Remediation Technology

Early DoD investment in perchlorate science and technology can be linked to the increased demand for, and decreased availability of, OB/OD facilities with the capacity to treat large rocket motors. The demand for such OB/OD facilities resulted from international arms control treaties and agreements that targeted the destruction of strategic missile systems. At the same time that strategic missile systems were being removed for demilitarization in compliance with international agreements, however, domestic environmental regulations that sought to limit OB/OD due to air quality concerns and the closure of military bases under BRAC restricted the use and availability of OB/OD facilities.

To comply with both international arms agreements and domestic regulations, the Air Force began investigating the use of bioremediation technologies to treat perchlorate-containing propellant production waste streams in 1990. The technologies that were identified and developed as a result of this initial investment have served as the basis for subsequent investigations into the biotreatment of perchlorate-contaminated water supplies.

SERDP is DoD's corporate environmental technology research and development program.[88] SERDP, in full partnership with EPA and other organizations, identifies, develops, and transitions environmental technologies that relate directly to accomplishment of defense missions.

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[87] *Department of Defense Report to Congress: Department of Defense Activities in the Interagency Perchlorate Steering Committee, August 25 2004, https://www.denix.osd.mil/denix/Public/Library/Water/Perchlorate/Correspondence/IPSCReporttoCongress-25Aug04.pdf*

[88] *Information on SERDP research projects and funding opportunities can be obtained at http://www.serdp.org/.*

The SERDP Program Office has funded research and development efforts focusing on the in-situ bioremediation of perchlorate in groundwater. The projects encompass laboratory-, bench-, and pilot field-scale research to develop biological approaches for the cost-effective in-situ treatment of perchlorate contaminated groundwater. The research will provide critical information needed to predict the practicability of proposed treatment technologies under field conditions.

In addition to the SERDP studies, the Environmental Security Technology Certification Program (ESTCP) has also funded several perchlorate remediation technology studies. ESTCP is DoD's demonstration and validation program for environmental technologies. ESTCP seeks to move promising and innovative environmental technologies that address DoD's most urgent environmental needs beyond the basic research and development phase by demonstrating and validating these technologies through their implementation and commercialization.

DoD's investment in developing and demonstrating treatment technology continues at several locations across the country.[89] These sites represent a wide range of environmental and geological conditions, allowing a detailed understanding of the effects of site-specific conditions on treatment technology efficacy and allowing implementation costs to be developed.

Edwards AFB Ion-Exchange System

Working closely with the local RAB, Edwards AFB approved a Treatability Study for perchlorate-contaminated groundwater in 2001. After receiving permission from the Deputy Assistant Secretary of the Air Force (Environment, Safety, and Occupational Health), Edwards AFB implemented a remediation technology demonstration and pilot study to evaluate the effectiveness of ion-exchange technology in removing perchlorate from contaminated Site 285 groundwater.

An ion-exchange system works like a magnet by capturing a perchlorate ion onto a positively charged resin and releasing a harmless chloride ion in its place. The exchange resin can be classified as selective or non-selective depending on the composition and net chemical and physical attraction of the resin for targeted ions. The system in place at Edwards AFB uses an innovative bi-functional, selective, regenerative resin developed by Oak Ridge National Laboratory (Figure 3.) This is the first known full-scale implementation and evaluation of this resin technology nationwide. The bi-functional resins are particularly effective at removing trace quantities of perchlorate to levels below the 4 ppb MRL.

[89] *Other sites where the Department is investing in the development and demonstration of innovative treatment technologies include the Naval Weapons Industrial Reserve Plant McGregor, Texas; Massachusetts Military Reservation, Falmouth, Massachusetts; Longhorn Army Ammunition Plant, Karnack, Texas; Naval Industrial Reserve Ordnance Plant Magna, Utah; and Redstone Army Ammunition and Naval Surface Warfare Center Indian Head, Maryland.*

Importantly, no pretreatment is needed to remove either dissolved organic matter or other competing anions that are often present in groundwater at levels three to five times higher than perchlorate.

Since its initial operation in May 2003, over 11.2 million gallons of groundwater have been treated, with a little more than 41 pounds of perchlorate removed.

Figure 3 – Ion-Exchange Technology at Edwards AFB

5.3.3 Pollution Prevention

DoD has invested approximately $8 million in pollution prevention, waste stream reduction, and related "green" energetic material initiatives designed to make munitions items safer to handle and more environmentally benign. These initiatives include research into:

- Development of more environmentally benign energetic materials and manufacturing and disposal methods that provide for safer, more cost-effective insensitive munitions, and which meet increasingly stringent environmental regulations
- Formulation and testing of improved pyrotechnic compositions containing high-energy metallic fuels and alloys, and non-chlorine containing oxidizers

- Synthesis, evaluation, and formulation of new oxidizers as alternatives to AP for use in missile propulsion applications
- Development of robust, perchlorate-free propellants with a reduced life cycle pollution burden and
- Recovery, recycling, and reuse of energetic material constituents, including perchlorate, from weapon systems.

In summary, the Department's integrated approach to perchlorate investments has successfully identified and is presently addressing issues that for most environmental contaminants are typically not considered until after regulatory standards have been developed and issued. DoD's upfront investment in perchlorate science and technology has eliminated this lag time, will ensure that appropriate risk management strategies will be based on sound science and are readily available once regulatory standards for perchlorate are issued. In addition, the Department's pollution prevention investments will serve to minimize the potential for future perchlorate releases and reduce the need for future remediation of perchlorate-contaminated water supplies.

APPENDIX A – Charge to the National Academies' National Research Council Committee to Assess the Health Implications of Perchlorate Ingestion

Perchlorate has been the focus of several recent government and scientific studies, including an EPA draft risk assessment. These studies have raised concerns among a number of Federal agencies regarding how to best characterize the potential risk posed by chemicals that disrupt the function of the thyroid gland. There has been agreement among the Agencies to forward a set of scientific questions associated with our ability to understand the health implications of perchlorate exposure to the National Academies' National Research Council for immediate and accelerated review.

A crosscutting issue is verification that the key studies underlying the health assessment are of the quality, reliability and relevance that are required to draw conclusions about the health implications of exposure to low levels of perchlorate in drinking water among sensitive subpopulations.

For each of the questions posed below, a response may be best represented by either a point estimate or a range. Where specific numbers are lacking in the scientific literature, please use best scientific judgment to determine what range is scientifically defensible.

1. What is the current state-of-the-science or understanding regarding the potential adverse effects due to disruption of thyroid function in humans and other animals at various stages of life?
    - Multiple researchers have proposed a model that frames potential adverse neurodevelopmental and neoplastic effects of perchlorate to be a consequence of the perturbation of thyroid hormone regulation after disruption of iodide uptake by the gland. Does the state-of-the-science support this basic model?
        - ✓ What is your level of confidence in such a model?

    - Using best scientific judgment, at what level does the chronic inhibition of iodide lead to adverse, not just adaptive, health effects in humans, especially sensitive subpopulations? Please indicate your level of confidence in each of these determinations.
        - ✓ Consider how the iodine-rich diet in the United States might influence the degree to which adverse effects might be expected in sensitive subpopulations.

2. Using best scientific judgment, what is the level where changes in thyroid hormones can lead to adverse, not just adaptive, health effects in humans,

especially sensitive subpopulations? Please indicate your level of confidence in these determinations.

3. Evaluate the key animal studies available for understanding and assessing the implications of perchlorate ingestion. Endpoints of concern should include brain morphometry, behavioral changes, thyroid hormone changes, and thyroid histopathology.
   - What is your level of confidence in extrapolating what the adverse changes documented in animals that have ingested perchlorate may mean for adverse effects in humans, especially sensitive subpopulations?
   - Specifically address the validity of models that extrapolate from studies of brain morphometry in rats to adverse effects in human population, especially sensitive subpopulations.

4. Based on your evaluation of the available animal and human studies, suggest "uncertainty factors" that would provide an approximation of a safe lifetime exposure for humans, especially sensitive subpopulations.

5. Would adverse effect other than those associated with iodide uptake inhibition be expected as a result of ingesting low levels of perchlorate on a daily basis?

6. Based on the responses to the above questions:
   - Are the EPA findings consistent with the panel's findings?
   - Did EPA properly evaluate and consistently critique all the relevant literature that supports, or fails to support, the conclusions in its risk assessment? Did EPA choose the best available scientific studies for use in supporting a health risk assessment?
   - If your review finds that any other key studies are appropriate but not properly considered by EPA, please provide advice regarding how EPA should use this information and modify their assessment.
   - Is there an alternative percent iodide uptake inhibition that would serve to protect individuals at various life stages and thyroid status? EPA used the lower limit on a 5 percent response for iodide uptake inhibition as a surrogate for a No-Observed-Adverse-Effect-Level to be protective of various life stages and thyroid status.
   - Is the EPA's use of the uncertainty factors consistent with your findings when applied to the animal data and in human clinical or epidemiological studies?

APPENDIX B – Perchlorate Sampling Data

Legend:	**DW Conc = Drinking Water Concentration**	**SW Conc = Surface Water Concentration**	**ppb = parts per billion**	**Note: Because much of the study area obtains its drinking water from groundwater sources and the Colorado River, perchlorate detections reported in drinking water are included in the data.**
	GW Conc = Groundwater Concentration	**Soil Cont = Soil Contamination**	**ND = Non-detect**	

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
DoD Facilities								
AZ	Pima	Tucson	David-Monthan AFB	ND	ND			Drinking Water Point of Entry #3, Pumphouse for reservoir 108, (wells 4, 11, &15) – detection limit 4 ppb
AZ	Pima	Tucson	David-Monthan AFB	ND	ND			Drinking Water Point of Entry #4, Pumphouse from reservoir 109, (wells 4, 11, &15) – detection limit 4 ppb
AZ	Pima	Tucson	David-Monthan AFB	ND	ND			Drinking Water Point of Entry #5, Pumphouse from 10 – detection limit 4 ppb
AZ	Pima	Tucson	David-Monthan AFB	ND	ND			Drinking Water Point of Entry #6, Pumphouse from 8 – detection limit 4 ppb
AZ	Pima	Tucson	David-Monthan AFB	ND	ND			Drinking Water Point of Entry #8, Base tower reservoir, (wells 2, 16, & 17) – detection limit 4 ppb
AZ	Pima	Tucson	David-Monthan AFB				510	Point #1 EOD Range surface after detonation
AZ	Pima	Tucson	David-Monthan AFB				28,000	Point #3 EOD Range surface after detonation
AZ	Pima	Tucson	David-Monthan AFB				ND	Point #7 EOD Range surface after detonation – Detection limit 40 ppb
AZ	Pima	Tucson	David-Monthan AFB				140	Pad 4-1 EOD Range, 1 ft bgs around burn pad
AZ	Pima	Tucson	David-Monthan AFB				ND	ODS 3-1 EOD Range, 1 ft bgs open detonation area – Detection limit 44 ppb
AZ	Pima	Tucson	David-Monthan AFB				840	ODS 6-1 EOD Range, 1 ft bgs open detonation area
AZ	Pima	Tucson	David-Monthan AFB				1,000	ODS 8-1 EOD Range, 1 ft bgs open detonation area
AZ	Pima	Tucson	David-Monthan AFB				ND	ODS 14-1 EOD Range, 1 ft bgs open detonation area – Detection limit 42 ppb
AZ	Pima	Tucson	David-Monthan AFB				90	Berm 9 EOD Range, graded soil from open detonation area in pile at edge of berm
AZ	Pima	Tucson	David-Monthan AFB				ND	Berm 2B EOD Range, graded soil from open detonation area in pile at edge of berm – Detection limit 43 ppb

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
AZ	Pima	Tucson	David-Monthan AFB				ND	Swale N EOD Range, 1 ft bgs where water draining from range ponds – Detection limit 45 ppb
AZ	Pima	Tucson	David-Monthan AFB				ND	Swale S EOD Range, 1 ft bgs where water draining from range ponds – Detection limit 43 ppb
AZ	Pima	Tucson	David-Monthan AFB				ND	Pit 1 – 1P Detection limit 43 ppb
AZ	Pima	Tucson	David-Monthan AFB				60	Pit 6-2P
AZ	Pima	Tucson	David-Monthan AFB				ND	Pit 9-2P Detection limit 48 ppb
AZ	Pima	Tucson	David-Monthan AFB				380	East
AZ	Pima	Tucson	David-Monthan AFB				620	South 2
AZ	Pima	Tucson	David-Monthan AFB				330	West
AZ	Pima	Tucson	Plant 44		ND			Plant conducts aircraft maintenance., production
AZ	Yuma	Yuma	Yuma Proving Ground			5		Initial Detection date 04/21/99. Sample from Colorado River
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-102 AERO
AZ	Yuma	Yuma	Yuma Proving Ground	10				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-361 LAAF
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-361 LAAF

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
AZ	Yuma	Yuma	Yuma Proving Ground	10				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-353 MTA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	31.9				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	24.1				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
AZ	Yuma	Yuma	Yuma Proving Ground	8.1				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	8.1				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-364 CDH
AZ	Yuma	Yuma	Yuma Proving Ground	10				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	10				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-367 KFR
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-403 MAA

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	5				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	16.2				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-403 MAA
AZ	Yuma	Yuma	Yuma Proving Ground	4				14-403 MAA
AZ	Yuma	Yuma	MCAS Yuma		4	5		These detections are associated with perchlorate from the Colorado River, which supplies drinking water to the base and recharges groundwater.
AZ	Yuma	Yuma	MCAS-Beckett House, Up-Gradient		3.3-3.5			Groundwater recharge from Colorado River which has a background level of 4-5 ppb.
AZ	Yuma	Yuma	MCAS -MCAS Main Water System Source Water			4.6		Drinking water obtained from Colorado River which has a background level of 4-5 ppb.
AZ	Yuma	Yuma	MCAS -Beckett House, Up-Gradient		3.3-3.5			Groundwater recharge from Colorado River which has a background level of 4-5 ppb.
AZ	Yuma	Yuma	MCAS - BMGR, Pistol Range		ND			Operational Testing
AZ	Yuma	Yuma	MCAS - BMGR, Tracker Building		ND			Operational Testing.
AZ	Yuma	Yuma	MCAS - BMGR Auxiliary II				ND-34.6	Single sample with detectable perchlorate was collected near the range residual stockpile
AZ	Yuma	Yuma	MCAS -Yodaville, BMGR				ND-93.9	One of 10 samples collected from Yodaville (Urban Warfare Training Complex) reported detectable perchlorate. This sample (93.9 ug/kg) was collected from a missile impact crater.
AZ	Yuma	Yuma	MCAS –Yuma BMGR – Munitions Training Range shothole				150	Sample collected from Munitions Training Range (MTR) shothole
CA	Orange	El Toro	Former MCAS El Toro Basewide Groundwater including -IRP Site 1		ND- 380			From EPA database: Initial detection 10/98. Not known to immediately threaten public water supply. IRP Sites 1 and 2 incorporated into Superfund Federal Facility Remedial Investigation and Feasibility Study.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	Orange	El Toro	Former MCAS El Toro-Base-wide Groundwater (excludes IRP Site 1)		ND-16		ND	DoD source of perchlorate not identified. Base-wide groundwater consistent with off-station groundwater concentrations
CA	Orange	El Toro	Former MCAS El Toro-Anomaly Area 3		ND			Perchlorate not detected.
CA	Orange	El Toro	Former MCAS El Toro -IRP Site 2		ND-20.7			Site is a Landfill, down gradient from known perchlorate source at IRP 1.
CA	Orange	El Toro	El Toro MCAS-IRP Site 1		ND-398.0		ND-320	EOD Training
CA	Orange	El Toro	El Toro-SITE 24, VOC PLUME, PRE-DESIGN PILOT Central Treatment System		5.4 - 9.0 Avg. 6.5			Navy/Marine Corps - 1/15/2003 to 1/14/2004. Avg sample results over same time period 6.5
CA	Imperial	Niland	Camp-Billy Machen Source Water, Chocolate Mountains Range	4.2				Colorado River used as source for drinking water. .Ambient perchlorate at intake is 4-5 ppb. .
CA	Imperial		MCAS Yuma-Cannon Air Defense Complex Water System Source Water	ND				NO perchlorate found.
CA	Imperial		MCAS Yuma-Camp Burt 2, Eastern Chocolate Mountains				ND	Part of Chocolate Mountain Aerial Gunnery Range.
CA	Imperial	Niland	MCAS Yuma -Camp Billy Machen, Western Chocolate Mountains				ND	Training
CA	Imperial	Yuma	MCAS -Camp Burt 1, Eastern Chocolate Mountains				ND	Training
CA	Imperial	Yuma	MCAS -Camp David Western Chocolate Mountains				ND	Training
CA	Imperial	Yuma	MCAS -Iris Wash, Western Chocolate Mountains				ND	Training

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	Orange	Tustin	Former MCAS Tustin-MTBE Groundwater Treatment System (UST Site 222) – NPDES		ND			The MTBE groundwater treatment system consists of an advanced oxidation and GAC bioremediation system. Currently, shallow groundwater is extracted from 6 wells within the center of a MTBE groundwater plume resulting from gasoline storage operations at UST Site 222. The current system flow rate ranges from 60-62 gpm and the effluent MTBE concentrations are below the laboratory detection limits. The sampling for perchlorate is part of the weekly NPDES discharge requirements. At no time during the history of MCAS Tustin has perchlorate been stored or utilized.
CA	Imperial	El Centro	El Centro-Outflow from drinking water plant	ND				Sampled from 3/13/01. Input to drinking water plant is Colorado River water.
CA	Orange	Seal Beach	NWS Seal Beach-IR Site 6 Explosive Burning Ground		ND			Site 6 was used for open burning of waste ordnance from 1944 to 1971. Material burned at Site 6 included Explosive-D, Explosive-D sludge, waste black powder, smokeless powder, fog oil, and miscellaneous pyrotechnics. Because of the past ordinance burning activities, perchlorate was sampled as part of the Removal Site Evaluation Study.
CA	Orange	Seal Beach	NWS Seal Beach-IR Site 70 Research Testing and Evaluation Area for Saturn II Launch Vehicle		ND			RT&E activities at Site 70 did not include live firing of the rocket engines. However, as part of the waste discharge requirement for the aquifer pumping test conducted at Site 70 in 2002, the Navy sampled for perchlorate in one GW monitoring well.
CA	Los Angeles	Los Angeles	Plant 42		ND			Research, Development, Test, and monitor wells
CA	Los Angeles	Azusa	Morris Dam		ND-52			Preliminary analytical results have not yet been validated. Testing activities at this site may have included the use of explosive devices (e.g., squibs and smoke bombs)
CA	Riverside	Glen Avon	Pyrite Canyon		31-81			Need to establish FUDS eligibility. Records search will also include checking if any perchlorate containing items were stored/assembled, etc on site or if site usage during FUDS time era could have contributed to conditions.
CA	San Bernardino	Barstow	MCLB-Yermo Drinking Well #4	ND				Sampled from 5/31/01; 6/19/02; 6/12/03
CA	San Bernardino	Barstow	MCAS -Yermo Drinking Well #5	ND				Sampled from 5/31/01; 6/19/02; 6/12/03
CA	San Bernardino	Barstow	MCAS -Yermo Drinking Well #6A	ND				Sampled from 10/29/02; 2/4/03; 5/13/03; 8/14/03. There is no known source of perchlorate for MCLB Barstow. Sampling was State of California requirement per Title 22 California Code Of

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								Regulations Section 64450 for unregulated chemical monitoring.
CA	San Bernardino	China Lake	China Lake NAWS – drinking water production wells	ND				All drinking water source wells have been tested for perchlorate. Uncertain how many of these wells are within San Bernadino County. China Lake NAWS spans three counties.
CA	San Bernardino	China Lake	China Lake NAWS – IRP Site 8 – Salt Wells Propulsion Labs Drainage Ditches		25-344			Historical wastewater discharges from munitions laboratories were released to unlined drainage ditches. These practices have been discontinued, and the site is being investigated through the IRP. China Lake NAWS spans three counties. This site is within San Bernardino County. Perchlorate has been shown to occur naturally in the vicinity of China Lake (USGS).
CA	San Bernardino	China Lake	China Lake NAWS – IRP Site 15 – Range Leach Field		15			Site 15 is the industrial sewer system for the Warhead Research area. There is no specific information on perchlorate use. Perchlorate was detected once in one well at a low level, so this detection is questionable. China Lake NAWS spans three counties. This site is not within San Bernardino County. Perchlorate has been shown to occur naturally in the vicinity of China Lake (USGS).
CA	San Bernardino	China Lake	China Lake NAWS – IRP Site 43 - Minideck		35-50			Site 43 is a fire fighting R&D area located on the edge of the China Lake playa, with its high TDS groundwater. One qualified detection here was at 2,590 ug/l (RLS43-MW05), but that is very questionable. A field duplicate from this well was rejected due to interference. The fire fighting foam surfactants mix with the jet fuel resulting in an emulsion that is very difficult to analyze. China Lake NAWS spans three counties. This site is within San Bernardino County. There is no history of perchlorate use in this area, and these detections may be associated with naturally occurring perchlorate. Perchlorate has been shown to occur naturally in the vicinity of China Lake (USGS).
CA	San Bernardino	China Lake	China Lake NAWS – IRP Site 46 – Dunkit Drainage Ditch		58-421			China Lake NAWS spans three counties. This site is within San Bernardino County. Perchlorate has been shown to occur naturally in the vicinity of China Lake (USGS). This site was part of IRP Site 8 that has been separately identified because of a chlorinated VOC plume.
CA	Kern	China Lake	China Lake NAWS – IRP Site 7 – Michelson Laboratories		19-720			The perchlorate source for Site 7 was the R&D activities at Michelson Lab, probably from the chemistry wing. Small amounts of various propellants and explosives were analyzed there. China Lake NAWS spans three counties. This site is not within San Bernardino County. Perchlorate has been shown to occur naturally in the vicinity of China Lake (USGS).
CA	Kern	Edwards	Edwards AFB-Site 282, North Base, JPL		ND-201			The perchlorate source for site 282 was propulsion research at JPL. 34 samples were collected.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	Kern	Edwards	Edwards AFB-Site 285, North Base, JPL		ND-30,700		700-2,100,000	The perchlorate source for site 285 was propulsion research at JPL. 37 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site AOC 422, North Base, JPL		ND-7.3			The perchlorate source for site AOC 422 was maintenance at JPL. 6 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site 116, AFRL		17-80			The perchlorate source for site 116 was a rocket test stand at AFRL. 12 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site 120, AFRL		ND-22			The perchlorate source for site 120 was a sewage treatment ponds at AFRL. 18 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site 133, AFRL		ND-100			The perchlorate source for site 133 was a landfill at AFRL. 130 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site 162/313, AFRL		ND-250			The perchlorate source for site 162/163 was a rocket test stand at AFRL. 65 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site 177, AFRL		ND-847			The perchlorate source for site 177 was a rocket test stand at AFRL. 25 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site 178, AFRL		234-570			The perchlorate source for site 178 was a rocket test stand at AFRL. 7 samples were collected.
CA	Kern	Edwards	Edwards AFB-Site 325, AFRL		5-336			The perchlorate source for site 325 was a rocket test stand at AFRL. 7 samples were collected.
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 10A	ND				Sample Dates: 12/12/01; 6/12/02; 12/11/02
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 11A	ND				Sample Dates: 8/28/97; 1/30/02; 6/12/02; 12/11/02
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 2A	ND				Sample Date: 8/28/97
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 3A	ND				Sample Date: 8/28/97
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 3B	ND				Sample Dates: 12/12/01; 6/12/02; 12/11/02
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 4A	ND				Sample Dates: 8/28/97; 12/12/01; 6/12/02; 12/11/02
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 5A	ND				Sample Dates: 8/28/97; 12/12/01; 6/12/02; 12/11/02
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 6A	ND				Sample Dates: 8/28/97; 12/12/01; 6/12/02; 12/11/02.
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 7A	ND				Sample Dates: 8/28/97; 12/12/01; 6/12/02
CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 8A	ND				Sample Dates: 8/28/97; 12/12/01; 6/12/02

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CA	San Bernardino	Twenty-nine Palms	MAGTF 29 Palms-Well 9A	ND				Sample Dates: 12/12/01; 6/12/02; 12/11/02. MAGTF 29 Palms is scheduled to re-sample source wells for perchlorate 2004 calendar year.
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #2202	ND				Sample Dates: 2/21/02; 5/2/02; 2/12/03; 4/9/03; 7/23/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #2301	ND				Sample Dates: 5/29/02; 1/27/03; 2/12/2003; 4/16/03; 7/17/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #23063	ND				Sample Dates: 5/9/02; 1/30/03; 5/8/03; 7/24/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #23073	ND				Sample Dates: 1/23/03; 2/12/03; 4/3/03; 7/17/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #2393	ND				Sample Dates: 3/13/02; 2/12/03; 4/3/03; 5/9/03; 7/23/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #2603	ND				Sample Dates: 5/9/02; 1/27/03; 2/19/03; 4/9/03; 7/24/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #26072	ND				Sample Dates: 1/23/03; 2/12/03; 4/10/03;5/9/03; 7/23/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #2671	ND				Sample Dates: 5/9/03; 1/23/03; 4/10/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #2673	ND				Sample Dates: 5/9/02; 1/22/03; 2/19/03; 4/9/03; 7/16/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #330923	ND				Sample Dates: 2/13/02; 5/9/02; 2/6/03; 4/23/03; 8/27/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #330925	ND				Sample Dates: 2/13/02; 5/9/02; 2/6/03; 4/10/03; 7/16/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #33924	ND				Sample Dates: 2/13/02; 5/9/02; 2/21/03; 4/14/03; 7/17/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #41611	ND				Sample Dates: 5/8/02; 2/6/02; 4/2/03; 7/24/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #41613	ND				Sample Dates: 5/8/02; 2/6/03; 4/2/03; 8/27/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #41621	ND				Sample Dates: 5/8/02; 2/6/03; 4/2/03; 7/24/03; 12/1/03

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CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #52013	ND				Sample Date: 5/8/02
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #52023	ND				Sample Dates: 5/8/02; 2/2/03; 4/3/03; 7/17/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #52028	ND				Sample Dates: 2/20/02; 5/8/02; 2/5/03; 4/3/03; 7/17/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #61511	ND				Sample Dates: 5/8/02; 2/5/03; 4/2/03; 7/16/03; 12/1/03
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #61521	ND				Sample Dates: 2/20/02; 5/8/02; 2/5/02; 4/2/03; 7/16/03; 12/1/03;
CA	San Diego	San Diego	MCB Camp Pendleton-UCMR-Well #62621	ND				Sample Dates: 5/8/02; 2/5/03; 4/2/03; 7/16/03; 12/1/03
CA	San Diego	Coronado	Coronado Naval Base-NASNI IR Site 9		ND			Site 9 was used for disposal of many waste streams, but had no specific history of munitions disposal. Perchlorate was sampled for in Oct 2003. All 5 samples were ND. Sampling was performed due to interest by the state regulatory agencies.
CA	San Diego	Warner Springs	Warner Springs-SERE Camp Backup Well	ND				Sampled 1/18/01; 5/7/03; 11/7/03. SERE Camp: Drinking water wells that pull groundwater to serve the base. Site is a small training base in the East part of San Diego County.
CA	San Diego	Warner springs	Warner Springs-SERE Camp Main Well	ND				Sampled 1/18/01; 5/7/03; 11/7/03. Drinking water wells that pull groundwater to serve the base. Site is a small training base in the East part of San Diego County.
CA	Ventura	San Nicolas Island	San Nicolas OLF – Zitnic Spring	ND-20		ND-20		Perchlorate was detected in surface springs that were used to supplement drinking water supplies on the island. Initial Detection date 09/23/98, The springs are no longer used as a source of drinking water; however, the springs continue to be sampled monthly and most recent data from the springs has been ND.
CA	Ventura	San Nicolas Island	San Nicolas OLF – Windmill Spring	ND-16		ND-16		Perchlorate was detected in surface springs that were used to supplement drinking water supplies on the island. Initial Detection date 09/23/98, The springs are no longer used as a source of drinking water; however, the springs continue to be sampled monthly and most recent data from the springs has been ND.
CA	Ventura	San Nicolas	San Nicolas OLF – Thousand	ND		ND		Perchlorate was detected in surface springs that were used to

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
		Island	Springs					supplement drinking water supplies on the island. Initial Detection date 09/23/98, The springs are no longer used as a source of drinking water; however, the springs continue to be sampled monthly and most recent data from the springs has been ND.
CA	Ventura	San Nicolas Island	San Nicolas OLF – EOD range		2.3			8000 feet southwest of Explosives Ordnance Disposal range.
CA	Ventura	San Nicolas Island	San Nicolas OLF – IR Site 18				1.7-266	Surface and near-surface soils in vicinity of EOD range. Approximately half the detections less than 10 ppb.
CA	Ventura	Port Hueneme	CBC Port Hueneme Naval Base Ventura		ND			IR Site 14 (landfill) monitoring wells MW 01, 02, 03, 04, 16, 17, 18 and 19
Non DoD or Industrial Facilities								
CA	Los Angeles	Santa Clarita, Saugus	Whittaker Bermite	47				
CA	Riverside	Glen Avon	Stringfellow	2.1-677	682,000			
AZ	Maricopa	Tempe	Aerodyne Corp		18			
AZ	Maricopa	Goodyear	Unidynamics/Phoenix Goodyear Airport	8.4 - 65	80			
AZ	Maricopa	Phoenix	UPCO	2	43-130			There is soil contamination
CA	San Bernardino	Rialto	City of Rialto (B.F. Goodrich Aerospace & Defense & other PRPs)	811				
CA	San Bernardino	Redlands	Lockheed Propulsion Company (Former)	87				Treatment System Operational-approx 5 million gallons/day. State Regional Water Quality Control Board Orders.
CA	Santa Barbara	Casmalia	Casmalia Resources		58			
CA	Los Angeles	Pasadena	NASA JPL	25	1,500			
NV	Clark	Henderson	Kerr-McGee Chemical	24	3,700,000	120,000		
NV	Clark	Henderson	Kerr McGee Property Above Slurry Wall		1,300,000–1,500,000			Monitoring location reflects perchlorate source area; not likely to decrease for many years
NV	Clark	Henderson	Kerr McGee Property below Slurry Wall (M-100)		110,000 – 130,000			Has declined about 80% since slurry wall installed in October 2001
NV	Clark	Henderson	PEPCON		600,000			
State and Local Government								
AZ	La Paz	La Paz	Brook Water LLC-Lakeside_UCMR	6				
CA	Imperial	Brawley	City of Brawley-UCMR	5				

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	Imperial		Imperial Valley College-UCMR	6				
CA	Imperial	El Centro	Imperial Irrigation District-CENTRAL MAIN - AGRICULTURAL	4.4-6.0				Sample Dates: 10/19/01, 1/14/02, 4/15/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Imperial	El Centro	Imperial Irrigation District-DROP 4 - AGRICULTURAL	4.2-4.8				Sample Dates: 10/19/01, 1/14/02, 4/15/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Imperial	El Centro	Imperial Irrigation District-EAST HIGH LINE - AGRICULTURAL	4.1-5.3				Sample Dates: 10/19/01, 1/14/02, 4/15/02, 7/15/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Imperial	El Centro	Imperial Irrigation District-WESTSIDE MAIN - AGRICULTURAL	4.9-5.4				Sample Dates: 4/15/02, 7/15/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles		CALIFORNIA WATER SERVICE CO.-ELAWELL 10-03-INACTIVE	6.2-8.5				Sample Dates: 05/00-09/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles		VALLEY COUNTY WATER DIST.-WELL 03 MORADA ST. - INACTIVE	12.0-13.0				Sample Dates: 5/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles		VALLEY COUNTY WATER DIST.-WELL 07 LANTE STREET - INACTIVE	61.0-94.0				Sample Dates: 5/97-12/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles		VALLEY COUNTY WATER DIST.-WELL 09 BIG DALTON - INACTIVE	21.0-48.0				Sample Dates: 5/97- 7/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		Newhall CWD-Newhall-WELL 11 - INACTIVE	12.0-20.0				Sample Dates: 05/97-12/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		RUBIO CANON LAND & WATER ASSOCIATION-WELL 04	4.2-6.0				Sample Dates: 06/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALENCIA HEIGHTS WATER CO.-WELL 01 LACFCD 3113A	4.0-8.5				Sample Dates: 07/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALENCIA HEIGHTS WATER CO.-WELL 02 LACFCD 3113	4.0-8.0				Sample Dates: 07/97-09/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALENCIA HEIGHTS WATER CO.-WELL 04 LACFCD 3102B - INACTIVE	18.0-33.0				Sample Dates: 10/97-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

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CA	LOS ANGELES		VALENCIA HEIGHTS WATER CO.-WELL 05	5.0-7.2				Sample Dates: 07/97-11/00. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALENCIA HEIGHTS WATER CO.-WELL 06	4.9-7.1				Sample Dates: 12/02-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALENCIA WATER CO.WELL 157 - INACTIVE	7.0-14.0				Sample Dates: 04/97-06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALLEY WATER CO.-WELL 01	4.2-6.4				Sample Dates: 06/97-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALLEY WATER CO.-WELL 02	4.0-7.4				Sample Dates: 06/97-10/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALLEY WATER CO.-WELL 03	4.1-7.3				Sample Dates: 07/99-10/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALLEY WATER CO.-WELL 04	4.6-8.0				Sample Dates: 06/97-10/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY-BASSETT SITE - BLEND - CTC	4.0-4.5				Sample Dates: 08/02-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY-IX EFFLUENT HEADER - TREATED	4.0-5.1				Sample Dates: 06/03-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY-IX INFLUENT HEADER - RAW	5.8-12.0				Sample Dates: 08/02-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY-WELL 02	4.0-5.6				Sample Dates: 10/99-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY-WELL 03	4.0-8.5				Sample Dates: 05/02-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY-WELL 08	4.0-5.9				Sample Dates: 05/02-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY-WELL 14	4.6-14.0				Sample Dates: 11/01-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

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CA	Los Angeles	Arcadia	ARCADIA-CITY, WATER DIVISION-ST. JOSEPH WELL 02	4.2-8.6				Sample Dates: 1/02-6/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Azura	AZUSA LIGHT AND WATER-WELL 10 (AVWC8)	5.0-12.0				Sample Dates: 6/97-2/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA data shows 11 ppb.
CA	Los Angeles	Azura	Azusa Light and Water-UCMR	11				CA data reports concentrations of 5.0-12.0 ppb
CA	Los Angeles	BELLFLOWER - SOMERSET	MWC-WELL 833	6.1-6.7				Sample Dates: 02/99-03/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	BELLFLOWER-NORWALK	PARK WC - BELLFLOWER-NORWALK-WELL 29-K	3.2-7.50				Sample Dates: 10/98-05/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Claremont	SCWC-CLAREMONT-CAMPBELL WELL 01-INACTIVE	6.0-7.4				Sample Dates:01/98-07/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	COVINA	COVINA-CITY, WATER DEPT.-GRAND AVE. WELL - INACTIVE	20.0-23.0				Sample Dates: 12/97-04/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Industry	WATERWORKS SYSTEMS-WELL 03 - STANDBY	5.3-12.0				Sample Dates: 09/98-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Industry	WATERWORKS SYSTEMS-WELL 4 - STANDBY (12-27-01)	4.2-14.8				Sample Dates: 09/98-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Industry	WATERWORKS SYSTEMS-WELL 5 - STANDBY (12-27-01)	5.0-10.0				Sample Dates: 12/97-7/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Foothill	Foothill MUNICIPAL WATER DIST.-PURCHASED TREATED WATER - MWD (WEYMOUTH)	4.1-4.3				Sample Dates: 5/013/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	Glendale	WATER DEPT.-CS-VPB-04 - MONITORING SITE	4.7-5.3				Sample Dates: 09/01-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	Glendale	WATER DEPT.-GOU GN-3 DISCHARGE	4.6-6.3				Sample Dates: 02/00-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA CANADA	IRRIGATION DIST.-WELL 01	4.8-6.0				Sample Dates: 06/97-06/98. Sources are primarily groundwater wells, although sources containing water from the Colorado

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								River have also reported perchlorate.
CA	LOS ANGELES	LA PUENTE	LA PUENTE VALLEY CWD-POST UVTERRA/PRECHLORINATION EFF-TREATED	3.4-4.8				Sample Dates: 05/01-08/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA PUENTE	LA PUENTE VALLEY CWD-WELL 02 - STANDBY	42.0-129.0				Sample Dates: 06/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA PUENTE	LA PUENTE VALLEY CWD-WELL 03	35.0-110.0				Sample Dates: 06/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA PUENTE	LA PUENTE VALLEY CWD-WELL 04-Standby	60.0-159.0				Sample Dates: 6/97-03/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LAS FLORES	LAS FLORES WATER CO.-GAC FOR WELL 02 - 50% PORT	4.4-8.1				Sample Dates: 04/03-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LAS FLORES	LAS FLORES WATER CO.-GAC FOR WELL 02 - Effluent	4.1-8.4				Sample Dates: 04/03-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LAS FLORES	LAS FLORES WATER CO.-GAC FOR WELL 02A - 75%-Port	4.6-8.0				Sample Dates: 02/23/04, 03/08/04, 03/15/04, 03/22/04, 03/29/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LAS FLORES	LAS FLORES WATER CO.-VOC/NT BLENDING SUMP - TREATED	4.0-5.6				Sample Dates: 09/01-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LAS FLORES	LAS FLORES WATER CO.-WELL 02	4.0-9.0				Sample Dates: 06/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-AMHERST WELL	8.9-15.0				Sample Dates: 02/02-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-CARTWRIGHT - INACTIVE	12.0-20.4				Sample Dates: 04//98-04/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-LA VERNE HEIGHTS WELL 02 - INACTIVE	5.0-5.3				Sample Dates: 04/98-06/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-LA VERNE HEIGHTS WELL 03	8.4-19.0				Sample Dates: 04/28/98-01/04 Sources are primarily groundwater wells, although sources containing water from the

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-LINCOLN	11.0-22.0				Sample Dates: 04/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-MILLS TRACT	15.0-20.0				Sample Dates: 04/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-OLD BALDY	7.9-26.0				Sample Dates: 04/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY WD-WALNUT WELL	4.2-6.7				Sample Dates: 11/02-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LINCOLN AVENUE WATER CO.-GAC - COMBINED EFFLUENT	5.8-10.0				Sample Dates: 06/02/97, 07/17/97, 09/16/97, 11/24/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LINCOLN AVENUE WATER CO.-WELL 03	2.5-16.0				Sample Dates: 06/97-09/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LINCOLN AVENUE WATER CO.-WELL 05	2.0-6.0				Sample Dates: 06/97-05/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-MISSION WELL 05 - INACTIVE	4.0-6.0				Sample Dates: 11/2001-02/03 . Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-RINALDI TOLUCA WELL 03	4.2-9.2				Sample Dates: 11/00-11/03 . Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-TUJUNGA WELL 05	4.1-4.7				Sample Dates: 01/01-02/02 . Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-TUJUNGA WELL 06	4.2-4.8				Sample Dates: 02/02-03/03 . Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-TUJUNGA WELL 07	4.2-5.4				Sample Dates:07/01-12/02 . Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-TUJUNGA WELL 08	4.1-4.9				Sample Dates: 07/01-10/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-TUJUNGA WELL 10	4.0-11.0				Sample Dates: 10/00-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-TUJUNGA WELL 11	5.8-21.0				Sample Dates: 12/00-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER-TUJUNGA WELL 12	4.0-9.3				Sample Dates: 02/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-DIAMOND VALLEY LAKE - WB CENTER - RAW	4.0-5.0				Sample Dates:04/01-10/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-DIAMOND VALLEY LAKE -DIEMER PLANT EFFLUENT - TREATED	4.0-6.0				Sample Dates: 08/99-05/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD. OF SO. CAL.-DIAMOND VALLEY LAKE -LAKE HAVASU - NEAR WHITSETT INTAKE	4.0-8.0				Sample Dates: 06/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA shows concentration of 7.0 ppb.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-DIAMOND VALLEY LAKE -LAKE MATHEWS HEADWORKS (EFFLUENT)	4.1-9.0				Sample Dates: 06/97-09/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-LAKE SKINNER OUTLET CONDUIT	4.0-6.0				Sample Dates: 07-01-07/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-SAN JACINTO TUNNEL - DIST SYS - RAW	4.0-7.0				Sample Dates: 02/99-09/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-SKINNER PLANT EFFLUENT #1 - TREATED	4.0-5.0				Sample Dates: 08/99-04/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-SKINNER PLANT EFFLUENT #2 - TREATED	4.0-5.0				Sample Dates: 08/99-04/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-SKINNER PLANT INFLUENT - DIST SYS - RAW	4.0-5.0				Sample Dates: 08/99-04/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-SKINNER RESERVOR EFFLUENT - TREATED	4.0-5.0				Sample Dates: 07/01-06/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-WEYMOUTH PLANT EFFLUENT - TREATED	4.0-6.0				Sample Dates:08/99-10/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.-WEYMOUTH PLANT INFLUENT - DIST SYS - RAW	5.0-6.0				Sample Dates:02/99-08/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Los Angeles	MWD of Southern California-UCMR	7				CA data reports concentrations of 4.0-8.0 ppb.
CA	Los Angeles	Los Angeles	California State Polytechnical University-Pomaona-UCMR	6				
CA	Los Angeles	Los Angeles	South California-West Orange-UCMR	6				
CA	Los Angeles	Los Angeles	Suburban Water Systems-UCMR	7				
CA	LOS ANGELES	MONROVIA	MONROVIA-CITY, WATER DEPT.-MONROVIA WELL 01 - ABANDONED	6.0-8.4				Sample Dates:12/99-04/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	MONROVIA	MONROVIA-CITY, WATER DEPT.-MONROVIA WELL 02	4.0-7.4				Sample Dates:02/03-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	MONTEREY PARK	MONTEREY PARK-CITY, WATER DEPT.-FERN WELL - STANDBY	2.0-5.3				Sample Dates:08-10/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	MONTEREY PARK	MONTEREY PARK-CITY, WATER DEPT.-WELL 05 - STANDBY	4.3-6.5				Sample Dates:11/99-09/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	MONTEREY PARK	MONTEREY PARK-CITY, WATER DEPT.-WELL 06 - STANDBY	4.6-5.9				Sample Dates:02/02/-04/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	MONTEREY PARK	MONTEREY PARK-CITY, WATER DEPT.-WELL 12	5.4-14.0				Sample Dates:08/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	MONTEREY PARK	MONTEREY PARK-CITY, WATER DEPT.-WELL 12 SITE PTA INFLUENT (WELLS 9 & 12)	4.2-6.0				Sample Dates: 02/04-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-AERATION - NORTH TOWER - INFLUENT	9.0-28.0				Sample Dates:06/97-07/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-AERATION -SOUTH TOWER - INFLUENT	5.0-27.0				Sample Dates:06/97-07/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-AERATION TOWERS EFFLUENT	4.0-17.0				Sample Dates:06/97-07/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-ARROYO - INACTIVE	2.9-54.0				Sample Dates:06/97-04/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-BANGHAM	2.92-9.03				Sample Dates:9/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-CHAPMAN	3.98-6.93				Sample Dates:6/99-01/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-COPELIN	3.93-17.43				Sample Dates:9/97-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-CRAIG	2.5-5.84				Sample Dates:01/99-05/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-GARFIELD	3.090-27.7				Sample Dates:01/99-04/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-MONTE VISTA	1.490-4.590				Sample Dates:01/99-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-SUNSET	2.490-15.9				Sample Dates:04/99-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-SUNSET RESERVOIR-A BASIN-	2.340-12.230				Sample Dates:07/01-09/99. Sources are primarily groundwater wells, although sources containing water from the Colorado

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
			NO3 & VOC BLEND					River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-SUNSET RESERVOIR-TANK #1-NO3 & VOC BLEND	3.980-20.180				Sample Dates: 08/99-10/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-SUNSET RESERVOIR-TANK #2-NO3 & VOC BLEND	3.0-29.0				Sample Dates: 03/99-10/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-VENTURA	2.72-9.0				Sample Dates: 7/97-10/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-VILLA	2.97-7.24				Sample Dates: 4/99-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-Well 52	6.00-34.880				Sample Dates: 6/97-10/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-WINDSOR	1.87-13.590				Sample Dates: 2/99-10/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-WINDSOR RESERVOIR - NO3 & VOC BLENDING	4.0-18.66				Sample Dates: 06/97-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-WOODBURY	2.42-3.41				Sample Dates: 01/01-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	Los Angeles	Pasadena	City of Pasadena Water Department-UCMR	35				Well is not identified. CA data reports concentrations of up to 54.0 ppb.
CA	Los Angeles	S. Pasadena	City of South Pasadena Water Department-UCMR	5				CA data reports concentrations of 4.0-6.8 ppb
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.-ANION-EXCHANGE FACILITY - BLEND	3.1-18.7				Sample Dates: 8/98-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- ANION-EXCHANGE FACILITY - RAW	5.6-15.2				Sample Dates: 8/98-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- ANION-EXCHANGE FACILITY - TREATED	3.0-7.82				Sample Dates: 8/98-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- RESERVOIR 6 EFFLUENT AT BOOSTER 3	3.9-8.8				Sample Dates: 10/00-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 01B - INACTIVE	4.58-7.0				Sample Dates: 05/98-08/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 02	4.2-8.1				Sample Dates: 05/98-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 03	5.94-6.06				Sample Dates: 05/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 04	6.930-13.5				Sample Dates: 05/98-04/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 05B	5.0-7.240				Sample Dates: 05/98-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 06	9.8-16.3				Sample Dates: 02/04-05/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 07 - INACTIVE	8.280-11.9				Sample Dates: 05/98-01/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 08B - INACTIVE	8.73-12.0				Sample Dates: 05/98-01/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 09B - INACTIVE	4.4-12.0				Sample Dates: 03/02-05/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 10	5.9-9.5				Sample Dates: 05/98-08/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 11	9.2-17.0				Sample Dates: 05/98-08/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 12	9.5-19.0				Sample Dates: 05/98-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 14	6.2-13.2				Sample Dates: 05/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 15	7.3-14.0				Sample Dates: 05/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 16	10.0-19.0				Sample Dates: 05/98-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 17	8.8-17.0				Sample Dates: 05/98-02/04 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 18	8.9-16.0				Sample Dates: 05/98-02/04 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 19 - RECLAIMED SYSTEM -	11.0-12.0				Sample Dates: 03/02-11/03 Sources are primarily groundwater wells, although sources containing water from the Colorado

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
			INACTIVE					River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 23	5.5-10.0				Sample Dates: 05/98-09/02 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 25	3.2-6.5				Sample Dates: 05/98-03/04 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 26	3.1-8.4				Sample Dates: 05/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.- WELL 34	9.910-16.1				Sample Dates: 05/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.
CA	Los Angeles	Pomona	City of Pomona-UCMR	10				CA data reports concentrations of 3.1-19.0 ppb.
CA	Los Angeles	Santa Clarita	SANTA CLARITA WATER CO.- SAUGUS WELL 01 - INACTIVE	21.0-34.0				Sample Dates: 05/97-04/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Santa Clarita	SANTA CLARITA WATER CO.- SAUGUS WELL 02 - INACTIVE	12.0-47.0				Sample Dates: 04/97-04/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Santa Clarita	SANTA CLARITA WATER CO.- STADIUM WELL 13	4.2-5.9				Sample Dates:10/02-11/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN DIMAS	SCWC-SAN DIMAS-BASELINE WELL 03	13.0				Sample Dates: 01/03-02/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN DIMAS	SCWC-SAN DIMAS-BASELINE WELL 04	5.0-20.0				Sample Dates: 04/97-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN DIMAS	SCWC-SAN DIMAS-COLUMBIA WELL 07	3.9-5.2				Sample Dates: 04/97-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	SAN DIMAS	SCWC-SAN DIMAS-DURWARD	8.5-17.9				Sample Dates:07/99-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN DIMAS	SCWC-SAN DIMAS-HIGHWAY RESERVOIR - NO3 BLEND, EFFLUENT	4.2-4.8				Sample Dates:08/01-12/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN DIMAS	SCWC-SAN DIMAS-HIGHWAY WELL	6.9-8.0				Sample Dates:10/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN GABRIEL	SAN GABRIEL CWD-WELL 07 - ACTIVE	4.0-5.6				Sample Dates:09/02-04/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SOUTH PASADENA	SOUTH PASADENA-CITY, WATER DEPT.-GRAVES WELL 02	4.0-6.8				Sample Dates: 07/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 5.0 ppb.
CA	Los Angeles	San Fernando	San Fernando City Water Department-UCMR	9				Public Water supply Wells not immediately threatened. Incorporated into Superfund Remedial Investigation Monitoring Program.
CA	Los Angeles	SAN GABRIEL	VALLEY WATER CO.-EL MONTE-RESVR B5 - NO3, BLEND, WELLS B5A,B5B,B5C	4.0-5.0				Sample Dates: 06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	SAN GABRIEL	VALLEY WATER CO.-EL MONTEELL B11A	4.4-8.0				Sample Dates: 6/97-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	SAN GABRIEL	VALLEY WATER CO.-EL MONTE-WELL B5A LACFCD 2994V	5.9-10.0				Sample Dates: 6/97-9/00. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	SAN GABRIEL	VALLEY WATER CO.-EL MONTE-WELL B5B LACFCD 2994Q - INACTIVE	9.0-12.0				Sample Dates: 6/97-06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	SAN GABRIEL	VALLEY WATER CO.-EL MONTE-WELL B6C - INACTIVE	72.0-77.0				Sample Dates: 06/97-06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	Los Angeles	SAN GABRIEL	VALLEY WATER CO.-EL MONTE-WELLS B6C, B6D BLEND NO3-RES-EFF-INACTIVE	38.0-42.0				Sample Dates: 06/97-06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	San Gabriel	San Gabriel CWD-UCMR	4				Treatment Systems Operational-Will increase capacity to 33 million gallons/day. Superfund Record of Decision and cleanup Order.
CA	Los Angeles	San Gabriel	San Gabriel Valley WC-Fontana-UCMR	15				This facility is listed under San Bernardino County in the CA data.
CA	LOS ANGELES	SOUTH SAN GABRIEL	SCWC-SOUTH SAN GABRIEL-B1 - EFFLUENT PORT	2.2-4.4				Sample Dates: 12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SOUTH SAN GABRIEL	SCWC-SOUTH SAN GABRIEL-SAN GABRIEL WELL 01 - ACTIVE	4.1-8.1				Sample Dates: 07/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-126-W2	5.2-10.0				Sample Dates: 06/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-139-W4	4.0-12.0				Sample Dates: 06/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-139-W5	2.0-9.7				Sample Dates: 09/97-06/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-139-W6 - INACTIVE	7.0-35.4				Sample Dates: 01/98-06/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-140-W3	4.8-14.6				Sample Dates: 6/97-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-140-W4	13.0-14.6				Sample Dates: 6/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-140-W5	4.2-7.9				Sample Dates: 03/99-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-140W4-POST RAYOX/PRE CL2 EFFL	5.0-7.0				Sample Dates: 09/01-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-BIG DALTON TREATMENT - EFFLUENT-INACTIVE	5.0-39.0				Sample Dates: 05/97-06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-BIG DALTON TRTMNT-3/4 SAMP TAP-V2-INACTV	5.0-42.0				Sample Dates: 05/97-06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-BLENDING RESERVOIR 121-R1	5.3-12.0				Sample Dates: 05/97-09/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-BLENDING RESERVOIR 128-R1	4.3-8.4				Sample Dates: 07/98-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY - 1921 A - OAK KNOLL CIRCLE - INACTIVE	4.4-5.7				Sample Dates: 06/97-03/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY - 1921 B - OSWEGO	4.5-20.0				Sample Dates: 06/97-09/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY - 1923 - PATTON - INACTIVE	4.3-5.2				Sample Dates: 06/97-03/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY - 1925 - LONGDEN - TREATED	4.1-5.0				Sample Dates: 03/01-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY - 1928 - LAMANDA PARK	4.0-4.4				Sample Dates: 06/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY - 1947 - ROANOKE - INACTIVE	4.2-5.6				Sample Dates: 06/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY - LONGDEN IN-LINE NO3 BLENDING	3.1-5.0				Sample Dates: 07/02-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles	Vernon	Vernon City Water Department-UCMR	5				CA data reports concentrations of 4.4-19.0 ppb
CA	LOS ANGELES	VERNON	VERNON-CITY, WATER DEPT.-WELL 18	4.4-19.0				Sample Dates: 02/00-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 5.0 ppb.
CA	LOS ANGELES	WHITTIER	WHITTIER-CITY, WATER DEPT.-WELL 16	4.0				Sample Dates: 11/97-11/98. Sources are primarily groundwater wells, although sources containing water from the Colorado

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								River have also reported perchlorate.
CA	Maricopa	Chaparrel	Chaparral City Water Co-UCMR	6				
CA	Maricopa	Glendale	Glendale Municipal Water CC-UCMR	5				
CA	Maricopa	Scottsdale	Scottsdale Municipal Water-UCMR	7				
CA	ORANGE		Page Avenue Mutual Water Company-WELL 01	4.1-9.1				Sample Dates: 03/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Orange		Irvine Ranch Water District-UCMR	6				
CA	ORANGE		Crescent Water Association-WELL 01	4.0-5.9				Sample Dates: 06/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		Villa Capri Mobile Estates-WELL 01	4.4-6.3				Sample Dates: 04/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		WELL 07	5.2-5.52				Sample Dates:02/98-12/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		Southern Calif WC - West Orange-CLAIR 03	4.1-5.27				Sample Dates:07/98-05/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		Southern Calif WC - West Orange-CLAIR 04	4.7-4.9				Sample Dates:02/02-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		Southern Calif WC - West Orange-LOWELL	4.9-7.7				Sample Dates: 04/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		Southern Calif WC - West Orange-SANTA PAULA	4.7-5.72				Sample Dates: 04/98-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		Southern Calif WC - West Orange-SYCAMORE (FERN)	4.5-4.8				Sample Dates: 02/02-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	LENAIN FILTER PLANT EFFLUENT-TREATED	4.26-4.5				Sample Dates: 05/02-11/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 012	5.1-5.5				Sample Dates: 02/02-03/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 016 - ABANDONED	5.94-6.96				Sample Dates: 05/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								also reported perchlorate.
CA	ORANGE	Anaheim	WELL 018	4.1-5.1				Sample Dates: 02/02-10/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 020	5.21-7.23				Sample Dates: 03/98-07/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 027	5.5-7.250				Sample Dates: 08/02-11/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 039	4.5-5.760				Sample Dates: 04/98-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 040	4.1-6.3				Sample Dates: 06/98-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 049	5.240-6.170				Sample Dates:03/98-04/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 105 - INACTIVE	4.8-4.9				Sample Dates:02/02-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	WELL 112	4.8-5.2				Sample Dates:02/02-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Orange	Anaheim	City of Anaheim-UCMR	4				
CA	ORANGE	Fullerton	CHRISTLIEB WELL 15A	4.0-4.3				Sample Dates:12/03-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Orange	Garden Grove	City of Garden Grove-UCMR	4				
CA	Orange	Garden Grove	WELL 027	4.0-4.8				Sample Dates: 06/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Orange	Irvine	Irvine Ranch Water District-WELL 03	5.3-6.1				Sample Dates: 12/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Orange	Santa Ana	City of Santa Ana	4				
CA	ORANGE	SANTA ANA	WELL 13	4.0-5.06				Sample Dates: 08/98-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	ORANGE	SANTA ANA	WELL 32	4.3-5.48				Sample Dates: 05/98-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	17TH STREET WELL 01 - INACTIVE	5.350-7.210				Sample Dates: 03/98-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	17TH STREET WELL 02	5.6-8.17				Sample Dates: 03/98-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	17TH STREET WELL 04	4.2-7.4				Sample Dates: 05/03-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	BENETA	6.33-6.4				Sample Dates: 11/98-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	MAIN STREET WELL 02 - ABANDONED	6.0-8.0				Sample Dates: 02/98-11/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	MAIN STREET WELL 03	4.2-5.23				Sample Dates: 08/98-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	MAIN STREET WELL 04	4.2-5.5				Sample Dates: 02/02-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	NEWPORT	5.7-10.7				Sample Dates: 03/98-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Orange	Tustin	City of Tustin	9				
CA	RIVERSIDE		Desert Water Agency-WELL 09 - STANDBY	5.4-6.0				Sample Dates:07/01-12/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		Desert Water Agency-WELL 21	5.4-6.6				Sample Dates:06/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		Desert Water Agency-WELL 22	4.2-5.7				Sample Dates:12/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		Desert Water Agency-WELL 30	4.0-4.4				Sample Dates: 06/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		Desert Water Agency-WELL 35	4.0-6.0				Sample Dates: 12/01-11/03. Sources are primarily groundwater

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Riverside		Desert Water Agency	7				
CA	RIVERSIDE		Eastern Municipal WD-WELL 44 - SUNNYMEAD 4	5.0-7.5				Sample Dates: 09/00-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		Eastern Municipal WD-WELL 49 - TREATED	11.0-12.0				Sample Dates: 07/03-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Riverside		Eastern Municipal WD-UCMR	8				
CA	RIVERSIDE		Jurupa Community SD-WELL 06	4.0-5.0				Sample Dates: 07/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Riverside		Jurupa Community-UCMR	5				
CA	Riverside		Rubidoux Community SD-UCMR	10				
CA	RIVERSIDE		Rubidoux Community SD-WELL 02 - TROYER	7.1-12.0				Sample Dates: 06/99-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		Rubidoux Community SD-WELL 04 - OLD SKOTTY	8.3-12.0				Sample Dates: 06/99-08/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		Rubidoux Community SD-WELL 06 - NEW SKOTTY	6.0-12.0				Sample Dates: 06/99-08/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	7TH & CHICAGO - DISTRIBUTION	4.0-12.0				Sample Dates: 02/98-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	BRUNTON WELL - AGRICULTURAL	17.0-23.0				Sample Dates:03/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	CREST BOOSTER STATION	4.1-12.0				Sample Dates: 01/99-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	ELECTRIC STREET WELL	4.0-5.3				Sample Dates: 10/98-01/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	ELEVENTH ST. WELL - INACTIVE	14.0-17.0				Sample Dates: 09/00-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	RIVERSIDE	Riverside	FILL WELL - INACTIVE	10.0-16.0				Sample Dates: 09/00-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE DELIVERY - TREATED	4.0-17.0				Sample Dates: 06/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 26-1	5.0-17.0				Sample Dates: 06/97-08/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 27-1	4.0-12.0				Sample Dates: 06/97-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 27-2	5.0-14.0				Sample Dates: 06/97-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 29-1	5.0-12.0				Sample Dates: 06/97-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 29-2	7.2-49.0				Sample Dates: 06/97-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 29-3	20.0-65.0				Sample Dates: 08/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 31-1	4.2-10.0				Sample Dates: 08/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 46-1	4.5-23.0				Sample Dates:06/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 51-1	5.0-62.0				Sample Dates: 05/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 66-1	5.0-22.0				Sample Dates: 06/97-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GAGE WELL 92-1	4.0-45.0				Sample Dates: 06/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GARNER WELL 02	4.8-14.0				Sample Dates: 06/01-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	RIVERSIDE	Riverside	GARNER WELL 07	4.0-6.2				Sample Dates: 06/01-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	GRAND TERRACE BSTR - DISTRIBUTION	64.0-6.9				Sample Dates: 07/01-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	HUNT WELL 06	4.4-10.0				Sample Dates: 06/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	HUNT WELL 10	4.0-9.3				Sample Dates: 06/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	HUNT WELL 11	4.0-8.7				Sample Dates: 10/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	INDUSTRIAL BSTR - DISTRIBUTION	4.1-5.2				Sample Dates: 07/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	IOWA BOOSTER - DISTRIBUTION SYSTEM	4.3-5.4				Sample Dates: 08/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	MOORE GRIFFITH	4.0-7.4				Sample Dates: 07/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	NORTH ORANGE AT COLUMBIA - DISTRIBUTION	4.0-6.5				Sample Dates: 03/00-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	NORTH ORANGE AT FIRE STATION-DIST. TRTD	4.1-6.3				Sample Dates: 09/03-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	PALMYRITA GAC PLANT EFFLUENT	4.3-6.6				Sample Dates: 07/03-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	PALMYRITA WELL 02	4.4-10.0				Sample Dates: 07/98-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	RAUB WELL 02	4.0-14.0				Sample Dates: 09/00-08/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	RAUB WELL 04	6.4-20.0				Sample Dates: 06/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	RIVERSIDE	Riverside	RAUB WELL 05	4.4-4.6				Sample Dates: 04/02-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	RAUB WELL 06	5.0-5.1				Sample Dates: 04/99-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	RUSSELL C WELL	4.1-4.2				Sample Dates: 12/03-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	SCHEUER	5.5-7.8				Sample Dates: 07/00-12/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	STILES	5.0-13.0				Sample Dates: 08/98-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	SUNNYSIDE IX/GAC PLANT EFFLUENT - TRTD	4.0-8.1				Sample Dates:10/02-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	TIPPECANOE IX/GAC PLANT EFFLUENT - TRTD	5.0-27.0				Sample Dates:10/02-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	TWIN SPRINGS	4.8-8.0				Sample Dates:07/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	WARREN WELL 01	5.0-7.8				Sample Dates:02/99-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Riverside	LESTER SWTP EFFLUENT - TREATED	4.7-8.3				Sample Dates: 03/01-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	LESTER SWTP INFLUENT - RAW	5.0-8.0				Sample Dates: 03/01-06/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 06 - ABANDONED	8.4-12.0				Sample Dates: 03/00-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 07 - DESTROYED	5.3-11.0				Sample Dates: 03/00-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 07A	5.7-6.9				Sample Dates: 12/02-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	RIVERSIDE	Corona	WELL 08 - STANDBY	4.4-5.3				Sample Dates: 01/02-12/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 08A	5.6-7.0				Sample Dates: 02/02-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 09 - DESTROYED	4.2-5.9				Sample Dates: 07/00-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 09A	5.7-7.93				Sample Dates: 03/03-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 11	7.0-11.0				Sample Dates: 03/00-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 12A	5.4-7.6				Sample Dates: 01/02-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 13	12.0-13.0				Sample Dates: 12/02-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 14	8.3-11.0				Sample Dates:03/00-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 15	4.7-9.4				Sample Dates:03/00-06/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 17A	4.7-5.41				Sample Dates: 06/03-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 19	4.0-6.5				Sample Dates: 01/02-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 22 (DESALTER SUPPLY)	5.3-11.0				Sample Dates: 01/02-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	Corona	WELL 25 (DESALTER SUPPLY)	6.1-9.4				Sample Dates: 01/02-08/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Riverside	Corona	City of Corona-UCMR	13				
CA	Riverside	Coachella	Coachella V. WD: Cove Community-	6				

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
			UCMR					
CA	RIVERSIDE	Hemet	WELL 03	5.3-6.0				Sample Dates: 09/99-06/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth. ARLINGTON-ARLINGTON DES. - RO BYPASS - TREATED	4.9-7.1				Sample Dates: 01/03-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth. ARLINGTON-ARLINGTON DES. - RO INFLUENT	4.2-6.2				Sample Dates:01/03-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth. ARLINGTON-WELL 01	4.9-6.5				Sample Dates: 08/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth. ARLINGTON-WELL 02	4.4-7.0				Sample Dates: 08/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth. ARLINGTON-WELL 03	4.3-7.3				Sample Dates: 08/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth. ARLINGTON-WELL 04	4.0-7.2				Sample Dates: 08/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth. ARLINGTON-WELL 05	4.0-5.8				Sample Dates: 02/03-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino		East Valley WD-UCMR	16				
CA	SAN BERNARDINO		EAST VALLEY WD-WELL 011A	4.1-4.8				Sample Dates:07/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		EAST VALLEY WD-WELL 012A	5.7-16.0				Sample Dates:02/01-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		EAST VALLEY WD-WELL 024B	4.2-6.0				Sample Dates: 07/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		EAST VALLEY WD-WELL 025A	4.0-5.9				Sample Dates: 07/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDI		EAST VALLEY WD-WELL 027 - INACTIVE	4.1-8.5				Sample Dates: 02/01-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
	NO							River have also reported perchlorate.
CA	SAN BERNARDINO		EAST VALLEY WD-WELL 028A	4.4-8.1				Sample Dates: 02/01-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		EAST VALLEY WD-WELL 028A-WELL 041 - INACTIVE	7.0-11.0				Sample Dates: 02/01-07/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		EAST VALLEY WD-WELL 028A-WELL 107	5.3-14.0				Sample Dates: 02/01-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		HAVASU WC-LAKE HAVASU - RAW	5.0-5.8				Sample Dates: 08/00-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		LOMA LINDA UNIVERSITY-ANDERSON WELL 3	4.0-4.9				Sample Dates: 11/02-04/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino		Riverside Highland Water Co.-UCMR	5				
CA	SAN BERNARDINO		WEST VALLEY WATER DISTRICT-WELL 18A	4.0-7.4				Sample Dates: 05/00-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		WEST VALLEY WATER DISTRICT-WELL 22 - ABANDONED	19.5-820.0				Sample Dates: 09/97-08/00. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		WEST VALLEY WATER DISTRICT-WELL 37	4.4-10.0				Sample Dates: 06/02-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		WEST VALLEY WATER DISTRICT-WELL 41	4.1-8.8				Sample Dates: 09/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		WEST VALLEY WATER DISTRICT-WELL 42	4.1-8.1				Sample Dates: 04/99-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		VICTORIA FARMS MWC-WELL 01 - INACTIVE	12.0-16.0				Sample Dates: 04/97-05/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		YUCAIPA BLVD WELL - INACTIVE	7.1-18.0				Sample Dates: 05/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDI	CHINO	WELL 05	6.2-11.0				Sample Dates: 09/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
	NO							River have also reported perchlorate.
CA	SAN BERNARDINO	CHINO	WELL 06	4.4-6.0				Sample Dates: 10/01-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	CHINO	WELL 09 - STANDBY	10.0-20.0				Sample Dates: 09/97-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	CHINO	WELL 10 - STANDBY	14.0-29.00				Sample Dates: 09/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	CHINO	WELL 12	8.0-18.0				Sample Dates: 09/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	CHINO	WELL 14	5.0-14.0				Sample Dates: 09/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino	Chino	City of Chino	21				
CA	SAN BERNARDINO	Chino Hills	WELL 07B	4.1-4.4				Sample Dates: 02/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino	Cucamonga	Cucamonga CWD-UCMR	8				
CA	SAN BERNARDINO	COLTON	WELL 15	5.7-7.8				Sample Dates: 09/97-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	COLTON	WELL 17	9.2-9.4				Sample Dates: 03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	COLTON	WELL 24	4.2-6.0				Sample Dates: 09/01-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	MOUNTAIN VIEW BLENDING SITE - TREATED	5.0-13.6				Sample Dates: 07/99-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	MT. VIEW 02 - Inactive	6.0-35.0				Sample Dates: 09/97-04/00. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	MT. VIEW WELL 01 - Destroyed	5.0-28.0				Sample Dates: 04/97-04/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	SAN BERNARDINO	LOMA LINDA	RICHARDSON ST. WELL 01	4.0-37.0				Sample Dates: 03/00-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	RICHARDSON ST. WELL 02 - Destroyed	6.4-33.4				Sample Dates: 06/97-10/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	RICHARDSON WELLS BLENDING SITE - TREATED	4.0-6.9				Sample Dates: 08/99-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino	Monte Vista	Monta Vista CWD-UCMR	4				
CA	SAN BERNARDINO	ONTARIO	WELL 03A	4.1-6.0				Sample Dates: 11/01-05/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	ONTARIO	WELL 04 - INACTIVE	8.1-12.0				Sample Dates: 11/01-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	ONTARIO	WELL 09	5.2-7.6				Sample Dates: 02/02-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	ONTARIO	WELL 15	4.5-8.0				Sample Dates: 11/01-05/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	ONTARIO	WELL 18	5.0-9.5				Sample Dates: 11/97-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	ONTARIO	WELL 30 - INACTIVE	6.0-5.7				Sample Dates: 10/97-11/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	ONTARIO	WELL 37	4.7-6.3				Sample Dates: 11/01-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino	Ontario	City of Ontario-UCMR	12				
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD-WELL 01	5.0-9.0				Sample Dates: 01/01-08/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD-WELL 17	4.0-8.0				Sample Dates: 08/00-08/02 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD-WELL 20	5.0-7.4				Sample Dates: 08/00-08/02 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD-WELL 30	5.2-6.0				Sample Dates: 01/01-03/02 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD-WELL 31	6.0-6.2				Sample Dates: 09/97-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD-WELL 33	4.0-5.4				Sample Dates: 09/97-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD-WELL 34	4.2-6.7				Sample Dates: 08/01-03/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-AIRPORT WELL	4.0-5.2				Sample Dates: 12/01-01/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-CHICKEN HILL WELL - INACTIVE	5.9-12.0				Sample Dates: 05/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-CHURCH STREET WELL	4.0-6.6				Sample Dates: 06/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-LEE WELL - INACTIVE	4.6-5.3				Sample Dates: 09/01-09/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-MISSION WELL - INACTIVE	8.0-17.0				Sample Dates: 05/97-11/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-NEW YORK STREET WELL	13.0-20.0				Sample Dates: 07/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-REES GAC TREATED - INACTIVE	4.9-8.8				Sample Dates: 05/97-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-REES WELL	4.4-9.0				Sample Dates: 04/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV-WELL 10 - INACTIVE	4.2-8.8				Sample Dates: 09/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV - WELL 11 - INACTIVE	5.8-10.0				Sample Dates: 06/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV - WELL 13 - INACTIVE	4.7-7.6				Sample Dates: 06/01-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV - WELL 14 - INACTIVE	8.8-16.0				Sample Dates: 06/01-06/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV- WELL 16 - INACTIVE	4.8-9.6				Sample Dates: 06/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV- WELL 30A - AGRICULTURAL	16.0-75.0				Sample Dates: 05/01-12/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV - WELL 31A	55.0-130.0				Sample Dates: 04/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV - WELL 32	9.9-52.0				Sample Dates: 05/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV- WELL 34	5.0-15.0				Sample Dates: 12/97-11/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV- WELL 35 - INACTIVE	6.8-87.0				Sample Dates: 05/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV- WELL 37 - INACTIVE	4.0-8.0				Sample Dates: 09/01-05/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV- WELL 39	4.2-7.3				Sample Dates: 05/02-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV- WELL 41-INACTIVE	8.4-13.0				Sample Dates: 05/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	San Bernardino	Redlands	Redlands City Mud-Water Div-UCMR	7				CA data reports concentrations of 4.0-5.2 ppb
CA	SAN BERNARDINO	RIALTO	CHINO WELL 02	4.2-5.6				Sample Dates: 12/01-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RIALTO	DUNCAN WELL (RIALTO 04)	4.1-5.8				Sample Dates: 10/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RIALTO	ETIWANDA WELL (RIALTO 06)	5.0-46.0				Sample Dates: 09/97-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RIALTO	HIGHLAND WELL (RIALTO 02) - INACTIVE	36.0-88.0				Sample Dates: 10/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RIALTO	RIALTO TUDOR (CHINO 01)	4.0-14.0				Sample Dates: 01/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN BERNARDINO	ANTIL WELL 06	5.0-7.49				Sample Dates: 7/00-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino	Rialto	City Rialto	21				
CA	SAN BERNARDINO	SAN BERNARDINO	PERRIS HILL WELL 04	6.1-9.40				Sample Dates:01/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	San Bernardino	San Bernardino	San Bernardino City-UCMR	7				
CA	SAN BERNARDINO	SAN BERNARDINO	PATTON STATE HOSPITAL-WELL 10	9.3-13.0				Sample Dates: 07/01-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN BERNARDINO	PATTON STATE HOSPITAL-WELL 14	5.2-6.3				Sample Dates: 10/01-20/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - FONTANA-WELL F-03A (16) - INACTIVE	7.8-10.5				Sample Dates:10/97-03/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - FONTANA-WELL F-04A	9.0-16.0				Sample Dates: 09/97-08/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - FONTANA-WELL F-17B (39)	6.1-24.0				Sample Dates:10/97-09/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - FONTANA-WELL F-17C	4.0-21.0				Sample Dates:10/97-09/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - FONTANA-WELL F-18A (34)	5.4-17.3				Sample Dates:10/97-07/02 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - WELL F-25A - INACTIVE	5.9-7.7				Sample Dates:10/97-06/99 Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - WELL F-35A (11)	4.4-7.8				Sample Dates:11/01-08/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN DIEGO	Escondido	FILTRATION PLANT EFFLUENT	4.3-4.5				Sample Dates: 02/01-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN DIEGO	Escondido	SAN DIEGO COUNTY WATER AUTHORITY - RAW	4.0-4.7				Sample Dates: 05/01-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Diego	Escondido	City of Escondido-UCMR	4				
CA	Ventura	Santa Susana	Santa Susana Field Lab, Rocketdyne Divisions (DOE)		750			
NV	Clark		Mohave Generating Station-UCMR	7				
NV	Clark		S. Nevada Water System-UCMR	14				

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
NV	Clark	Henderson	Kerr-McGee Chemical	24	6,600,000	120,000		Drinking water concentrations with a high of ~13 ppb have been recorded over the last year
NV	Clark	Henderson	Kerr McGee Property Above Slurry Wall		1,300,000-1,500,000			Monitoring location reflects perchlorate source area; not likely to decrease for many years
NV	Clark	Henderson	Kerr McGee Property below Slurry Wall (M-100)		110,000 - 130,000			Has declined about 80% since slurry wall installed in October 2001
NV	Clark	Henderson	PEPCON		600,000			
NV	Clark	Bolder City	Lake Mead at Las Vegas Bay (LVB 2.7/LVB 3.5)		20-100 (Seasonal Variation; peaks in spring/summer; valleys in fall /winter)			No clear trend during last 3 years (except seasonal variation). On 12/16/03 sampling location moved to LVB 3.5 due to low water elevations in Lake Mead
NV	Clark	Bolder City	Lake Mead at Saddle Island(AMSWTF Raw Water)		9.8 (2003 average)			Concentrations appear to be declining in late 2003; further declines expected in 2004. Monthly average concentrations declined to 5.9 ppb in September and 6.6 ppb in October 2003, the 2 lowest values in more than 4 years of data. November and December monthly average peaks were both 10.5 ppb, about 35% lower than pervious 3 years peaks (2000-2002). 2003 annual average was 9.8 ppb, about the same as 2001 (10.4 ppb) and 2002 (9.9 ppb); lower lake levels have likely prevented decreases in annual average concentrations.
NV	Clark	Las Vegas	Groundwater at Athens Road Wells (ART-8)		400,000-450,000			Not likely to decrease for many years
NV	Clark	Las Vegas	Groundwater Below Athens Road Wells (ARP-3)		220,000			Has declined 50%-60% since Athens Road Wells began continuous operation in October 2002. Results erratic; there could be a nearly flat gradient with low flows just below Athens Road Wells
NV	Clark	Las Vegas	Groundwater at Seep Area (PC-97)		10,000			Has declined about 90% since Athens Road Wells began continuous operation in October 2002

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
NV	Clark	Las Vegas	Las Vegas Wash Downstream of Seep Area (LW 5.3)		80-90			Has declined about 775% since Athens Road Wells began continuous operation in October 2002
NV	Clark	Las Vegas	Las Vegas Wash at North Shore Rd		100 expected in 2004			Perchlorate concentration have declined about 50% to 60% in 2003 to about 200-270 ppb
NV	Clark		Colorado River Below Hoover Dam (Willow Beach)		~3.0 (October 2003)			Peak concentrations have decreased from about 10 ppb or about 7 ppb since seep capture began in November 1999. Concentrations decreased to 3.4 ppb in September and 3.0 ppb in October 2003; the 2 lowest values ever measured at this location. Further declines expected in 2004.
NV	Clark		Colorado River at Colorado River Aqueduct at Lake Havasu		6			Peak concentrations have gradually declined from 9 ppb to less than 6 ppb since seep capture began in November 1999. Recent concentrations have ranged from non-detect (ND=4 ppb) to 6 ppb. Annual average concentrations has declined from 6.4 ppb in 2000 to 4.8 ppb in 2003 (a 25% decrease). Further decrease expected in 2004.

APPENDIX C – Summary of Perchlorate Sampling Data

Legend:	DW Conc = Drinking Water Concentration GW Conc = Groundwater Concentration	SW Conc = Surface Water Concentration	ppb = parts per billion	Note: Because much of the study area obtains its drinking water from groundwater sources and the Colorado River, perchlorate detections reported in drinking water are included in the data.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
DoD Facilities								
AZ	PIMA	TUCSON	DAVIS-MONTHAN AFB				ND-28,000	EOD Range surface after detonation. Detection limit was 40 ppb.
AZ	PIMA	TUCSON	DAVIS-MONTHAN AFB				ND – 1,000	Fifteen samples collected in September and October, 2003, in conjunction with RCRA closure of EOD range. Includes samples form bottom of old munitions residue burial pits, open detonation range surface, and drainage swales where rainwater pools. Detection limits from 42 to 48 ppb.
AZ	PIMA	TUCSON	DAVIS-MONTHAN AFB DRINKING WATER RESERVOIR ENTRY POINTS	ND	ND			
AZ	PIMA	TUCSON	PLANT 44		ND			Plant conducts aircraft maintenance, production
AZ	YUMA	YUMA	MCAS YUMA		3.3 - 4	4.6 - 5		These detections are associated with perchlorate from the Colorado River, which supplies drinking water to the base and recharges groundwater.
AZ	YUMA	YUMA	YUMA PROVING GROUND	4 – 31.9		5		Surface water sample from Colorado River, drinking water samples from 2000-2003. 97% drinking water samples below 10 ppb, 90% 4-5 ppb.
AZ	YUMA	YUMA	MCAS YUMA RANGE - BMGR		ND		ND – 150	Training
AZ	YUMA	YUMA	MCAS YUMA -MCAS MAIN WATER SYSTEM SOURCE WATER			4.6		Drinking water obtained from Colorado River which has a background level of 4-5 ppb.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	ORANGE	EL TORO	MCAS EL TORO-BASE-WIDE GROUNDWATER (NOTINCLUDING IRPSITE 1)		ND-16			Perchlorate not known to immediately threaten public water supply. IRP Sites 1 and 2 reported separately. Regulatory concurrence that no further investigation activities are required for any basewide groundwater areas other than Federally-owned IRP Sites 1 & 2. Base-wide groundwater consistent with off-station groundwater concentrations
CA	ORANGE	EL TORO	FORMER MCAS EL TORO -IRP SITE 1		ND-398.0		ND – 320	EOD Training area
CA	ORANGE	EL TORO	FORMER MCAS EL TORO – IRP SITE 2		ND-20.7			Landfill area down gradient from known perchlorate source at IRP 1.
CA	ORANGE	EL TORO	FORMER MCAS EL TORO-SITE 24, VOC PLUME, PRE-DESIGN PILOT TREATMENT SYSTEM		5.4 – 9.0 AVG. 6.5			1/15/2003 to 1/14/2004. Avg sample results over same time period 6.5
CA	ORANGE	TUSTIN	FORMER MCAS-MTBE GROUNDWATER TREATMENT SYSTEM (UST SITE 222) – NPDES		ND			The MTBE groundwater treatment system consists of an advanced oxidation and GAC bioremediation system. Currently, shallow groundwater is extracted from 6 wells within the center of a MTBE groundwater plume resulting from gasoline storage operations at UST Site 222. The current system flow rate ranges from 60-62 gpm and the effluent MTBE concentrations are below the laboratory detection limits. The sampling for perchlorate is part of the weekly NPDES discharge requirements. At no time during the history of MCAS Tustin has perchlorate been stored or utilized.
CA	IMPERIAL	EL CENTRO	EL CENTRO-OUTFLOW FROM DRINKING WATER PLANT	ND				Sampled from 3/13/01. Input to drinking water plant is Colorado River water.
CA	IMPERIAL		MCAS YUMA RANGE – CHOCOLATE MOUNTAIN	4.2				Drinking Water obtained from Colorado River.
CA	IMPERIAL		MCAS YUMA RANGE – CHOCOLATE MOUNTAIN				ND	Training
CA	ORANGE	SEAL BEACH	NWS SEAL BEACH – IR SITES 6 &70 EXPLOSIVE BURNING GROUND AND LIVE FIRING OF ROCKET ENGINES.		ND			Site 6 was used for open burning of waste ordnance from 1944-1971. material burned at site 6 included explosive-D, explosive-D sludge, waste powder, fog oil, and pyrotechnics. RT&E activities at site 70 did not include live firing of rocket engines. As part of the waste discharge requirements for the aquifer, the Navy sampled for perchlorate in one GW monitoring well.
CA	LOS ANGELES	LOS ANGELES	PLANT 42		ND			Research, Development, Test, and monitor wells

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	LOS ANGELES	MORRIS DAM		ND-52			
CA	RIVERSIDE	GLEN AVON	PYRITE CANYON		31-81			Need to establish FUDS eligibility. Records search will also include checking if any perchlorate containing items were stored/assembled, etc on site or if site usage during FUDS time era could have contributed to conditions.
CA	SAN BERNARDINO	BARSTOW	MCLB-YERMO – DRINKING WATER WELLS	ND				Sampled from 5/31/01; 6/19/02; 6/12/03. There is no known source of perchlorate for MCLB Barstow. Sampling was State of California requirement per Title 22 California Code Of Regulations Section 64450 for unregulated chemical monitoring.
CA	SAN BERNARDINO	CHINA LAKE	CHINA LAKE NAWS	ND	15-720			China Lake NAWS is located in three counties, San Bernardino, Kern, and Inyo; the perchlorate data in this table reflects the installation as a whole; therefore, some of the results may be from areas outside the study area. Naturally occurring perchlorate has been detected in area soils by USGS. The deeper, drinking water aquifer used in this area does not appear to be hydraulically connected to the high TDS groundwater that underlies the installation. Groundwater samples were taken from shallow, non-beneficial use groundwater.
CA	KERN	EDWARDS	EDWARDS AFB-JPL		ND-30,700		700-2,100,000	Data based on 72 samples. Sources of perchlorate include propulsion research and development.
CA	KERN	EDWARDS	EDWARDS AFB-AFRL		ND-847			Data based on 304 samples. Sources of perchlorate include rocket testing and associated support activities.
CA	SAN BERNARDINO	TWENTY-NINE PALMS	MAGTF 29 PALMS-DRINKING WATER WELLS	ND				Sampling from 8/28/97 to 12/11/02 MAGTF 29 Palms is scheduled to re-sample source wells for perchlorate 2004 calendar year.
CA	SAN DIEGO	SAN DIEGO	MCB CAMP PENDLETON-UCMR-MULTIPLE DRINKING WATER WELLS	ND				Sampled from 2/21/02; 5/2/02; 2/12/03; 4/9/03; 7/23/03; 12/1/03
CA	SAN DIEGO	CORONADO	CORONADO NAVAL BASE- IR SITE 9,		ND			Sampled from 1/18/03; 5/7/03; 11/7/03. NAB Coronado, NASNI Site 9: Sampling for perchlorate was performed due to interest by the state regulatory agencies and not due to any specific requirement
CA	SAN DIEGO	WARNER SPRINGS	SERE CAMP MAIN AND BACKUP WELLS	ND				SERE Camp: Drinking water wells that pull groundwater to serve the base. Site is a small training base in the East part of San Diego County.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	VENTURA	SAN NICOLAS ISLAND	SAN NICOLAS ISLAND OLF	ND-20	2.3	ND-20	1.7-266	Perchlorate was detected in surface springs that were used to supplement drinking water supplies on the island. Initial Detection date 0923/98. The springs are no longer used as a source of drinking water; however, the springs continue to be sampled monthly and most recent data from the springs has been ND. Groundwater and soil perchlorate results from Explosives Ordnance Disposal (EOD) range.
CA	VENTURA	PORT HUENEME	CBC PORT HUENEME NAVAL BASE VENTURA		ND			IR Site 14 monitoring wells
Non-DoD or Industrial Facilities								
CA	LOS ANGELES	SANTA CLARITA, SAUGUS	WHITTAKER BERMITE	47	290,000		1,500,000	
CA	RIVERSIDE	GLEN AVON	STRINGFELLOW	2.1-67	682,000			
AZ	MARICOPA	TEMPE	AERODYNE CORP		18			
AZ	MARICOPA	GOODYEAR	UNIDYNAMICS/PHOENIX GOODYEAR AIRPORT	8.4 - 65	80			
AZ	MARICOPA	PHOENIX	UPCO	2	43-130			THERE IS UNQUANTIFIED SOIL CONTAMINATION
CA	SAN BERNARDINO	RIALTO	CITY OF RIALTO (B.F. GOODRICH AEROSPACE & DEFENSE & OTHER PRPS)	811				DEPARTMENT CONTESTS PRP STATUS
CA	SAN BERNARDINO	REDLANDS	LOCKHEED PROPULSION COMPANY (FORMER)	87				TREATMENT SYSTEM OPERATIONAL-APPROX 5 MILLION GALLONS/DAY. STATE REGIONAL WATER QUALITY CONTROL BOARD ORDERS.
CA	SANTA BARBARA	CASMALIA	CASMALIA RESOURCES		58			
CA	LOS ANGELES	PASADENA	NASA JPL	25	1,500			Treatment plant operational in early 2005
NV	CLARK	HENDERSON	KERR-MCGEE CHEMICAL	24	6,600,000	120,000		Drinking water concentrations with a high of ~13 ppb have been recorded over the last year
NV	CLARK	HENDERSON	KERR MCGEE PROPERTY ABOVE SLURRY WALL		1,300,000–1,500,000			MONITORING LOCATION REFLECTS PERCHLORATE SOURCE AREA; NOT LIKELY TO DECREASE FOR MANY YEARS
NV	CLARK	HENDERSON	KERR MCGEE PROPERTY BELOW SLURRY WALL (M-100)		110,000–130,000			HAS DECLINED ABOUT 80% SINCE SLURRY WALL INSTALLED IN OCTOBER 2001
NV	CLARK	HENDERSON	PEPCON		600,000			

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
State, Local and Water Purveyors								
AZ	LA PAZ	LA PAZ	BROOK WATER LLC-LAKESIDE_UCMR	6				
AZ	MARICOPA	CHAPARREL	CHAPARRAL CITY WATER CO-UCMR	6				
AZ	MARICOPA	GLENDALE	GLENDALE MUNICIPAL WATER CC-UCMR	5				
AZ	MARICOPA	SCOTTSDALE	SCOTTSDALE MUNICIPAL WATER-UCMR	7.0				
CA	IMPERIAL	BRAWLEY	CITY OF BRAWLEY-UCMR	5				
CA	IMPERIAL		IMPERIAL VALLEY COLLEGE-UCMR	6				
CA	IMPERIAL	EL CENTRO	IMPERIAL IRRIGATION DISTRICT- AGRICULTURAL WELLS	4.1-6.0				Sample Dates: 10/19/01, 1/14/02, 4/15/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles		CALIFORNIA WATER SERVICE CO.-ELAWELL 10-03-INACTIVE	6.2-8.5				Sample Dates: 05/00-09/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Los Angeles		VALLEY COUNTY WATER DIST.INACTIVE WELLS	12.0-94.0				Sample Dates: 5/97 – 12/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		NEWHALL CWD-NEWHALL-WELL 11 - INACTIVE	12.0-20.0				Sample Dates: 05/97-12/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		RUBIO CANON LAND & WATER ASSOCIATION-WELL 04	4.2-6.0				Sample Dates: 06/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALENCIA HEIGHTS WATER CO.-ACTIVE AND INACTIVE WELLS	4.0-33.0				Sample Dates: 04/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		VALLEY WATER CO.-WELLS 01-04	4.0 –8.0				Sample Dates: 06/97-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES		CALIFORNIA DOMESTIC WATER COMPANY	4.0-14.0				Sample Dates: 10/99-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	ARCADIA	ARCADIA-CITY, WATER DIVISION-ST. JOSEPH WELL 02	4.2-8.6				Sample Dates: 1/02-6/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	AZURA	AZUSA LIGHT AND WATER-WELL 10 (AVWC8)	5.0-12.0				Sample Dates: 6/97-2/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA data shows 11 ppb.
CA	LOS ANGELES	AZURA	AZUSA LIGHT AND WATER-UCMR	11				CA data reports concentrations of 5.0-12.0 ppb
CA	Los Angeles	BELLFLOWER - SOMERSET	MWC-WELL 833	6.1-6.7				Sample Dates: 02/99-03/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	BELLFLOWER-NORWALK	PARK WC - BELLFLOWER-NORWALK-WELL 29-K	3.2-7.50				Sample Dates: 10/98-05/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	CLAREMONT	SCWC-CLAREMONT-CAMPBELL WELL 01-INACTIVE	6.0-7.4				Sample Dates:01/98-07/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	COVINA	COVINA-CITY, WATER DEPT.-GRAND AVE. WELL – INACTIVE	20.0-23.0				Sample Dates: 12/97-04/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	INDUSTRY	WATERWORKS SYSTEMS-WELLS – STANDBY	5.3-14.8				Sample Dates: 09/98-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	FOOTHILL	FOOTHILL MUNICIPAL WATER DIST.-PURCHASED TREATED WATER - MWD (WEYMOUTH)	4.1-4.3				Sample Dates: 5/013/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	GLENDALE	WATER DEPT.	4.6-6.3				Sample Dates: 02/00-07/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA CANADA	IRRIGATION DIST.-WELL 01	4.8-6.0				Sample Dates: 06/97-06/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA PUENTE	LA PUENTE VALLEY CWD-POST UVTERRA/PRECHLORINATION EFF-TREATED	3.4-4.8				Sample Dates: 05/01-08/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LA PUENTE	LA PUENTE VALLEY CWD-WELLS	35.0-159.0				Sample Dates: 06/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LAS FLORES	LAS FLORES WATER CO.	4.0-9.0				Sample Dates: 06/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	LA VERNE	LA VERNE, CITY ACTIVE AND IINACTIVE WELLS	4.2-26.0				Sample Dates: 04/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LINCOLN AVENUE WATER CO.	2.0-16.0				Sample Dates: 06/02/97 – 05/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	LOS ANGELES-CITY, DEPT. OF WATER & POWER WELLS	4.0-21.0				Sample Dates: 10/00-02/04 . Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SO. CAL.	4.0-8.0				Sample Dates:06/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	LOS ANGELES	MWD OF SOUTHERN CALIFORNIA-UCMR	7.0				
CA	LOS ANGELES	LOS ANGELES	CALIFORNIA STATE POLYTECHNICAL UNIVERSITY-POMAONA-UCMR	6				
CA	LOS ANGELES	LOS ANGELES	SOUTH CALIFORNIA-WEST ORANGE-UCMR	6				
CA	LOS ANGELES	LOS ANGELES	SUBURBAN WATER SYSTEMS-UCMR	7				
CA	LOS ANGELES	MONROVIA	MONROVIA-CITY, WATER DEPT.-MONROVIA WELL 01 – ABANDONED	4.0-8.4				Sample Dates:12/99-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	MONTEREY PARK	MONTEREY PARK-CITY, WATER DEPT	2.0-14.0				Sample Dates:08/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	PASADENA	PASADENA-CITY, WATER DEPT.-	1.49-54.0				Sample Dates:06/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 35.0 ppb.
CA	LOS ANGELES	PASADENA	CITY OF PASADENA WATER DEPARTMENT-UCMR	35				Well is not identified. CA data reports concentrations of up to 54.0 ppb.
CA	LOS ANGELES	S. PASADENA	CITY OF SOUTH PASADENA WATER DEPARTMENT-UCMR	5				CA data reports concentrations of 4.0-6.8 ppb
CA	LOS ANGELES	POMONA	POMONA- CITY, WATER DEPT.	3.0-19.0				Sample Dates: 8/98-3/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 10.0 ppb.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	POMONA	CITY OF POMONA-UCMR	10				CA data reports concentrations of 3.1-19.0 ppb.
CA	LOS ANGELES	SANTA CLARITA	SANTA CLARITA WATER CO.-	4.2-47.0				Sample Dates: 04/97-11/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN DIMAS	SCWC-SAN DIMAS	3.9 – 20.0				Sample Dates: 04/97-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN GABRIEL	SAN GABRIEL CWD-WELL 07 - ACTIVE	4.0-5.6				Sample Dates:09/02-04/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SOUTH PASADENA	SOUTH PASADENA-CITY, WATER DEPT.-GRAVES WELL 02	4.0-6.8				Sample Dates: 07/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 5.0 ppb.
CA	LOS ANGELES	SAN FERNANDO	SAN FERNANDO CITY WATER DEPARTMENT-UCMR	9				Public Water supply Wells not immediately threatened. Incorporated into Superfund Remedial Investigation Monitoring Program.
CA	LOS ANGELES	SAN GABRIEL	VALLEY WATER CO.-EL MONTE	4.0-77.0				Sample Dates: 06/97- 11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN GABRIEL	SAN GABRIEL CWD-UCMR	4				Treatment Systems Operational-Will increase capacity to 33 million gallons/day. Superfund Record of Decision and cleanup Order.
CA	LOS ANGELES	SAN GABRIEL	SAN GABRIEL VALLEY WC-FONTANA-UCMR	15				This facility is listed under San Bernardino County in the CA data.
CA	LOS ANGELES	SOUTH SAN GABRIEL	SCWC-SOUTH SAN GABRIEL	2.2-8.1				Sample Dates: 07/02-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN JOSE	SUBURBAN WATER SYSTEMS-126-W2	2.0 – 42.0				Sample Dates: 05/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	LOS ANGELES	SAN MARINO	CAL/AM WATER COMPANY	3.1-20.0				Sample Dates: 06/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	LOS ANGELES	VERNON	VERNON-CITY, WATER DEPT.-WELL 18	4.4-19.0				Sample Dates: 02/00-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 5.0 ppb.
CA	LOS ANGELES	WHITTIER	WHITTIER-CITY, WATER DEPT.-WELL 16	4.0				Sample Dates: 11/97-11/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		PAGE AVENUE MUTUAL WATER COMPANY-WELL 01	4.1-9.1				Sample Dates: 03/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		IRVINE RANCH WATER DISTRICT-UCMR	6				
CA	ORANGE		CRESCENT WATER ASSOCIATION-WELL 01	4.0-5.9				Sample Dates: 06/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		VILLA CAPRI MOBILE ESTATES-WELL 01	4.4-6.3				Sample Dates: 04/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		WELL 07	5.2-5.52				Sample Dates:02/98-12/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE		Southern Calif WC Wells	4.1-7.7				Sample Dates:07/98-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	Anaheim	CITY OF ANAHEIM WELLS	4.1-7.25				Sample Dates: 03/98-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	Orange	Anaheim	CITY OF ANAHEIM-UCMR	4				
CA	ORANGE	Fullerton	CHRISTLIEB WELL 15A	4.0-4.3				Sample Dates:12/03-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	GARDEN GROVE	CITY OF GARDEN GROVE-UCMR	4				
CA	ORANGE	GARDEN GROVE	WELL 027	4.0-4.8				Sample Dates: 06/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	IRVINE	IRVINE RANCH WATER DISTRICT-WELL 03	5.3-6.1				Sample Dates: 12/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	ORANGE	SANTA ANA	WELL3 13 & 32	4.0-5.48				Sample Dates: 05/98-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	ORANGE	TUSTIN	CITY OF TUSTIN	4.2-10.7				Sample Dates: 03/98-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		DESERT WATER AGENCY WELLS	4.0-7				Sample Dates:06/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		EASTERN MUNICIPAL WD	5.0-12.0				Sample Dates: 09/00-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		JURUPA COMMUNITY	4.0-5.0				Sample Dates: 07/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE		JURUPA COMMUNITY-UCMR	5				
CA	RIVERSIDE		RUBIDOUX COMMUNITY SD-UCMR	10				
CA	RIVERSIDE		RUBIDOUX COMMUNITY	6.0 -12.0				Sample Dates: 06/99-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	7TH & CHICAGO - DISTRIBUTION	4.0-12.0				Sample Dates: 02/98-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	BRUNTON WELL - AGRICULTURAL	17.0-23.0				Sample Dates:03/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	CREST BOOSTER STATION	4.1-12.0				Sample Dates: 01/99-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	ELECTRIC STREET WELL	4.0-5.3				Sample Dates: 10/98-01/99. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	ELEVENTH ST. WELL - INACTIVE	14.0-17.0				Sample Dates: 09/00-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	FILL WELL - INACTIVE	10.0-16.0				Sample Dates: 09/00-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	GAGE DELIVERY TREATED	4.0-17.0				Sample Dates: 06/97-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
								have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	GAGE WELLS	4.0-65.0				Sample Dates: 06/97-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	GARNER WELLS	4.0-14.0				Sample Dates: 06/01-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	GRAND TERRACE BSTR - DISTRIBUTION	64.0-6.9				Sample Dates: 07/01-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	HUNT WELLS	4.0-10.0				Sample Dates: 06/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	INDUSTRIAL BSTR - DISTRIBUTION	4.1-5.2				Sample Dates: 07/03-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	IOWA BOOSTER - DISTRIBUTION SYSTEM	4.3-5.4				Sample Dates: 08/01-11/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	MOORE GRIFFITH	4.0-7.4				Sample Dates: 07/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	NORTH ORANGE	4.0-6.5				Sample Dates: 03/00-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	PALMYRITA	4.3-10.0				Sample Dates: 07/03-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	RAUB WELLS	4.0-20.0				Sample Dates: 04/99-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	RUSSELL C WELL	4.1-4.2				Sample Dates: 12/03-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	SCHEUER	5.5-7.8				Sample Dates: 07/00-12/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	STILES	5.0-13.0				Sample Dates: 08/98-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	RIVERSIDE	RIVERSIDE	SUNNYSIDE IX/GAC PLANT EFFLUENT - TRTD	4.0-8.1				Sample Dates:10/02-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	TIPPECANOE IX/GAC PLANT EFFLUENT - TRTD	5.0-27.0				Sample Dates:10/02-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	TWIN SPRINGS	4.8-8.0				Sample Dates:07/98-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	WARREN WELL 01	5.0-7.8				Sample Dates:02/99-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	RIVERSIDE	LESTER SWTP	4.7-8.3				Sample Dates: 03/01-06/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	CORONA	MULTIPLE WELLS – ACTIVE< ABANDONED, DESTROYED	4.2-13.0				Sample Dates: 03/00-12/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	CORONA	CITY OF CORONA-UCMR	13				
CA	RIVERSIDE	COACHELLA	COACHELLA V. WD: COVE COMMUNITY-UCMR	6				
CA	RIVERSIDE	HEMET	WELL 03	5.3-6.0				Sample Dates: 09/99-06/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	RIVERSIDE	SANTA ANA	Santa Ana Wtrshd Project Auth.	4.0-7.3				Sample Dates: 08/02-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		EAST VALLEY WD-UCMR	16				
CA	SAN BERNARDINO		EAST VALLEY WD WELLS	4.0-16.0				Sample Dates:02/01-02/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		HAVASU WC-LAKE HAVASU - RAW	5.0-5.8				Sample Dates: 08/00-09/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		LOMA LINDA UNIVERSITY-ANDERSON WELL 3	4.0-4.9				Sample Dates: 11/02-04/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		RIVERSIDE HIGHLAND WATER CO.-UCMR	5				

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	SAN BERNARDINO		WEST VALLEY WATER DISTRICT-WELLS 18A & 22	4.0-10.0				Sample Dates: 05/00-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		WEST VALLEY WATER DISTRICT-WELL 22 – ABANDONED	19.5-820.0				Sample Dates: 09/97-08/00. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		VICTORIA FARMS MWC-WELL 01 – INACTIVE	12.0-16.0				Sample Dates: 04/97-05/97. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO		YUCAIPA BLVD WELL – INACTIVE	7.1-18.0				Sample Dates: 05/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	CHINO	MULTIPLE WELLS	4.0-29.0				Sample Dates: 09/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	CHINO	CITY OF CHINO	21				
CA	SAN BERNARDINO	CHINO HILLS	WELL 07B	4.1-4.4				Sample Dates: 02/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	CUCAMONGA	CUCAMONGA CWD-UCMR	8				
CA	SAN BERNARDINO	COLTON	WELLS 15, 17, 24	4.2-9.4				Sample Dates: 09/97-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	MOUNTAIN VIEW BLENDING SITE - TREATED	5.0-13.6				Sample Dates: 07/99-08/01. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	MT. VIEW 02 - Inactive	6.0-35.0				Sample Dates: 09/97-04/00. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	MT. VIEW WELL 01 - Destroyed	5.0-28.0				Sample Dates: 04/97-04/98. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	LOMA LINDA	RICHARDSON ST. WELLS 01	4.0-37.0				Sample Dates: 06/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	San Bernardino	Monte Vista	Monta Vista CWD-UCMR	4				
CA	SAN BERNARDINO	ONTARIO	MULTIPLE WELLS	4.1-12.0				Sample Dates: 10/97-05/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
CA	SAN BERNARDINO	ONTARIO	CITY OF ONTARIO-UCMR	12				
CA	SAN BERNARDINO	RANCHO CUCAMONGA	CUCAMONGA CWD WELLS	4.0-9.0				Sample Dates: 09/97-08/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY-MUD-WATER DIV WELLS	4.0-130.0				Sample Dates: 05/97-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate. EPA reports concentration of 7.0 ppb.
CA	SAN BERNARDINO	REDLANDS	REDLANDS CITY MUD-WATER DIV-UCMR	7				
CA	SAN BERNARDINO	RIALTO	MUNICIPAL WELLS	4.1 – 88.0				Sample Dates: 10/97-03/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	RIALTO	CITY RIALTO UCMR	21				
CA	SAN BERNARDINO	SAN BERNARDINO	PERRIS HILL WELL 04	6.1-9.40				Sample Dates:01/01-01/04. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN BERNARDINO	SAN BERNARDINO CITY-UCMR	7				
CA	SAN BERNARDINO	SAN BERNARDINO	PATTON STATE HOSPITAL-WELLS10 & 14	5.2-13.0				Sample Dates: 07/01-10/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN BERNARDINO	SAN GABRIEL VALLEY	SAN GABRIEL VALLEY WC - FONTANA-WELLS	4.0-24.0				Sample Dates:09/97-00/03. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN DIEGO	ESCONDIDO	SAN DIEGO COUNT WATER AUTHORITY	4.0-4.7				Sample Dates: 02/01-02/02. Sources are primarily groundwater wells, although sources containing water from the Colorado River have also reported perchlorate.
CA	SAN DIEGO	ESCONDIDO	CITY OF ESCONDIDO-UCMR	4				
CA	VENTURA	SANTA SUSANA	SANTA SUSANA FIELD LAB, ROCKETDYNE DIVISIONS (DOE)		750			
NV	CLARK		MOHAVE GENERATING STATION-UCMR	7				
NV	CLARK		S. NEVADA WATER SYSTEM-UCMR	14				

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
NV	CLARK	BOLDER CITY	LAKE MEAD AT LAS VEGAS BAY (LVB 2.7/LVB 3.5)		20-100 (Seasonal Variation; peaks in spring/summer; valleys in fall/winter)			No clear trend during last 3 years (except seasonal variation). On 12/16/03 sampling location moved to LVB 3.5 due to low water elevations in Lake Mead
NV	CLARK	BOLDER CITY	LAKE MEAD AT SADDLE ISLAND(AMSWTF RAW WATER)		9.8 (2003 average)			Concentrations appear to be declining in late 2003; further declines expected in 2004. Monthly average concentrations declined to 5.9 ppb in September and 6.6 ppb in October 2003, the 2 lowest values in more than 4 years of data. November and December monthly average peaks were both 10.5 ppb, about 35% lower than pervious 3 years peaks (2000-2002). 2003 annual average was 9.8 ppb, about the same as 2001 (10.4 ppb) and 2002 (9.9 ppb); lower lake levels have likely prevented decreases in annual average concentrations.
NV	CLARK	LAS VEGAS	GROUNDWATER AT ATHENS ROAD WELLS (ART-8)		400,000-450,000			Not likely to decrease for many years
NV	CLARK	LAS VEGAS	GROUNDWATER BELOW ATHENS ROAD WELLS (ARP-3)		220,000			Has declined 50%-60% since Athens Road Wells began continuous operation in October 2002. Results erratic; there could be a nearly flat gradient with low flows just below Athens Road Wells
NV	CLARK	LAS VEGAS	GROUNDWATER AT SEEP AREA (PC-97)		10,000			Has declined about 90% since Athens Road Wells began continuous operation in October 2002
NV	CLARK	LAS VEGAS	LAS VEGAS WASH DOWNSTREAM OF SEEP AREA (LW 5.3)		80-90			Has declined about 775% since Athens Road Wells began continuous operation in October 2002
NV	CLARK	LAS VEGAS	LAS VEGAS WASH AT NORTH SHORE RD		100 expected in 2004			Perchlorate concentration have declined about 50% to 60% in 2003 to about 200-270 ppb

State	County	City	Facility/Site Name	DW Conc. (ppb)	GW Conc. (ppb)	SW Conc. (ppb)	Soil Cont. (ppb)	Comments
NV	CLARK		COLORADO RIVER BELOW HOOVER DAM (WILLOW BEACH)		~3.0 (October 2003)			Peak concentrations have decreased from about 10 ppb or about 7 ppb since seep capture began in November 1999. Concentrations decreased to 3.4 ppb in September and 3.0 ppb in October 2003; the 2 lowest values ever measured at this location. Further declines expected in 2004.
NV	CLARK		COLORADO RIVER AT COLORADO RIVER AQUEDUCT AT LAKE HAVASU		6			Peak concentrations have gradually declined from 9 ppb to less than 6 ppb since seep capture began in November 1999. Recent concentrations have ranged from non-detect (ND=4 ppb) to 6 ppb. Annual average concentrations has declined from 6.4 ppb in 2000 to 4.8 ppb in 2003 (a 25% decrease). Further decrease expected in 2004.

APPENDIX D – CALIFORNIA STUDY AREA TREATMENT STATUS
As of March, 2005

Lead Agency	Location	Treatment Status
DoD	Edwards AFB North Base Edwards, CA	Not known to immediately threaten public water supply. Air Force initiated project, incorporated into Superfund Federal Facility Remedial Investigation and Feasibility Study. Treatability Study underway.
DoD	MCAS El Toro Orange County, CA	Not known to immediately threaten public water supply. Incorporated into Superfund Federal Facility Remedial Investigation and Feasibility Study.
State	Lockheed Propulsion Redlands, CA	Treatment System Operational - approximately 5 million gallons per day. State Regional Water Quality Control Board Orders.
NASA	NASA Jet Propulsion Lab Pasadena, CA	Pilot Scale treatment system operational. On-site full-scale treatment system expected to be operational by the end of 2005. Full Scale treatment system for on- and off-site plumes expected to be completed by mid-2007.Superfund Site (Federal Facility).
State/ EPA	Rialto-Colton Plume Rialto, CA	Treatment Systems Operational - Over 10 million gallons per day. Public water supply wells temporarily closed or blended to PHG. Incorporated into state and EPA Remedial Investigation.
EPA	San Gabriel Valley Sites Baldwin Park, CA	Treatment System Operational - Will increase capacity to 33 million gallons per day. Superfund Record of Decision and Cleanup Orders
State	San Nicolas Island Ventura County, CA	Alternative water supply to contaminated springs. U.S. Navy firing range on remote island.*
EPA	Stringfellow Superfund Site Glen Avon, CA	Not known to immediately threaten public water supply. Incorporated into Superfund Remedial Investigation and Feasibility Study
State	Whittaker-Bermite Ordnance Santa Clarita, CA	Public water supply wells temporarily closed or blended to PHG. Incorporated into state Remedial Investigation and USACE planning.

* Navy voluntarily stopped using the spring to augment the installation's drinking water supplies which were provided primarily by an existing drinkingwater desalinization plant.

APPENDIX E – Acronym List

ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
AFB	Air Force Base
AP	ammonium perchlorate
ASP	Ammunition Storage Point
BD/DR	Building Demolition and Debris Removal
BMGR	Barry M. Goldwater Range
BRAC	Base Realignment and Closure
CBC	Construction Battalion Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLWA	Castaic Lake Water Agency
CWS	Chemical Warfare Service
DERP	Defense Environmental Restoration Program
DHS	Department of Health Services
DoD	Department of Defense
DOE	Department of Energy
DTSC	Department of Toxic Substances Control
DWEL	Drinking Water Equivalent Level
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESTCP	Environmental Security Technology Certification Program
FBR	Fluidized Bed Reactor
FUDS	Formerly Used Defense Sites
HBGL	Health-Based Guidance Level
H. Rept.	House Report
IC	ion chromatography
IR	Installation Restoration
IRP	Installation Restoration Program
IWG	interagency working group
JPL	Jet Propulsion Laboratory
KM	Kerr-McGee Chemical LLC
KMCC	Kerr-McGee Chemical Company
KP	potassium perchlorate
MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
MCLB	Marine Corps Logistics Base
MgP	magnesium perchlorate
MMRP	Military Munitions Response Program
MRL	Method Reporting Limit
MS	mass spectrometry
MTBE	methyl tertiary butyl ether

MWD	Metropolitan Water District of Southern California
NAF	Naval Air Facility
NaP	Sodium perchlorate
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NAWC/WD	Naval Air Warfare Center Weapons Division
NDEP	Nevada Department of Environmental Protection
NOLF	Navy Outlying Landing Facility
NOSC	Naval Ocean Systems Center
NPDES	National Pollutant Discharge Elimination System
NPL	Superfund National Priorities List
NS	Naval Station
NTC	Naval Training Center
NTTR	Nevada Test and Training Range
NWS	Naval Weapons Station
OB/OD	open burning and open detonation
OCWD	Orange County Water District
ORNL	Oak Ridge National Laboratory
OSW	Office of Solid Waste
OU	Operable Unit
PAL	provisional action level
PEPCON	Pacific Electrical Production Company
PHG	public health goal
ppb	parts per billion
ppm	parts per million
QA/QC	quality assurance and quality control
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RT&E	research, testing, and evaluation
SCVWD	Santa Clara Valley Water District
SDWA	Safe Drinking Water Act
SERDP	Strategic Environmental Research and Development Program
SERE	Survival, Evasion, Resistance, and Escape
SNWA	Southern Nevada Water Authority
TDS	total dissolved solids
UCMR	Unregulated Contaminant Monitoring Rule
UPCO	Universal Propulsion Company
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
VOC	volatile organic compound