

Arizona

Perchlorate Occurrence Study

Drinking Water Sources

Phase One Sampling

April / May / July / August / September 1999



Water Quality Division
Drinking Water Section

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Perchlorate Occurrence Study
Drinking Water Sources
Phase One

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Mission: The Department of Environmental Quality shall preserve, protect and enhance the environment and public health and shall be a leader in the development of public policy to maintain and improve the quality of Arizona's air, land and water resources.

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Preface

This report was made possible through a cooperative partnership between ADEQ Drinking Water Section, the Arizona Small Utilities Association (ASUA), the Intertribal Council of Arizona (ITCA), the Fort Mohave Indian Tribe, Chemehuevi Indian Tribe, North Cocopah Tribal Council, the Colorado River Indian Tribes, the Arizona Department of Health Services (ADHS), the Arizona Department of Environmental Quality Southern Regional Office (SRO), the Arizona Department of Environmental Quality Northern Regional Office (NRO) and all those owners and operators of small rural water systems and municipalities who allowed the ASUA representative to enter their sites to collect samples for the study.

It must also be mentioned, with deep appreciation, that the Interagency Perchlorate Steering Committee (IPSC) sponsored the Perchlorate Stakeholders Forum. This sharing of ideas and pooling of scientific information from other states, as well as from the EPA, has been beneficial in understanding issues relating to perchlorate contamination, its occurrence and its effects on drinking water. It was through ADEQ's participation in the IPSC forum that the need to better understand the occurrence of perchlorate in drinking water sources in Arizona was identified.

This report is Phase One of a two-part report. This phase covers the time periods of high water usage in the summer which also corresponds to high volume dam releases along the Colorado River. Phase Two will be started in January 2000 and should conclude March 2000. It will cover winter water usage and a time period with normally low seasonal volume dam releases along the Colorado River. This is based upon the 1998 statistical information gathered from the Bureau of Land Management. It should also be recognized that the Colorado River not only serves as a source of drinking water for the majority of the population in Arizona, but it is also used as a source of water for agricultural and recreational uses.

For more information on perchlorate issues at the national level, or for other drinking water information, please visit these websites:

EPA website <http://www.epa.gov/ogwdw/ccl/perchlor/perchlo.html>
IPSC website <http://www.epa.gov/ogwdw/ccl/perchlor/ipsc.html>
ADEQ website <http://www.adeq.state.az.us>
ADHS website <http://www.hs.state.az.us/edc/ehpage.html>

Executive Summary

Scope of this report:

The purpose of this document is to present a summary of perchlorate occurrence data collected at a number of drinking water sources used by public water systems in Arizona. This includes sampling points along the Colorado River, the Central Arizona Project (CAP) canal, groundwater wells near surface water sources, groundwater injection wells, and groundwater wells. This report is also intended to provide a foundation of scientific occurrence information that can be utilized for trend analysis, policy development, national rule writers or by risk analysis staff at the state and federal levels.

There are currently no regulatory levels for perchlorate in drinking water at the national or state level. As of the date of this report, the ADHS Office of Environmental Health has developed a Provisional Drinking Water Health Based Guidance Level (HBGL) of 31 parts per billion and is also about to publish a newborn risk study relating to perchlorate and drinking water sources. The ADHS newborn risk study has not been released as of date of this report. Inquiries should be made to the ADHS.

The levels of perchlorate in the drinking water sources contained in this report range from No Detect, which is defined as less than four parts per billion (<4 ppb), to 8.5 ppb. Lake Mead results range from No Detect (<4 ppb) to 480 ppb. The closer the sample points were to the Las Vegas Wash inlet into Lake Mead, the higher the perchlorate levels.

Historical Information - The Colorado River and Perchlorate:

This report is a more detailed occurrence study than a report concluded earlier this year by the EPA. In that study, the EPA conducted occurrence sampling along the Colorado River only. The EPA's sampling was conducted to help address issues raised by concerned citizens of Nevada, Arizona, California and the Indian Communities using the Colorado River for irrigation, agriculture and drinking purposes. The sampling time frame also had to do with availability and accuracy of laboratory methods. In February 1999, the EPA was provided with a more accurate laboratory method that could reach detection levels for perchlorate down to four parts per billion. Just months earlier the lowest level that could be reached by previous laboratory methods was 200 ppb. The EPA focused on the Colorado River because the river had become a recipient of a major source of perchlorate contamination from a waste site located in Henderson, Nevada.

Approximately ten years ago a major explosion occurred at a solid rocket fuel manufacturing plant in Henderson, Nevada. After the explosion, the soluble ammonium perchlorate found its way into the Las Vegas Wash. The Las Vegas Wash drains into Lake

Executive Summary (Continued)

Mead, which then feeds into the Colorado River as it flows through Hoover Dam. The higher concentrations of perchlorate occur in Nevada and in Lake Mead; lower concentrations are found in the Colorado River, downstream from Hoover Dam. As with any occurrence study, the data points are only pictures in time. The results do not necessarily represent the water quality of the sampling points under all conditions of flow.

Study Format:

This study is represented in text format, table format, GIS visual map format and is supplemented with laboratory documentation on the quality assurance, quality control information. In addition, site specific supplemental information was conducted at each sample point such as ambient air temperature, water temperature, conductivity, depth of sample measurement, global positioning documentation and corresponding zip codes. These additional data points were requested by several interested persons including the ADHS, Indian Tribes, and by ADEQ scientific and hydrological staff. This report does not attempt to correlate the supplemental scientific information to fluctuations in perchlorate levels. Phase Two may provide an opportunity to conduct trend analysis of the occurrence data to the temperature, depth, pH or conductivity of the source water, if any such scientific correlation exists.

Regulation of Perchlorate in Drinking Water:

The EPA's Drinking Water Program has published a draft federal rule which proposes to make perchlorate an unregulated constituent within the drinking water rules, so that national occurrence information can be collected by water systems throughout the nation. The EPA and the National Academy of Science are continuing their perchlorate toxicology review and risk characterization to human health as well as to the ecosystem. Updates on their human risk studies can be obtained on the EPA or IPSC websites (please see page one).

ADEQ's Drinking Water Section will continue to share all information relating to this issue with any interested persons, organizations or regulatory authorities. This report, as well as any updates, will also be posted on the ADEQ web site and will be provided to the EPA.

Currently, national and state level waste programs have regulations governing perchlorates. Although perchlorate is a new issue for both the national and state drinking water programs, stakeholders have already stated that it would be beneficial to include the waste programs, as well as other interested persons, into the information loop on any drinking water studies conducted by the EPA or States. Such a mechanism currently exists in the form of the IPSC. It is a prime example of the EPA's foresight in addressing the need to create a forum which allows for the cooperative exchange of scientific information on perchlorate. The EPA's proactive approach is helping to build a strong partnership, which aids in bringing

Executive Summary (Continued)

together the limited resources of other state environmental regulatory programs and provides up-to-date scientific information on perchlorate to concerned citizens, environmental professionals and state regulatory agencies.

Chemical Summary:

Perchlorate is an oxidizing anion that originates in ground and surface waters from the dissolution of ammonium-, potassium-, magnesium- or sodium perchlorate salts. Perchlorate is exceedingly mobile in aqueous systems and can persist for many decades under typical ground and surface water conditions.

Ammonium perchlorate is manufactured for use as an oxidizer component and primary ingredient in solid propellant for rockets, missiles, and fireworks. Because it is a reducing agent, it can undergo a variety of intramolecular redox reactions that lead to the release of gaseous products, and, thus, it can act as a thrust booster. Perchlorate salts are also used as a component of air bag inflators on a large scale.

Other uses of perchlorate salts include their use in nuclear reactors and electronic tubes, as additives in lubricating oils, in tanning and finishing leather, as a component in fabrics and dyes, in electroplating, in aluminum refining, in rubber manufacture, and in the production of paints and enamels. Chemical fertilizers also have been reported to be a potential source of perchlorate contamination.

Large scale production of perchlorate-containing chemicals in the United States began in the mid 1940's. Because of its short shelf life, perchlorate must be washed out of the United States' missile and rocket inventory regularly and replaced with a fresh supply. Thus, in various states, large volumes have been disposed of since the 1950's.

Perchlorate began to be discovered at various manufacturing sites and in well water throughout the United States. In California, most of the locations where perchlorate has been detected are associated with facilities that have manufactured or tested solid rocket fuels for the Department of Defense (DOD) or National Aeronautics and Space Administration (NASA).

Perchlorate in drinking water is a concern due to existing uncertainties in the toxicological database. Available information inadequately addresses the potential for perchlorate to produce human health effects at low levels. The EPA has published a DRAFT report entitled: Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization Based on Emerging Information; December 31, 1998; NCEA-1-0503.



Drinking Water Section

Fact Sheet #3

Perchlorate (ClO_4^-)

Arizona Department of Environmental Quality

Drinking Water Section

3033 N. Central Avenue, Phoenix, Arizona 85012

Information about ADEQ and the Drinking Water Program can be obtained by calling the Drinking Water Section toll free at 1-800-234-5677 extension 4644, or by the ADEQ web site which is located at: www.adeq.state.az.us

- ① Ammonium perchlorate is a man-made inorganic salt that is a strong oxidizer which is used as a component of solid rocket fuel, munitions and in the pyrotechnics fireworks industry. Ammonium perchlorate in fireworks produces the blue colors. Perchlorate continues to be manufactured and used nationwide.
- ② Ammonium perchlorate is very soluble and is mobile in groundwater and surface water. The chemical degrades very slowly in the environment.
- ③ Risk studies will determine whether or if there may be an impact to the environment or human health. Until the scientific studies are completed at the national level, we do not know the effects of low concentrations of perchlorate. Currently it is known that the Las Vegas Wash is transporting perchlorate contamination into Lake Mead which then feeds into the Colorado River.
- ④ A form of perchlorate has been used in medication for hyperthyroidism (Graves Disease). Potassium perchlorate disrupts the thyroid gland's ability to properly utilize iodine to produce thyroid hormones.
- ⑤ Current location information on perchlorate contamination of groundwater and surface water in Arizona is limited since the chemical is not a regulated drinking water contaminant. Testing has been conducted by the EPA along the Colorado River with results ranging from "not-detected" to 9 parts per billion. Other sampling conducted in Arizona along the CAP, in municipalities, Lake Havasu, Jose De Sonita River, Salt River, Verde River, and near some industrial parks ranged from "not-detected" to 6 parts per billion.

- ⑥ The Las Vegas area has groundwater contamination ranging from 630,000 parts per billion to 3,700,000 parts per billion. Utah has reported groundwater contamination ranging up to 200 parts per billion.
- ⑦ Laboratory methods to test for perchlorate could not get below 400 parts per billion detection level until the first part of 1997. Analysis of water samples conducted in August of 1998 used a modified laboratory method which is able to reach down to 1 part per billion using Ion Chromatography.
- ⑧ California currently has an interim health standard of 18 parts per billion. If results are above this level, water systems in California are required to remove that source from the drinking water system or to conduct public notification. California is able to do this since they have the legal authorities within their Department of Health.
- ⑨ There are currently no cost effective treatment technologies that can remove perchlorate from the drinking water, groundwater or surface water. Research is ongoing to find a cost-effective treatment technology.
- ⑩ Risk studies on perchlorate and its effects on human health are underway, and a revised reference dose is anticipated to be completed by the US EPA by January of 1999. ADEQ is a member of the Interagency Perchlorate Steering Committee (IPSC) which is a national group headed by the US EPA. It is the goal of ADEQ to keep the communities in Arizona up to date on this emerging issue.

Additional information and updates on the issues of perchlorate can be obtained from the **EPA Safe Drinking Water Hotline** located in Washington, D.C. toll free at: **1-800-426-4791**. Updated information can also be obtained on the US EPA Perchlorate website located at www.epa.gov/ogwdw000/ccl/perchlor/indexkeep.html

Arizona Sample Plan

- I. The samples collected in this study was based upon earlier sample sites conducted in a 1998 by EPA Region IX out of San Francisco, California. In early 1999 there was an IPSC forum held in Phoenix, Arizona. Participants included the EPA, National Academy of Science, DOD, state agencies, municipalities, Indian Nations, environmentalists, and other interested persons in the communities of Arizona. After the forum, it was felt both by ADEQ and drinking water stakeholders that Arizona needed a more detailed study of perchlorate levels in drinking water sources before any policies or regulatory actions are drafted in the state of Arizona.

There are two major sets of data points in this report for a total of 112 sample sites. The first set of sample locations primarily focuses on Lake Mead and the Colorado River downstream of Hoover Dam to Yuma. Samples were also collected at wells near the Colorado River, at the CAP intake, several CAP locations and groundwater injection wells utilizing CAP water (See tables 1 & 1a). The second set of sample points was collected by staff from the City of Phoenix municipal water system as part of a supplemental environmental project (SEP) agreement with the EPA and ADEQ. The goal of any SEP is to provide funding to an environmental project that would benefit the surrounding communities. The City of Phoenix sample plan focused on surface water sources and groundwater wells being used for drinking water in the Phoenix metropolitan area (the Valley), which includes several other major municipalities using treated CAP or Salt River Project water sources. This includes all of Phoenix's drinking water treatment plants which treat a number of surface water sources used in the Valley for drinking water purposes. (See tables 2 and 2a).

- II. Sample collection for the first set of data points was conducted by William M. Campbell, Groundwater Specialist for the Arizona Small Utilities Association. Whenever a surface water sample was taken, a depth sample was also taken in addition to the surface sampling. A horizontal Van Dorn water sampler was used to collect the depth samples. All locations were recorded using an ADEQ Global Positioning System (GPS) receiver and field test equipment such as temperature and conductivity meters.

Sample collection for the second set of data points was conducted by staff from the City of Phoenix municipal water system. The City of Phoenix also used ADEQ GPS receivers to insure consistency of location documentation. All samples were analyzed by Montgomery Watson laboratories in California using a modified EPA method 300 with a detection level of four parts per billion.

III. ADEQ Sample locations:

- ✓ Lake Mead - South Cove
- ✓ Lake Mead - Las Vegas Bay
- ✓ Lake Mead - Kingman Wash
- ✓ Lake Mohave - Katherines Landing
- ✓ Ft. Mohave Indian Reservation
- ✓ Colorado River at Chemehuevi Indian Reservation
- ✓ Irrigation water at Chemehuevi Indian Reservation
- ✓ Groundwater well at Chemehuevi Indian Reservation
- ✓ Colorado River -Las Angeles, CA water intake
- ✓ Lake Havasu at Havasu Springs
- ✓ Bill Williams River National Wildlife Refuge
- ✓ Big River Well - Colorado River Indian Tribe
- ✓ Colorado River - Colorado River Indian Tribe
- ✓ Colorado River - Cibola National Wildlife Refuge
- ✓ All American Canal - South of Imperial Dam
- ✓ Colorado River - Yuma Proving Ground
- ✓ Groundwater well - North Cocopah Indian Reservation
- ✓ Colorado River - North Cocopah Indian Reservation
- ✓ Groundwater well - Luke Air Force Base
- ✓ ADEQ Building faucet - Phoenix Municipal Water
- ✓ San Pedro River - St. David, AZ
- ✓ Groundwater well - AZ Army National Guard Reservation (Florence, AZ)
- ✓ CAP Canal - State Highway 79
- ✓ CAIDD CAP Blended - Red Rock, AZ
- ✓ Avra Valley Recharge Site - Tucson, AZ
- ✓ Groundwater Well - Camp Navajo, Bellmont, AZ
- ✓ Lake Mary Treatment Plant, Flagstaff, AZ - Raw Water
- ✓ Lake Mary Treatment Plant, Flagstaff, AZ - Finished Water
- ✓ Lake Mary Treatment Plant, Flagstaff, AZ - Groundwater Well
- ✓ Woody Mountain Treatment Plant, Flagstaff, AZ - Raw Water
- ✓ Woody Mountain Treatment Plant, Flagstaff, AZ - Finished Water

IV. Phoenix Metro Valley Sample Locations.

- ✓ Well # 001 - Verde Wells
- ✓ Well # 002 - Verde Wells
- ✓ Well # 003 - Verde Wells
- ✓ Well # 004 - Verde Wells
- ✓ Well # 005 - Verde Wells
- ✓ Well # 007 - Verde Wells
- ✓ Well # 008 - Verde Wells

IV. Phoenix Metro Valley Sample Locations (continued)

- ✓ Well # 009 - Verde Wells / Ft. McDowell Road
- ✓ Well # 010 - Verde Wells / Beeline Highway
- ✓ Well # 011 - Verde Wells
- ✓ Well # 012 - Verde Wells / Beeline Highway
- ✓ Well # 013 - Verde Wells
- ✓ Well # 014 - Verde Wells / Ft. McDowell Road
- ✓ Well # 072 - 5126 North 37th Avenue
- ✓ Point-of-Entry # 072 - 5126 North 37th Avenue
- ✓ Point-of-Entry # 113 - Verde Water Treatment Plant (finished water)
- ✓ Well # 130 - North of Dunlap between 29th Avenue & 35th Avenue
- ✓ Well # 146 - 1621 West Palmer
- ✓ Point of Entry # 146 - 1621 West Palmer
- ✓ Well # 166 - 4138 East Greenway Road
- ✓ Point-of-Entry# 166 - 4138 East Greenway Road
- ✓ Well # 177 - North of Dunlap between 29th Avenue & 35th Avenue
- ✓ Well # 202 - North of Dunlap between 29th Avenue & 35th Avenue
- ✓ Well # 218 - 4375 West Acoma Drive
- ✓ Point-of-Entry #218 - 4375 West Acoma Drive
- ✓ Well # 222 - 16630 South 54th Street
- ✓ Well # 227 - 5226 East Pecos Road
- ✓ Well # 232 - 10831 North 56th Street
- ✓ Point-of-Entry # 232 - 10831 North 56th Street
- ✓ Well # 233 - 10801 North 56th Street
- ✓ Point-of-Entry # 233 - 10801 North 56th Street -
- ✓ Well # 234 - 5356 East Double Tree Road
- ✓ Point-of-Entry # 234 - 5356 East Double Tree Road
- ✓ Well # 235 - 6026 East Caballo Drive
- ✓ Point-of-Entry # 235 - 6026 East Caballo Drive
- ✓ Well # 241 - North of Dunlap between 29th Avenue & 35th Avenue
- ✓ Well # 242 - 5330 East Pecos Road
- ✓ Well # 244 - 5602 East Bell Road
- ✓ Point-of-Entry # 244 - 5602 East Bell Road
- ✓ Well # 249 - 18419 North 29th Drive
- ✓ Point-of-Entry # 249 - 18419 North 29th Drive
- ✓ Well # 250 - 16820 North 47th Avenue
- ✓ Point of Entry #250 - 16820 North 47th Avenue
- ✓ Well # 252 - 3308 West Kristal Way
- ✓ Point-of-Entry # 252 - 3308 West Kristal Way
- ✓ Well # 256 - 3615 West Deer Valley Road

IV. Phoenix Metro Valley Sample Locations (continued)

- ✓ Point-of-entry # 256 - 3615 West Deer Valley Road
- ✓ Well # 258 - 24439 North 23rd Avenue
- ✓ Point-of-Entry # 258 - 24439 North 23rd Avenue
- ✓ Well # 261 - 20805 North 56th Street
- ✓ Point-of-Entry # 261 - 20805 North 56th Street
- ✓ Well #262 - 28825 North 28th Avenue
- ✓ Point-of-Entry # 262 - 28825 North 28th Avenue
- ✓ Well # 264 - 6714 East Juniper Avenue
- ✓ Point-of-Entry # 264 - 6714 East Juniper Avenue
- ✓ Well # 275 - 5746 East St. John
- ✓ Point-of-Entry # 275 - 5746 East St. John
- ✓ Well # 276 - 29402 North 44th Street
- ✓ Point-of-Entry # 276 - 29402 North 44th Street
- ✓ Well # 280 - 4390 North Rancho Tierra
- ✓ Point-of-Entry # 280 - 4390 North Rancho Tierra
- ✓ Well # 281 - 33005 North 51st Street
- ✓ Point-of-Entry # 281 - 33005 North 51st Street
- ✓ Well # 284 - 8200 South 56th Avenue
- ✓ Point-of-Entry # 284 - 8200 South 56th Avenue
- ✓ Well # 288 - 28401 North Tatum Blvd.
- ✓ Point-of-Entry # 288 - 28401 North Tatum Blvd.
- ✓ Well # 289 - 28606 North 56th Street
- ✓ Point-of-Entry # 289 - 28606 North 56th Street
- ✓ Well # 290 - 26231 North 32nd Street
- ✓ Point-of-Entry # 290 - 26231 North 32nd Street
- ✓ Well # 291 - 26268 North Tatum Blvd.
- ✓ Point-of-Entry # 291 - 26268 North Tatum Blvd.
- ✓ Well # 292 - 21425 North Tatum Blvd.
- ✓ Point-of-Entry # 292 - 21425 North Tatum Blvd.
- ✓ Point-of-Entry # 777 - 48th Street and Ray Road NW Corner
- ✓ Dear Valley Water Treatment Plant - 3030 West Dunlap
- ✓ Squaw Peak Water Treatment Plant (Raw Canal Water) - 6202 North 24th Street
- ✓ Squaw Peak Water Treatment Plant (Filter Building #6) - 6202 North 24th Street
- ✓ Squaw Peak Water Treatment Plant (J-Box Point of Entry) - 6202 North 24 Street
- ✓ Val Vista Water Treatment Plant (Raw Canal Water) - 3200 East McDowell Road
- ✓ Val Vista Water Treatment Plant (Finished Water Bldg. 12)-3200 East McDowell Rd
- ✓ Union Hills Water Treatment Plant (Raw Canal Water) - 2001 East Deer Valley Road
- ✓ Union Hills Water Treatment Plant (Mod 1) - 2001 East Deer Valley Road
- ✓ Union Hills Water Treatment Plant (Mod 2) - 2001 East Deer Valley Road

IV. Phoenix Metro Valley Sample Locations (continued)

- ✓ Verde Water Treatment Plant (Raw water), Point of Entry # 401
- ✓ Verde Water Treatment Plant (Finished water), Point of Entry # 401
- ✓ Colorado River - Havasu Pump Station
- ✓ Lake Havasu City Well #15
- ✓ Lake Havasu City Well #16
- ✓ Lake Pleasant (at dam discharge)
- ✓ Lake Pleasant Upstream
- ✓ Lake Pleasant Downstream
- ✓ CAP Canal/Power Road
- ✓ Granite Reef Diversion Dam
- ✓ Salt River upstream of Granite Reef Diversion Dam
- ✓ Verde River upstream of Granite Reef Diversion Dam

ADEQ Occurrence Study in Drinking Water Sources
Perchlorate Sampling Sites Phase One (April / May 1999)

Table 1

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
01	86444	No Detect (<4 ppb)	Lake Mead-South Cove, Meadview, AZ	Lake offshore	36° 05' 32.081" N 114° 06' 20.117" W
02	89005	160 ppb	Las Vegas Bay, Lake Mead	Las Vegas Bay (Surface)	36° 07' 48.062" N 114° 52' 10.428" W
03	89005	480 ppb	Las Vegas Bay, Lake Mead	Los Vegas Bay (Bottom)	36° 07' 48.062" N 114° 52' 10.428" W
04	86441	8.5 ppb	Lake Mead- Kingman Wash, AZ	Kingman Wash Bay (Surface)	36° 02' 08.062" N 114° 42' 28.230 W
05	86441	8.5 ppb	Lake Mead-Kingman Wash, AZ	Kingman Wash Bay (Bottom)	36° 02' 08.062" N 114° 42' 28.230 W
06	86401	6.5 ppb	Lake Mohave - Katherines Landing, AZ	Bay Surface	35° 12' 55.307" N 114° 34' 22.486 W
07	86401	6.3 ppb	Lake Mohave-Katherines Landing, AZ	Bay Bottom	35° 12' 55.307" N 114° 34' 22.486 W
08	92363	No Detect (<4 ppb)	Ft. Mohave Indian Reservation	Mohave Beach residence	34° 55' 07.217" N 114° 37' 49.293 W
09	92363	No Detect (<4 ppb)	Ft. Mohave Indian Reservation	Needles Well, Tribal HQ	34° 51' 08.685" N 114° 36' 55.346" W
10	92363	No Detect (<4 ppb)	Ft. Mohave Indian Reservation	Tribal Water Office	34° 54' 37.862" N 114° 35' 46.710" W
11	92363	No Detect (<4 ppb)	Ft. Mohave Indian Reservation	Casino Avi Tap	35° 00' 56.652" N 114° 38' 29.977" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Occurrence Study in Drinking Water Sources
Perchlorate Sampling Sites Phase One (April / May 1999)

Table 1

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
12	92363	5.4 ppb	Chemehuevi Indian Reservation, CA	Colorado River Channel Surface	34° 32' 53.151" N 114° 23' 39.472" W
13	92363	6.1 ppb	Chemehuevi Indian Reservation, CA	Colorado River Channel Bottom	34° 32' 53.151" N 114° 23' 39.472" W
14	92363	5.7 ppb	Chemehuevi Indian Reservation, CA	Irrigation Water	34° 31' 17.576" N 114° 23' 40.995" W
15	92363	No Detect (<4 ppb)	Chemehuevi Indian Reservation, CA	Havasu Palms well	34° 24' 02.381" N 114° 16' 37.453" W
16	92363	5.9 ppb	Los Angeles Water Intake, Lake Havasu	Lake Havasu before intake	34° 19' 00.841" N 114° 09' 24.140" W
17	85344	5.6 ppb	Lake Havasu-Havasu Springs, AZ	Shoreline near CAP intake	34° 17' 35.507" N 114° 06' 11.972" W
18	86403	No Detect (<4 ppb)	Bill Williams River National Wildlife Refuge, AZ	River east of Colorado River Confluence	34° 17' 55.930" N 114° 05' 16.076" W
19	92242	No Detect (<4 ppb)	Colorado River Indian Tribe Reservation, AZ	Big River Well	34° 07' 14.167" N 114° 22' 40.131" W
20	85344	6.2 ppb	Colorado River Indian Tribe Reservation, AZ	Main Irrigation Canal at Mohave Road	34° 00' 47.668" N 114° 23' 21.863" W
21	85344	6.4 ppb	Colorado River Indian Tribe Reservation, AZ	Colorado River midstream, Agnes Wilson Bridge	34° 02' 32.992" N 114° 26' 03.783" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Occurrence Study in Drinking Water Sources
 Perchlorate Sampling Sites Phase One (April / May 1999)
 Table 1

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
22	85356	5.4 ppb	Cibola National Wildlife Refuge, Cibola AZ	Colorado River Shoreline	33° 18' 10.391" N 114° 40' 36.651" W
23	92283	5.1 ppb	South of Imperial Dam	All American Canal	32° 52' 22.175" N 114° 28' 42.188" W
24	85365	5.0 ppb	Yuma Proving Grounds	Colorado River Shoreline	32° 51' 01.692" N 114° 26' 34.132" W
25	85350	No Detect (<4 ppb)	North Cocopah Indian Reservation, AZ	RV Park Groundwater Well	32° 44' 18.553" N 114° 41' 31.768" W
26	85350	No Detect (<4 ppb)	North Cocopah Indian Reservation, AZ	Colorado River shoreline	32° 44' 23.745" N 114° 41' 31.825" W
27	85340	No Detect (<4 ppb)	Luke Air Force Base, AZ	Groundwater Well	33° 32' 20.306" N 112° 21' 50.469" W
28	85338	Not able to collect	Phoenix /Goodyear Airport (Not sampled)	Monitoring Well (Not sampled).	Request to enter site and sample denied.
29	85012	No Detect (<4 ppb)	Phoenix Municipal Water tap sample 3033 North Central Avenue (ADEQ)	2nd Floor Mens Bathroom faucet	33° 29' 00.14" N 112° 04' 20.02" W
30	85630	No Detect (<4 ppb)	St. David, AZ	San Pedro River	31° 54' 19.618" N 110° 14' 44.984" W
31	85232	No Detect (<4 ppb)	Arizona Army National Guard Reservations, Florence, AZ	San Pedro River	32° 52' 22.175" N 114° 28' 42.188" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Occurrence Study in Drinking Water Sources
Perchlorate Sampling Sites Phase One (April / May 1999)

Table 1

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
32	85232	No Detect (<4 ppb)	State Highway 79 CAP crossing; Florence, AZ	Over bridge railing, downstream	33° 04' 42.669" N 111° 22' 24.186" W
33	85231	No Detect (<4 ppb)	Red Rock, AZ	CAIDD CAP inlet	32° 35' 18.057" N 111° 24' 50.525" W
34	85742	No Detect (<4 ppb)	Avra Valley Recharge Site, Tucson, AZ	CAP Recharge Water	32° 24' 53.605" N 111° 12' 49.164" W
35	86001	No Detect (<4 ppb)	Camp Navajo, Belmont, AZ	Groundwater Well	35° 13' 08.938" N 111° 50' 01.426" W
36	86001	No Detect (<4 ppb)	Flagstaff, Lake Mary Treatment Plant	Drinking Water Treatment Plant - Raw Water	35° 09' 00.382" N 111° 39' 02.517" W
37	86001	No Detect (<4 ppb)	Flagstaff, Lake Mary Treatment Plant	Drinking Water Treatment Plant - Finished Water	35° 09' 05.393" N 111° 39' 04.917" W
38	86001	No Detect (<4 ppb)	Flagstaff, Lake Mary Treatment Plant	Drinking Water Treatment Plant - Groundwater Well	35° 06' 32.707" N 111° 35' 08.116" W
39	86001	No Detect (<4 ppb)	Flagstaff, Woody Mountain Treatment Plant	Drinking Water Treatment Plant - Raw Water	35° 09' 32.988" N 111° 42' 54.387" W
40	86001	No Detect (<4 ppb)	Flagstaff, Woody Mountain Treatment Plant	Drinking Water Treatment Plant - Finished Water	35° 09' 35.246" N 111° 42' 28.088" W

ADEQ Occurrence Study in Drinking Water Sources
 Perchlorate Sampling Sites Phase One (April / May 1999)
 Table 1a

Site Number	Zip Code	Sample Location (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (Meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
01	86444	Lake Mead-South Cove, Meadview, AZ	April 14, 1999	18:30	28.9	15.6	16.3	770
02	89005	Las Vegas Bay, Lake Mead	April 15, 1999	14:20	27.8	0.3	15.2	1156
03	89005	Las Vegas Bay, Lake Mead	April 15, 1999	14:30	27.8	8.5	15.4	1155
04	86441	Lake Mead, Kingman Wash, AZ	April 15, 1999	11:45	28.9	0.3	13.1	1145
05	86441	Lake Mead, Kingman Wash, AZ	April 15, 1999	11:30	28.9	24.4	12.3	1147
06	86401	Lake Mohave, Katherines Landing, AZ	April 16, 1999	11:10	21.1	0.3	15.2	835
07	86401	Lake Mohave, Katherines Landing, AZ	April 16 1999	11:15	21.1	18.3	16.0	830
08	92363	Ft. Mohave Indian Reservation Mohave Beach Residence	April 16, 1999	15:15	**	Groundwater Well	19.4	1145
09	92363	Ft. Mohave Indian Reservation Needles Well, Tribal HQ	April 16, 1999	16:00	**	Groundwater Well	19.9	1222
10	92363	Ft. Mohave Indian Reservation Tribal Water Office	April 16, 1999	14:30	**	Groundwater Well	25.1	2280

** = No data available or No data collected for this data field.

ADEQ Occurrence Study in Drinking Water Sources
Perchlorate Sampling Sites Phase One (April / May 1999)

Table 1a

Site Number	Zip Code	Sample Location (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (Meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
11	92363	Ft. Mohave Indian Reservation Casino Avi Tap	April 16, 1999	21:00	**	Groundwater Well	19.5	1283
12	92363	Chemehuevi Indian Reservation, CA	April 17, 1999	13:20	29.4	0.3	14.3	887
13	92363	Chemehuevi Indian Reservation, CA, Colorado River Bottom	April 17, 1999	13:15	29.4	5.5	14.8	892
14	92363	Chemehuevi Indian Reservation, CA, Irrigation Water	April 17, 1999	14:15	29.4	Surface	31.0	1032
15	92363	Chemehuevi Indian Reservation, CA, Havasu Palms well	April 18, 1999	11:15	29.4	Groundwater Well	20.3	973
16	92363	Los Angeles Water Intake, Lake Havasu	April 18, 1999	12:45	28.9	6.1	16.4	1010
17	85344	Lake Havasu, Havasu Springs, AZ	April 18, 1999	14:30	33.9	3.1	15.8	1010
18	86403	Bill Williams River National Wildlife Refuge, AZ	April 18, 1999	13:40	33.9	3.1	16.5	1108

** = No data available or No data collected for this data field.

ADEQ Occurrence Study in Drinking Water Sources
Perchlorate Sampling Sites Phase One (April / May 1999)

Table 1a

Site Number	Zip Code	Sample Location (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (Meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
19	92242	Colorado River Indian Tribe Reservation, AZ, Big River Well	April 19, 1999	14:30	40.0	Groundwater Well	17.8	1878
20	85344	Colorado River Indian Tribe Reservation, AZ, Main Irrigation Canal at Mohave Road	April 19, 1999	11:00	**	0.3	18.7	810
21	85344	Colorado River Indian Tribe Reservation, AZ, Agnes Wilson Bridge	April 19, 1999	12:00	**	0.3	16.2	918
22	85356	Cibola National Wildlife Refuge, AZ, Colorado River Shoreline	April 20, 1999	12:45	37.2	0.3	19.5	1127
23	92283	South of Imperial Dam, CA	April 21, 1999	11:15	23.9	0.3	20.2	1158
24	85365	Yuma Proving Ground, River Shoreline	April 21, 1999	12:30	**	0.3	21.3	1715
25	85350	North Cocopah Indian Reservation, RV Park	April 21, 1999	05:45	**	Groundwater Well	25.7	1674
26	85350	North Cocopah Indian Reservation, Colorado River Shoreline	April 21, 1999	07:00	**	0.3	21.3	1715

** = No data available or No data collected for this data field.

ADEQ Occurrence Study in Drinking Water Sources
Perchlorate Sampling Sites Phase One (April / May 1999)

Table 1a

Site Number	Zip Code	Sample Location (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (Meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
27	85340	Luke Air Force Base, AZ	May 26, 1999	**	31.0	Groundwater Well	26.5	289
28	85338	Phoenix Goodyear Airport	Not Sampled					
29	85012	Phoenix Municipal Water, 2nd floor bathroom, ADEQ, 3033 N. Central Ave., Phoenix, AZ	May 27, 1999	**	Indoor sample site	Water Fountain	22.8	618
30	85630	St. David, AZ; San Pedro River	May 22, 1999	**	35.0	**	24.1	339
31	85232	Arizona Army National Guard Reservation, Florence AZ	May 13, 1999	**	36.7	Groundwater Well	23.6	1180
32	85232	State Highway 79 CAP Crossing, Florence, AZ. Downstream over bridge railing	May 13, 1999	**	36.7	**	22.2	1043
33	85231	Red Rock, AZ. CAIDD CAP inlet	May 13, 1999	**	36.7	**	24.6	1004
34	85742	Avra Valley Recharge Site (Tucson, AZ)	May 13, 1999	**	35.0	**	23.0	677

** = No data available or No data collected for this data field.

ADEQ Occurrence Study in Drinking Water Sources
Perchlorate Sampling Sites Phase One (April / May 1999)

Table 1a

Site Number	Zip Code	Sample Location (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (Meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
35	86001	Camp Navajo, Belmont, AZ, Groundwater Well	May 18, 1999	**	29.4	**	14.5	361
36	86001	Flagstaff, Lake Mary Treatment Plant - Raw Water	Sept 13, 1999	11:15	21.0	**	17.6	38
37	86001	Flagstaff, Lake Mary Treatment Plant - Finished Water	Sept 13, 1999	11:15	21.0	**	14.3	185
38	86001	Flagstaff, Lake Mary Treatment Plant - Groundwater Well	Sept 13, 1999	11:15	29.0	**	11.1	283
39	86001	Flagstaff, Woody Mountain Treatment Plant - Raw Water	Sept 13, 1999	11:15	30.0	**	11.2	125
40	86001	Flagstaff, Woody Mountain Treatment Plant - Finished Water	Sept 13, 1999	11:15	30.0	**	13.1	120

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
41	85264	Not Sampled	Verde Wells	Well # 001	33° 36' 39.130" N 111° 40' 44.842" W
42	85264	Not Sampled	Verde Wells	Well # 002	33° 36' 42.483" N 111° 40' 43.338" W
43	85264	Not Sampled	Verde Wells	Well # 003	33° 36' 45.829" N 111° 40' 40.995" W
44	85264	Not Sampled	Verde Wells	Well # 004	33° 36' 50.475" N 111° 40' 39.188" W
45	85264	Not Sampled	Verde Wells	Well # 005	33° 36' 57.924" N 111° 40' 31.524" W
46	85264	Not Sampled	Verde Wells	Well # 007	33° 35' 45.972" N 111° 40' 26.369" W
47	85264	Not Sampled	Verde Wells	Well # 008	33° 35' 00.549" N 111° 40' 27.284" W
48	85264	Not Sampled	Verde Wells & Ft. McDowell Road	Well # 009	33° 34' 54.184" N 111° 40' 32.702" W
49	85264	Not Sampled	Verde Wells & Beeline Hwy.	Well # 010	33° 34' 53.424" N 111° 40' 23.442" W
50	85264	Not Sampled	Verde Wells & Beeline Hwy.	Well # 011	33° 34' 52.338" N 111° 40' 17.629" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
51	85264	Not Sampled	Verde Wells & Beeline Hwy.	Well # 012	33° 34' 46.927" N 111° 40' 28.799" W
52	85264	Not Sampled	Verde Wells	Well # 013	33° 35' 02.449" N 111° 40' 15.583" W
53	85264	Not Sampled	Verde Wells & Ft. McDowell Road	Well # 014	33° 36' 20.633" N 111° 40' 43.887" W
54	85017	Not Sampled	5126 North 37th Avenue	Well # 072	33° 30' 45.922" N 112° 08' 20.061" W
54A	85017	No Detect (<4 ppb)	5126 North 37th Avenue	Point of Entry # 072	33° 30' 46.030" N 112° 08' 19.117" W
55	85264	No Detect (<4 ppb)	Verde Treatment Plant (Storage Tank)	Point of Entry # 113	33° 32' 49.902" N 112° 39' 58.402" W
56	85021	Not Sampled	Dear Valley Treatment Plant	Point of Entry # 130	33° 34' 11.663" N 112° 07' 27.658" W
57	85021	Not Sampled	1621 West Palmer	Well # 146	33° 34' 17.464" N 112° 05' 37.463" W
57A	85021	No Detect (<4 ppb)	1621 West Palmer	Point of Entry # 146	33° 34' 17.791" N 112° 05' 37.049" W
58	85032	Out of Service	4138 East Greenway Road	Well # 166	33° 37' 37.251" N 111° 59' 24.966" W

ppb = parts per billion = $\mu\text{g}/\text{l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
58A	85032	Out of Service	4138 East Greenway Road	Point of Entry # 166	33° 37' 37.801" N 111° 59' 25.873" W
59	85051	Not Sampled	3030 West Dunlap	Well # 177	33° 34' 11.653" N 112° 07' 12.823" W
60	85051	Not Sampled	3030 West Dunlap	Well # 202	33° 34' 12.945" N 112° 07' 46.515" W
61	85306	Out of Service	4375 West Acoma Drive	Well # 218	33° 37' 01.399" N 112° 09' 08.313" W
61A	85306	Out of Service	4375 West Acoma Drive	Point of Entry # 218	33° 37' 01.608" N 112° 09' 08.524" W
62	85226	Not Sampled	16630 South 54th Street	Well # 222	33° 17' 36.115" N 111° 58' 05.115" W
63	85226	Not Sampled	5226 East Pecos Road	Well # 227	33° 17' 27.354" N 111° 58' 12.970" W
64	85254	Not Sampled	10831 North 56th Street	Well # 232	33° 35' 08.127" N 111° 57' 34.236" W
64A	85254	No Detect (<4 ppb)	10831 North 56th Street	Point of Entry # 232	33° 35' 08.189" N 111° 57' 34.747" W
65	85254	Not Sampled	10801 North 56th Street	Well # 233	33° 35' 04.467" N 111° 57' 33.656" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
65A	85254	No Detect (<4 ppb)	10801 North 56th Street	Point of Entry # 233	33° 35' 04.467" N 111° 57' 33.656" W
66	85253	Out of Service	5356 East Double Tree Road	Well # 234	33° 34' 08.542" N 111° 57' 51.336" W
66A	85253	Out of Service	5356 East Double Tree Road	Point of Entry # 234	33° 34' 08.542" N 111° 57' 51.336" W
67	85253	Not Sampled	6026 East Caballo Drive	Well # 235	33° 33' 44.970" N 111° 57' 00.877" W
67A	85253	No Detect (<4 ppb)	6026 East Caballo Drive	Point of Entry # 235	33° 33' 44.915" N 111° 57' 01.960" W
68	85051	Not Sampled	3030 West Dunlap	Well # 241	33° 34' 17.380" N 112° 07' 58.239" W
69	85226	Not Sampled	5280 East Pecos Road	Well # 242	33° 17' 27.638" N 111° 58' 05.743" W
70	85254	Not Sampled	5602 East Bell Road	Well # 244	33° 38' 26.422" N 111° 57' 32.647" W
70A	85254	No Detect (<4 ppb)	5602 East Bell Road	Point of Entry # 244	33° 38' 26.422" N 111° 57' 32.647" W
71	85053	Out of Service	18419 North 29th Drive	Well # 249	33° 39' 12.497" N 112° 07' 15.240" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
71A	85053	Out of Service	18419 North 28th Drive	Point of Entry # 249	33° 39' 12.236" N 112° 07' 15.402" W
72	85306	Not Sampled	16820 North 47th Avenue	Well # 250	33° 38' 19.687" N 112° 09' 35.774" W
72A	85306	No Detect (<4 ppb)	16820 North 47th Avenue	Point of Entry # 250	33° 38' 19.308" N 112° 09' 35.968" W
73	85027	Not Sampled	3308 West Kristal Way	Well # 252	33° 39' 42.775" N 112° 07' 51.309" W
73A	85027	No Detect (<4 ppb)	3308 West Kristal Way	Point of Entry # 252	33° 39' 42.775" N 112° 07' 51.309" W
74	85308	Not Sampled	3615 West Deer Valley Road	Well # 256	33° 40' 59.994" N 112° 08' 15.596" W
74A	85308	No Detect (<4 ppb)	3615 West Deer Valley Road	Point of Entry # 256	33° 41' 00.877" N 112° 08' 15.850" W
75	85310	Not Sampled	24439 North 23rd Avenue	Well # 258	33° 42' 30.753" N 112° 06' 26.253" W
75A	85310	Not Sampled	24439 North 23rd Avenue	Point of Entry # 258	33° 42' 30.753" N 112° 06' 26.253" W
76	85054	Not Sampled	20805 North 56th Street	Well # 261	33° 40' 32.843" N 111° 57' 19.181" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
76A	85054	No Detect (<4 ppb)	20805 North 56th Street	Point of Entry # 261	33° 40' 32.843" N 111° 57' 19.181" W
77	85310	Not Sampled	28825 North 28th Avenue	Well # 262	33° 43' 39.233" N 112° 07' 07.251" W
77A	85310	Not Sampled	28825 North 28th Avenue	Point of Entry # 262	33° 43' 39.083" N 112° 07' 07.503" W
78	85254	Out of Service	6714 East Juniper Avenue	Well # 264	33° 38' 23.648" N 111° 56' 05.379" W
78A	85254	Out of Service	6715 East Juniper Avenue	Point of Entry # 264	33° 38' 23.832" N 111° 56' 05.119" W
79	85054	Not Sampled	5746 East St Johns	Well # 275	33° 38' 51.341" N 111° 57' 18.563" W
79A	85054	No Detect (<4 ppb)	5746 East St. Johns	Point of Entry # 275	33° 38' 51.101" N 111° 57' 18.598" W
80	85331	Not Sampled	29402 North 44th Street	Well # 276	33° 45' 07.818" N 111° 59' 12.546" W
80A	85331	No Detect (<4 ppb)	29402 North 44th Street	Point of Entry # 276	33° 45' 08.318" N 111° 59' 12.828" W
81	85331	Not Sampled	4390 North Rancho Tierra	Well # 280	33° 45' 56.859" N 111° 56' 05.029" W

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ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
81A	85331	No Detect (<4 ppb)	4390 North Rancho Tierra	Point of Entry # 280	33° 45' 56.425" N 111° 59' 05.654" W
82	85331	Not Sampled	33005 North 51st Street	Well # 281	33° 47' 10.282" N 111° 58' 06.083" W
82A	85331	No Detect (<4 ppb)	33005 North 51st Street	Point of Entry # 281	33° 47' 10.711" N 111° 58' 04.575" W
83	85339	Not Sampled	8200 South 56th Avenue	Well # 284	33° 22' 18.424" N 111° 10' 46.040" W
83A	85339	No Detect (<4 ppb)	8200 South 56th Avenue	Point of Entry # 284	33° 22' 18.320" N 112° 10' 46.409" W
84	85331	Not Sampled	28401 North Tatum Blvd.	Well # 288	33° 44' 34.722" N 111° 58' 32.112" W
84A	85331	No Detect (<4 ppb)	28401 North Tatum Blvd.	Point of Entry # 288	33° 44' 34.398" N 111° 58' 32.835" W
85	85331	Not Sampled	28606 North 56th Street	Well # 289	33° 44' 41.611" N 111° 57' 36.939" W
85A	85331	No Detect (<4 ppb)	28606 North 56th Street	Point of Entry # 289	33° 44' 41.611" N 111° 57' 36.939" W
86	85024	Not Sampled	26231 North 32nd Street	Well # 290	33° 43' 33.981" N 111° 59' 42.847" W

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ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
86A	85024	No Detect (<4 ppb)	26231 North 32nd Street	Point of Entry # 290	33° 43' 32.333" N 111° 59' 42.611" W
87	85024	Not Sampled	26268 North Tatum Blvd.	Well # 291	33° 43' 28.035" N 111° 58' 39.652" W
87A	85024	No Detect (<4 ppb)	26268 North Tatum Blvd.	Point of Entry # 291	33° 43' 27.741" N 111° 58' 39.509" W
88	85050	Not Sampled	21425 North Tatum Blvd.	Well # 292	33° 40' 51.599" N 111° 58' 36.704" W
88A	85050	No Detect (<4 ppb)	21425 North Tatum Blvd.	Point of Entry # 292	33° 40' 51.699" N 111° 58' 37.082" W
89	85044	No Detect (<4 ppb)	48th Street and Ray Road N/W corner	Point of Entry # 777	33° 19' 13.019" N 111° 58' 48.019" W
90	85051	Not Sampled	3030 West Dunlap	Dear Valley Treatment Plant (Headworks)	33° 34' 11.878" N 112° 07' 26.487" W
91	85051	No Detect (<4 ppb)	3030 West Dunlap	Dear Valley Treatment Plant (Finished Water)	33° 34' 04.592" N 112° 07' 35.288" W
92	85051	No Detect (<4 ppb)	3030 West Dunlap	Dear Valley Treatment Plant (Reservoir Inlet Bldg)	33° 34' 05.368" N 112° 07' 39.068" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
93	85016	No Detect (<4 ppb)	6202 North 24th Street	Squaw Peak Treatment Plant (Raw Water)	33° 31' 34.758" N 112° 01' 55.531" W
94	85016	Not Sampled	6202 North 24th Street	Squaw Peak Treatment Plant (Filter Bldg # 6)	33° 31' 53.331" N 112° 01' 57.122" W
95	85016	No Detect (<4 ppb)	6202 North 24th Street	Squaw Peak Treatment Plant (J-Box Point of Entry)	33° 31' 44.881" N 112° 01' 53.291" W
96	85213	No Detect (<4 ppb)	3200 East McDowell Road	Val Vista Treatment Plant (Raw Water)	33° 28' 19.702" N 111° 45' 36.049" W
97	85213	No Detect (<4 ppb)	3200 East McDowell Road	Val Vista Treatment Plant (Finished Water)	33° 27' 59.946" N 111° 46' 10.989" W
98	85027	No Detect (<4 ppb)	2001 East Deer Valley Road	Union Hills Treatment Plant (Raw Water)	33° 41' 12.652" N 112° 02' 11.413" W
99	85027	No Detect (<4 ppb)	2001 East Deer Valley Road	Union Hills Treatment Plant (Finished Water, MOD 1)	33° 40' 56.920" N 112° 02' 10.009" W
100	85027	No Detect (<4 ppb)	2001 East Deer Valley Road	Union Hills Treatment Plant (Finished Water, MOD 2)	33° 40' 59.582" N 112° 02' 12.046" W

ppb = parts per billion = $\mu\text{g}/\text{l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
101	85264	Out of Service	Out of Service	Verde Treatment Plant (Raw Water)	33° 32' 41.957" N 111° 40' 04.841" W
102	85264	Out of Service	Out of Service	Verde Treatment Plant (Finished Water)	33° 32' 50.066" N 111° 39' 59.523" W
103	85344	7.3 ppb	Colorado River	Havasu Pump Station	34° 07' 19.4" N 114° 66' 11.4" W
104	86404	No Detect (<4 ppb)	Well near Colorado River	Lake Havasu City Well #15	34° 30' 20" N 114° 21' 34" W
105	86404	No Detect (<4 ppb)	Well near Colorado River	Lake Havasu City Well #16	34° 27' 53" N 114° 20' 15" W
106	85382	No Detect (<4 ppb)	Lake Pleasant	Towers (at Dam discharge)	33° 50' 41" N 112° 16' 17" W
107	85382	6.7 ppb	Lake Pleasant Upstream	½ mile West of 99th Avenue	33° 46' 53.6" N 112° 17' 10.2" W
108	85382	4.5 ppb	Lake Pleasant Downstream	99th Avenue and CAP Canal	33° 46' 46" N 112° 14' 48" W
109	85215	5.6 ppb	CAP Canal/Power Road	McKellips Bridge	33° 27' 05" N 111° 40' 17" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
 Phoenix Municipal Water Sampling Sites
 Table 2

Site Number	Zip Code	Perchlorate Level	Sample Locations	Sample Site	GPS Coordinates
110	85263	No Detect (<4 ppb)	Granite Reef Diversion Dam	Downstream of Dam	33° 31' 3.214" N 111° 41' 28.617" W
111	85263	No Detect (<4 ppb)	Salt River/Bush Hwy. (Blue Point Bridge)	Upstream of Granite Reef Dam	33° 33' 15.041" N 111° 34' 28.466" W
112	85263	No Detect (<4 ppb)	Verde River - Beeline Hwy. Bridge	Upstream of Granite Reef Dam	33° 34' 50.893" N 111° 40' 13.983" W

ppb = parts per billion = $\mu\text{g/l}$ = micrograms per liter

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
41	85264	Verde Wells	Not Sampled					
42	85264	Verde Wells	Not Sampled					
43	85264	Verde Wells	Not Sampled					
44	85264	Verde Wells	Not Sampled					
45	85264	Verde Wells	Not Sampled					
46	85264	Verde Wells	Not Sampled					
47	85264	Verde Wells	Not Sampled					
48	85264	Verde Wells & Ft. McDowell Rd	Not Sampled					
49	85264	Verde Wells & Beeline Hwy.	Not Sampled					
50	85264	Verde Wells & Beeline Hwy.	Not Sampled					
51	85264	Verde Wells & Beeline Hwy.	Not Sampled					
52	85264	Verde Wells	Not Sampled					
53	85264	Verde Wells & Ft. McDowell Rd	Not Sampled					

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
54	85017	5126 North 37th Avenue	Not Sampled					
54A	85017	5126 North 37th Avenue	Aug 3, 1999	11:00	**	Groundwater Well	36.2	820
55	85264	Verde Treatment Plant (Storage Tank)	Aug 18, 1999	12:30	**	Groundwater Well	27	**
56	85021	Dear Valley Treatment Plant	Not Sampled					
57	85021	1621 West Palmer	Not Sampled					
57A	85021	1621 West Palmer	Aug 4, 1999	10:45	**	Groundwater Well	25.5	**
58	85032	4138 East Greenway Road	Out of Service					
58A	85032	4138 East Greenway Road	Out of Service					
59	85051	3030 West Dunlap	Not Sampled					
60	85051	3030 West Dunlap	Not Sampled					
61	85306	4375 West Acoma Drive	Out of Service					
61A	85306	4375 West Acoma Drive	Out of Service					

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
62	85226	16630 South 54th Street	Not Sampled					
63	85226	5226 East Pecos Road	Not Sampled					
64	85254	10831 North 56th Street	Not Sampled					
64A	85254	10831 North 56th Street	Aug 23, 1999	09:00	**	Groundwater Well	31.9	**
65	85254	10801 North 56th Street	Not Sampled					
65A	85254	10801 North 56th Street	Aug 24, 1999	09:15	**	Groundwater Well	33.1	**
66	85253	5356 East Double Tree Road	Out of Service					
66A	85253	5356 East Double Tree Road	Out of Service					
67	85253	6026 East Caballo Drive	Not Sampled					
67A	85253	6026 East Caballo Drive	Aug 23, 1999	11:15	**	Groundwater Well	33	**
68	85051	3030 West Dunlap	Not Sampled					
69	85226	5280 East Pecos Road	Not Sampled					

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
70	85254	5602 East Bell Road	Not Sampled					
70A	85254	5602 East Bell Road	Aug 25, 1999	11:15	**	Groundwater Well	35	**
71	85053	18419 North 29th Drive	Out of Service					
71A	85053	18419 North 28th Drive	Out of Service					
72	85306	16820 North 47th Avenue	Not Sampled					
72A	85306	16820 North 47th Avenue	Aug 9, 1999	10:15	**	Groundwater Well	36.1	**
73	85027	3308 West Kristal Way	Not Sampled					
73A	85027	3308 West Kristal Way	Aug 24, 1999	11:15	**	Groundwater Well	32.5	**
74	85308	3615 West Deer Valley Road	Not Sampled					
74A	85308	3615 West Deer Valley Road	Sept 15, 1999	11:20	30	Groundwater Well	27.8	440
75	85310	24439 North 23rd Avenue	Not Sampled					

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
75A	85310	24439 North 23rd Avenue	Not Sampled					
76	85054	20805 North 56th Street	Not Sampled					
76A	85054	20805 North 56th Street	Sept 8, 1999	10:20	33	Groundwater Well	32	980
77	85310	28825 North 28th Avenue	Not Sampled					
77A	85310	28825 North 28th Avenue	Not Sampled					
78	85254	6714 East Juniper Avenue	Out of Service					
78A	85254	6715 East Juniper Avenue	Out of Service					
79	85054	5746 East St. Johns	Not Sampled					
79A	85054	5746 East St. Johns	Aug 25, 1999	09:30	**	Groundwater Well	33.3	**
80	85331	29402 North 44th Street	Not Sampled					
80A	85331	29402 North 44th Street	Aug 31, 1999	12:45	38	Groundwater Well	32	510
81	85331	4390 North Rancho Tierra	Not Sampled					

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites

Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
81A	85331	4390 North Rancho Tierra	Aug 30, 1999	12:55	38	Groundwater Well	29.5	**
82	85331	33005 North 51st Street	Not Sampled					
82A	85331	33005 North 51st Street	Sept 7, 1999	12:35	40	Groundwater Well	32	680
83	85339	8200 South 56th Avenue	Not Sampled					
83A	85339	8200 South 56th Avenue	Aug 3, 1999	08:30	**	Groundwater Well	27.8	**
84	85331	28401 North Tatum Blvd.	Not Sampled					
84A	85331	28401 North Tatum Blvd.	Aug 31, 1999	09:15	34	Groundwater Well	30	560
85	85331	28606 North 56th Street	Not Sampled					
85A	85331	28606 North 56th Street	Sept 1, 1999	09:45	30	Groundwater Well	29.2	474
86	85024	26231 North 32nd Street	Not Sampled					

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
86A	85024	26231 North 32nd Street	Sept 7, 1999	10:35	38	Groundwater Well	32	490
87	85024	26268 North Tatum Blvd.	Not Sampled					
87A	85024	26268 North Tatum Blvd.	Aug 11, 1999	11:30	**	Groundwater Well	30.5	**
88	85050	21425 North Tatum Blvd.	Not Sampled					
88A	85050	21425 North Tatum Blvd.	Sept 15, 1999	09:50	30	Groundwater Well	28.5	1270
89	85044	48th Street and Ray Road N/W corner	Sept 14, 1999	10:55	41	Groundwater Well	30.9	1730
90	85051	Dear Valley Treatment Plant (Headworks)	Not Sampled					
91	85051	Dear Valley Treatment Plant (Finished Water)	Aug 8, 1999	12:15	**	**	29.4	**
92	85051	Dear Valley Treatment Plant (Reservoir Inlet Bldg.)	Aug 8, 1999	11:45	**	**	29.4	**

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
93	85016	Squaw Peak Treatment Plant (Raw Water)	Sept 16, 1999	10:15	35	1.5	26	1420
94	85016	Squaw Peak Treatment Plant (Filter Bldg. # 6)	Not Sampled					
95	85016	Squaw Peak Treatment Plant (J- Box Point of Entry)	Sept 16, 1999	11:00	25	**	30.6	1270
96	85213	Val Vista Treatment Plant (Raw Water)	Sept 14, 1999	12:20	40	**	24.9	1230
97	85213	Val Vista Treatment Plant (Finished Water)	Sept 14, 1999	13:15	39	**	29.9	1230
98	85027	Union Hills Treatment Plant (Raw Water)	Sept 8, 1999	11:50	29	**	25	1040
99	85027	Union Hills Treatment Plant (Finished Water, MOD 1)	Sept 8, 1999	12:20	25	**	22	990
100	85027	Union Hills Treatment Plant (Finished Water, MOD 2)	Sept 8, 1999	12:30	26	**	20	970

** = No data available or No data collected for this data field.

ADEQ Perchlorate Occurrence Study in Drinking Water Sources
Phoenix Municipal Water Sampling Sites
Table 2a

Site Number	Zip Code	Sample Locations (General Location Description)	Sample Date	Sample Time (24 hr)	Air Temp (Celsius)	Sample Depth (meters)	Water Temp (Celsius)	Conductivity (μ siemens/cm)
101	85264	Verde Treatment Plant (Raw Water) - Out of Service	Out of Service					
102	85264	Verde Treatment Plant (Finished Water) - Out of Service	Out of Service					
103	85344	Colorado River	July 13, 1999	07:00	26.1	1.8	28	899
104	86404	Lake Havasu City Well #15	Sept 21, 1999	09:00	30	152	22.7	1110
105	86404	Lake Havasu City Well #16	Sept 21, 1999	08:00	30	38	26.6	1770
106	85382	Lake Pleasant	July 14, 1999	10:30	35	**	17.6	780
107	85382	Lake Pleasant Upstream	Aug 20, 1999	14:30	30	1.2	31.7	910
108	85382	Lake Pleasant Downstream	Aug 20, 1999	13:45	38	0.9	21.6	970
109	85215	CAP Canal/Power Road	Aug 20, 1999	11:30	38	0.9	22.6	920
110	85263	Granite Reef Diversion Dam	Sept 23, 1999	10:30	33	1.5	26.8	1260
111	85263	Salt River/Bush Hwy. (Blue Point Bridge)	Sept 24, 1999	13:15	35	0.8	27	1190
112	85263	Verde River-Beeline Hwy. Bridge	Sept 23, 1999	12:00	34	0.9	31.5	560

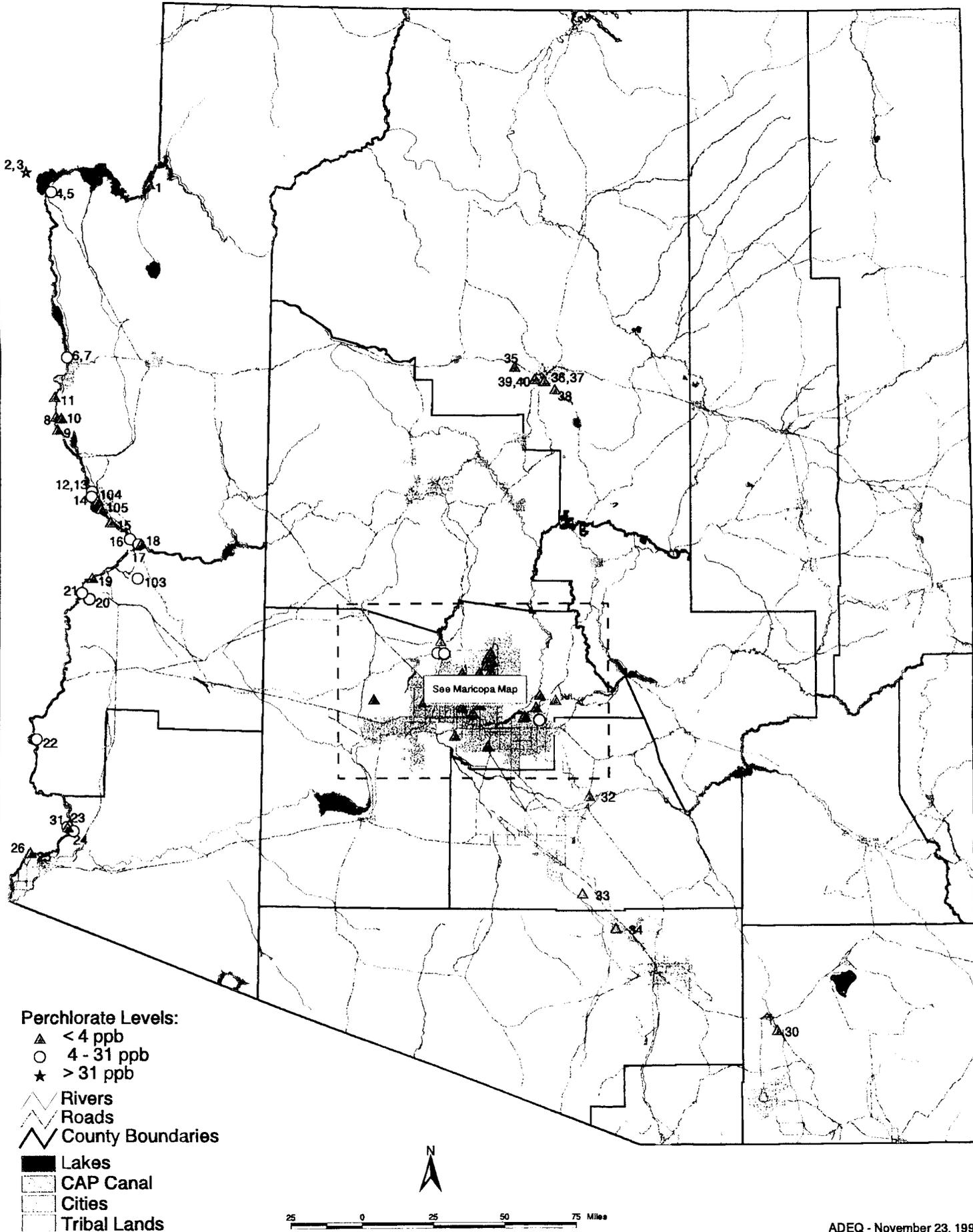
** = No data available or No data collected for this data field.

Occurrence Data Maps

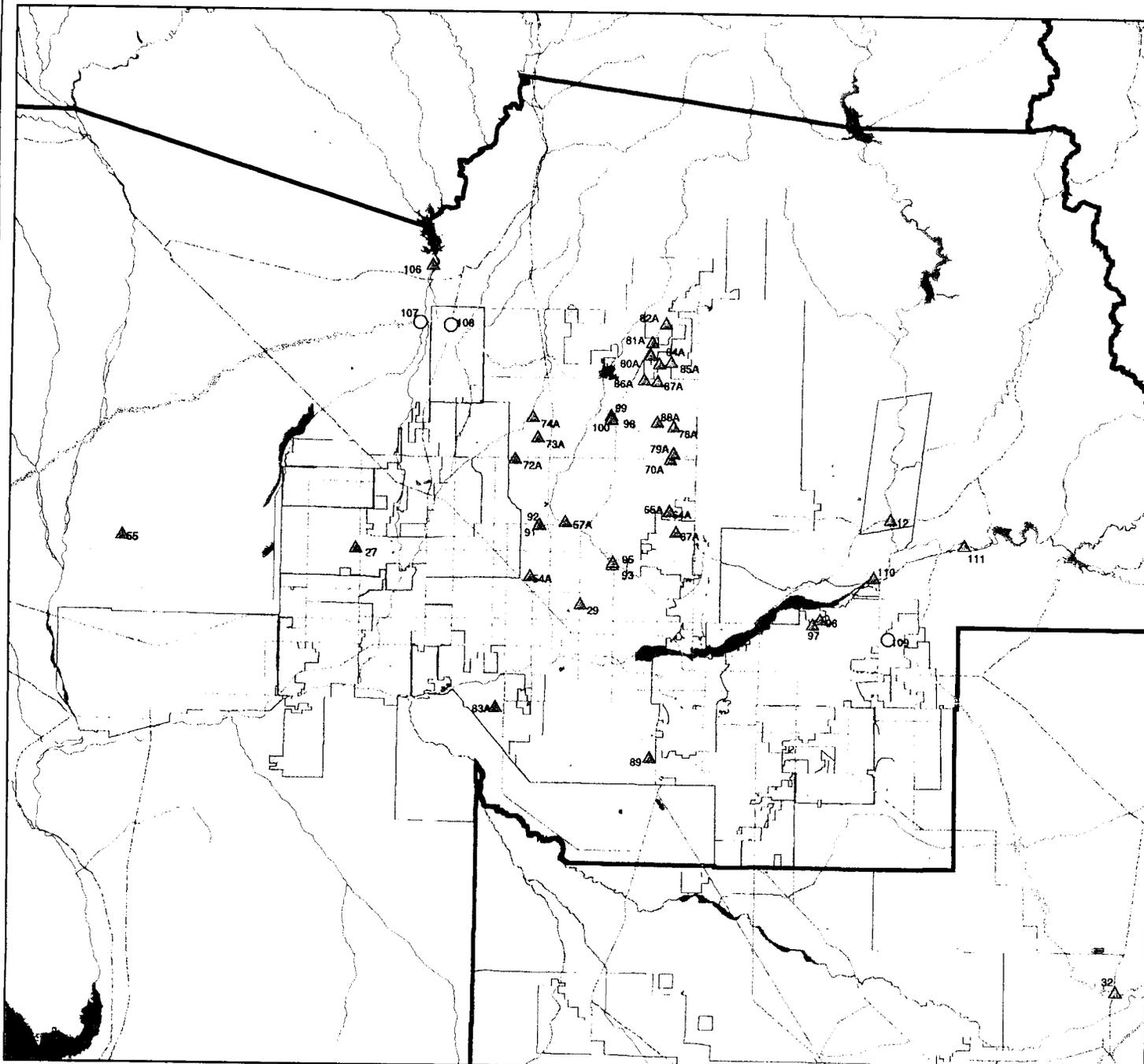
These maps were created using GPS data and occurrence data collected during various sampling trips. After inputting location and occurrence data by site number, several “covers” were added in order to provide reference points. These covers included municipal boundaries, roads, surface water features, the CAP canal and Tribal Lands.

One note on site locations: the state-wide map only shows features within Arizona’s boundaries. Therefore, some points that appear to be off the map are actually across the border in other states (i.e. points 2 and 3 are actually on the Nevada side of Lake Mead).

Perchlorate Occurrence Study



Perchlorate Occurrence Study Maricopa County

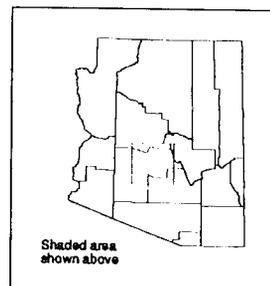


Perchlorate Levels:

- ▲ < 4 ppb
- 4 - 31 ppb
- ★ > 31 ppb

- ~ Streams
- ▬ County Boundaries
- ▬ Major Roads

- ▭ Metro Phoenix
- ▭ CAP Canal
- ▭ Lakes
- ▭ Tribal Lands



Field Equipment Used

I. Portable Conductivity/pH meter/Temp

LaMotte CDS 5000

Range: 1 - 199.9 $\mu\text{S}/\text{cm}$
200 - 1999 $\mu\text{S}/\text{cm}$
2 - 19.99 mS/cm
20 - 199.9 mS/cm
0 - 100 $^{\circ}\text{C}$

Resolution: ± 0.1
 ± 1
 ± 10
 ± 100

Probe: Carbon electrode

Power: 9 volt alkaline battery

Calibration: HF Scientific Inc. 0.02 NTU. Lot number 40204

II. Portable Turbidity Meter

HF Scientific DRT-15 C

Range: 0-20 Nephelometric Turbidity Units (NTU)
0-200 Nephelometric Turbidity Units (NTU)

Linearity: (+ or -) 1% of Full Scale on either range

Repeatability: (+ or -) 1% of Full Scale on either range

Power: 9 volt alkaline battery

Operating

Temperature: 0-50 $^{\circ}\text{C}$ (32 - 122 $^{\circ}\text{F}$)

Calibration: Advanced Polymer Systems Standards

CAS Number 9003-70-7; MSDS Number A002-01

0.0 NTU (Styrene Divinyl Benzene Copolymer Bead <1%,
Deionized Reverse Osmosis Water >99%)

19.8 NTU (Styrene Divinyl Benzene Copolymer Bead <1%,
Deionized Reverse Osmosis Water >99%)

198 NTU (Styrene Divinyl Benzene Copolymer Bead <1%,
Deionized Reverse Osmosis Water >99%)

Field Equipment Used (Continued)

III. Portable pH/Temperature Meter

VWR Scientific model 2000

Range: 0.000 to 14.00 pH

± 1600 mV

0.0 to 100.00 °C

Resolution: 0.01 / 0.1 pH

1 mV

0.1 °C

Power: 9 volt alkaline battery

Probe: Electrode, pH, Epoxy Combo, VWR 34105-023

Calibration: Standards of pH Buffers from Arizona State Laboratory

IV. Water Sampler on loan from EPA Region IX

Horizontal Van Dorn Bottle.

V. Global Positioning System Receiver

Trimbal Basic Plus; Trimbal Navigation Limited.

Property of ADEQ Drinking Water Section.

Acronyms and Definitions

ADEQ	Arizona Department of Environmental Quality. State Agency whose responsibility is to implement environmental and public health programs promulgated by the Environmental Protection Agency.
ADHS	Arizona Department of Health Services. State Agency whose responsibility includes but is not limited to public health oversight, risk analysis research, and community health education. Located in Phoenix, Arizona.
ASUA	Arizona Small Utilities Association. A non-profit organization located in Tucson, Arizona whose membership includes rural and urban water utilities serving 10,000 or fewer persons.
CAP	Central Arizona Project. Canal system bringing Colorado River water to Phoenix and Tucson.
conductivity	The ability of a solution to conduct an electrical current. The current is conducted by electrically charged particles called ions. Conductivity is measured in microsiemens/centimeter.
EPA	Environmental Protection Agency. Arizona is within EPA Region IX, whose office is located in San Francisco, CA.
GPS	Global Positioning System. A satellite receiver that can mathematically determine a precise geographic position by processing signals from a minimum of four NAVSTAR satellites simultaneously. The ADEQ GPS units use the Department of Defense navigation satellite time and ranging system consisting of 24 orbiting GPS satellites that provide 24 hour, all weather navigation and surveying capabilities.
HBGL	Health Based Guidance Level; statistically set using health risk studies and estimates.
IPSC	Interagency Perchlorate Steering Committee. Group created and chaired by the EPA consisting of environmental professionals, state agencies, federal agencies, universities, environmental groups, Bureau of Indian Affairs, Indian Tribes and Nations with a goal of sharing information and knowledge on issues relating to perchlorate.
ITCA	Intertribal Council of Arizona, Environmental & Natural Resources Programs. Mission: to provide member tribes with the means for action on matters that affect them collectively and individually, to promote tribal sovereignty and to strengthen tribal governments. Established in 1952.
ppb	Parts per billion. One ppb is equal to one penny in ten million dollars.
SRO	Southern Regional Office of the Arizona Department of Environmental Quality. SRO is located in Tucson, Arizona.
NRO	Northern Regional Office of the Arizona Department of Environmental Quality. NRO is located in Flagstaff, Arizona.

Bibliography

U.S. Environmental Protection Agency. (December 31, 1998) Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization Based on Emerging Information. Washington, D.C.: National Center for Environmental Assessment, Office of Research and Development; report number NCEA-1-0503. Available online at: www.epa.gov/ncea/perch.htm

Professor Paul Westerhoff, Ph.D, Assistant Professor, Arizona State University. (July 1998). Shan Miller, Graduate Student Project on Perchlorate. College of Engineering and Applied Sciences, Department of Civil and Environmental Engineering. CEE 590.
e-mail: p.westerhoff@asu.edu.

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Montgomery Watson Laboratories, Los Angeles, California.

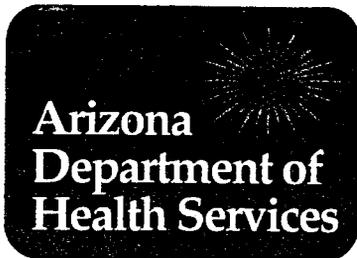
William P. Reed, EHS II, Primacy Team, Drinking Water Section, Water Quality Division, Arizona Department of Environmental Quality, Phoenix, Arizona.

Sonia Valdez, EHS II, Program Development and Outreach Unit, Drinking Water Section, Water Quality Division, Arizona Department of Environmental Quality, Phoenix, Arizona.

Appendix A

ADHS Provisional Health Base Guidance Level Letter - dated March 15, 1999

The attached letter was written as a response to inquires from the SRO of ADEQ. This level is intended to be a guide only. Currently the EPA has not set a final Maximum Contaminant Level for Perchlorate. ADEQ is waiting for the EPA to set a final level based on toxicological assessments. The EPA is also evaluating possible rule development for Perchlorates in drinking water.



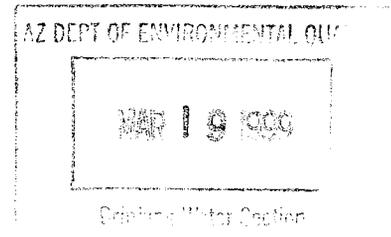
*Bureau of Epidemiology and Disease Control Services
Office of Environmental Health*

3815 North Black Canyon Highway
Phoenix, Arizona 85015-5351
(602) 230-5830
(602) 230-5933 FAX

JANE DEE HULL, GOV
JAMES R. ALLEN, M.D., M.P.H., DIR

March 15, 1999

Mr. William Ellett
Arizona Department of Environmental Quality
Southern Regional Office
400 West Congress, Suite 433
Tucson, Arizona 85701



Dear Mr. Ellett:

RE: PROVISIONAL HBGL FOR PERCHLORATE

The Arizona Department of Health Services (ADHS) has developed a provisional drinking water Human Health-based Guidance Level (HBGL) for perchlorate of 31 $\mu\text{g}/\text{L}$. This HBGL was calculated using the default ADHS formula and the provisional reference dose (RfD) from the United States Environmental Protection Agency (USEPA) document entitled "*Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization Based on Emerging Information*" dated December 31, 1998. We did not use a relative source contribution in the calculations since perchlorate is a rare contaminant in soils, air, and foods.

The USEPA indicated in the source document that the RfD is provisional. Additional toxicological information is forthcoming that may change the RfD. We are following the toxicological research closely, and will update the HBGL as appropriate.

Sincerely,

Will Humble, MPH
Chief,
Office of Environmental Health

WH:ps

cc: Lee Bland, BEDCS
Mason Bolitho, ADWR
Dale Ohnmeiss, ADEQ
Chuck Graf, ADEQ