

- Water System Operations June 2006 Activity Report

## Summary

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This new report format of the Water System Operations Group activities focuses on Water Quality for the period following the June 2006 Board Meeting.

## Detailed Report

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### Water Quality

Several water quality issues (perchlorate, chromium VI, bromate, Lake Mead wastewater discharge, and algae management) are engaging staff. These issues are currently ongoing or their status has changed since the last board report. Therefore, these issues are being highlighted in this report.

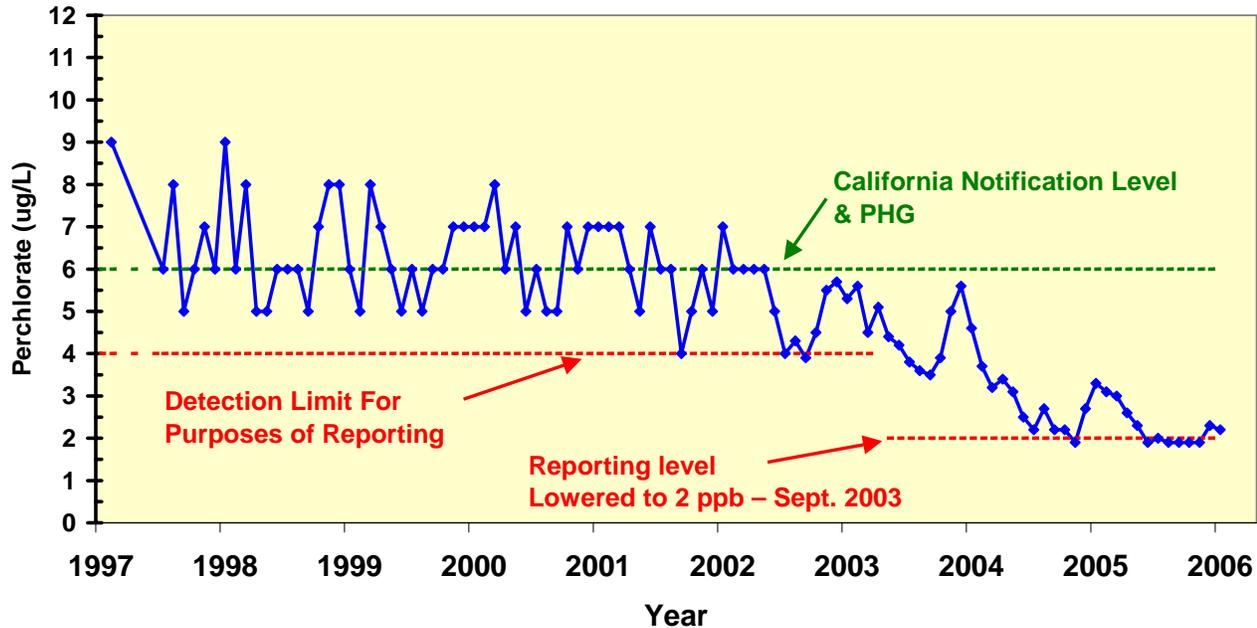
#### *Perchlorate*

Perchlorate was first detected in Colorado River water in June 1997. Perchlorate is used in the manufacture of solid rocket propellants, munitions, and fireworks. The source of the contamination was determined to have come from the Kerr-McGee chemical manufacturing facility (recently purchased by Tronox) in Henderson, Nevada, where high concentrations of perchlorate were being discharged from the Las Vegas Wash into Lake Mead. Treatment was initiated in 1998 and currently utilizes extraction with ion-exchange and *ex-situ* biological treatments. Perchlorate loading into the Las Vegas Wash has declined from approximately 1000 lbs/day in 1998 to 113 to 164 lbs/day in 2005-06. A second perchlorate plume emanating from a site formerly owned by Pepcon and near the Tronox facility has also been identified. This plume is located behind the Kerr-McGee plume and is moving at a very slow rate. Nevada Department of Environmental Protection (NDEP) is working to cleanup the site and prevent the plume from reaching the Las Vegas Wash.

Currently there is no State or Federal maximum contaminant level (MCL) for perchlorate. The California's Office of Environmental Health Hazard and Assessment (OEHHA) has established a public health goal (PHG) of 6 parts per billion (ppb) but the MCL that the State was to establish by January 2004 has been delayed. The California Department of Health Services (CDHS) has adopted a notification level of 6 ppb.

Metropolitan has monitored Lake Havasu at Whitsett Intake monthly since 1997 (Figure 1). The effects of cleanup efforts that began in 1998 show progressive reduction of perchlorate starting in 2002. The levels at Lake Havasu have declined to less than 4 ppb in 2002 and 2 ppb in 2005. Modeling efforts predicted that based on the expected perchlorate loading reduction from groundwater treatment, as well as hydrology, and inflows/releases to Lake Mead, between 1-2 ppb would be the lowest level achievable at Lake Havasu Intake over the next several years. Metropolitan will continue to monitor the efforts of the cleanup to ensure that levels of less than 2 ppb are achieved consistently. Metropolitan will also continue to track the cleanup efforts at the Pepcon site.

Figure 1: Perchlorate Levels at Lake Havasu (Whitsett Intake)



*Chromium VI*

Chromium VI has been detected in a groundwater aquifer along the Colorado River Aqueduct (CRA) near the town of Topock, Arizona. The source of the Chromium VI is from a Pacific Gas and Electric (PG&E) gas compressor station located in San Bernardino County across the river from the town of Topock. Chromium VI was used as a corrosion inhibitor and the waste was discharged from 1951 to 1969 into a wash that seeped into the groundwater. Currently, there is no drinking water standard for chromium VI. The CDHS MCL for total chromium is set at 50 ppb. The OEHHA is working on a PHG that will be used by CDHS to set an MCL for chromium VI.

PG&E entered into a Corrective Action Consent Agreement with the Department of Toxic Substances Control (DTSC) in 1996. The process is designed to evaluate the releases of hazardous substances and to identify, develop, and implement appropriate corrective actions.

PG&E tests approximately 59 groundwater monitoring wells and nine river monitoring stations. A peak concentration of 13,000 ppb has been detected in one well. High levels of chromium VI are being detected at two monitoring wells adjacent to the river. In May of 2006, 960 ppb was found at monitoring well MW-34-100 (located approximately 50-65 feet from the river) and 1,610 ppb was found at monitoring well MW-44-115 (located 70 feet north of MW-34-100 and 90 feet from the river). Both wells have shown an increasing trend of chromium VI and indicate that pumping at extraction wells TW-3 and PE-1 has not controlled the migration of chromium VI towards the river. Metropolitan continues to participate in the Consultative Work Group in order to urge DTSC to complete the characterization of the site contamination and hydrogeology.

Metropolitan began sampling the Colorado River near Topock in 2003 and that effort continues. To date, chromium VI results for all sampling points have been mostly non-detect with some low-level detection ranging from 0.03 to 0.04 ppb. Metropolitan will continue to work with DTSC to seek solutions to protect the Colorado River from chromium VI contamination.

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### *Waste Water Discharge into Lake Mead*

Wastewater discharge into Lake Mead from the Las Vegas area is expected to increase from 170 million gallons per day (mgd) of tertiary treated wastewater to approximately 400 mgd by 2050. Several agencies (City of Las Vegas, City of Henderson, and Clark County Sanitation District) have formed a collaborative partnership [Clean Water Coalition; (CWC)] and proposed alternatives for wastewater discharge into Lake Mead. These alternatives collectively referred to as the Systems Conveyance and Operations Program, were described in a draft Environmental Impact Statement (EIS). Metropolitan submitted comments on December 21, 2005 expressing concern with various components of the proposed discharge program as explained in the EIS. The increase of tertiary treated wastewater discharge will result in the additional loading of chemical and microbial agents into the Colorado River system. Nutrients such as phosphorus are of principal concern, as they will stimulate the growth of algae. Some algal species can produce algal toxins of human health concern while others can produce undesirable taste-and-odor compounds or impair the filtration process in drinking water treatment plants. On June 8, 2006, Metropolitan received CWC's response to our comments. CWC was not in agreement with Metropolitan's assessment of the impacts of their proposed program. Metropolitan and representatives of CWC met on June 20, 2006 to discuss strategies to address Metropolitan's concerns. Metropolitan will continue to work with CWC to resolve this issue.

### *Bromate Task Force*

Bromate is a disinfection by-product formed from the reaction of ozone and naturally occurring bromide. Although Metropolitan is in full compliance with the current MCL set at 10 ppb for bromate, the Long Beach Water Department has requested Metropolitan establish a goal of 5 ppb. As setting a lower goal would require additional chemical costs, Metropolitan formed a Member Agency Task Force. Objectives of this task force were to: (1) review health effects, risk trade-offs and regulatory developments associated with bromate, (2) discuss various treatment alternatives for bromate control, (3) compare appropriate bromate goals, and (4) develop cost estimates associated with implementing various bromate control strategies. Participating member agencies included the City of Long Beach, City of Pasadena, City of Santa Monica, City of Torrance, Los Angeles Department of Water and Power, Calleguas Municipal Water District, Central Basin Municipal Water District, West Basin Municipal Water District, Eastern Municipal Water District, Western Municipal Water District, Municipal Water District of Orange County, and San Diego County Water Authority.

A total of four meetings were conducted between January and June 2006. Seven speakers (6 external experts and one Metropolitan staff member) gave presentations on: review of health effects of bromate; risk trade-offs for bromate; health risk assessments; regulatory developments associated with bromate; drinking water industry perspective on bromate; technology and costs for bromate control; and Metropolitan's compliance with the Disinfectants/Disinfection By-product (D/DBP) Rules. A summary of the Task Force findings is being prepared. The Task Force findings and Metropolitan recommendations will be discussed at the July 14 Member Agency Manager Meeting.

### *Algae and Taste and Odor Management Program*

Over the past few years, there has been an increase in the number of algal events in Metropolitan's source waters. This is due to the increased reliance on State project water (SPW) that has 5 to 6 times the algae growth potential of Colorado River water. As a result, more nuisance algae (that can affect treatment and conveyance system operations), more taste and odor algae, and increased potential for algae capable of toxin production are expected in the next few years. The following describes the algal activities for the first three weeks of June 2006.

Castaic Lake was treated on June 6 with 7 tons of copper sulfate to manage a blue-green algae bloom producing high levels of geosmin. Follow-up monitoring indicates that an additional treatment may be required.

Lake Skinner was treated on June 20 with 8 tons of copper sulfate to manage a taste-and-odor producing blue-green algae and another blue-green species known to produce the algal toxin microcystin. Reports from the day after the treatment indicated a significant visual improvement. The levels of toxins leaving Lake Skinner have been well below the World Health Organization guidelines and are not of concern. The copper sulfate treatment was conducted, in part, as a precautionary action to avoid the proliferation of the microcystin producing algae. Currently, there are no standards for algae toxins in the U.S. but algae toxins are included in the U.S.

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Environmental Protection Agency's Contaminant Candidate List (CCL). Both chlorine and ozone are effective in destroying the dissolved microcystin.

Lake Perris is experiencing a phytoplankton bloom with high levels of geosmin. A recommendation to treat the lake was sent to the Department of Water Resources (DWR) Southern Field Division on Wednesday, June 21. Lake Perris is also experiencing significant anaerobic conditions in the deep part of the lake (hypolimnion). The aeration system currently installed at Lake Perris was not operating to design capacity. Divers were able to identify the source of the problem and repairs have been made to the aeration system.

Diamond Valley Lake is experiencing a non-problem algae bloom that is stimulating comments from visitors. Similarly, the Forebay has developed a green color from non-problem blue-green algae growing in Silverwood Lake.

Methylisoborneol and geosmin is increasing in the East Branch to levels that have triggered further investigation. Focused monitoring will be conducted to characterize the extent of the algal growth.