

LMWQF Meeting
October 28, 2014
Perchlorate Summary Notes

LV Wash:

- The perchlorate mass loading passing Northshore Road for over the last five years has ranged between ~51 to ~95 lbs/day (September 2008 – October 2014). The perchlorate loading for October 2014 was ~70 lbs/day.
- This continues to be an approximate 90% reduction from pre-remediation values when the mass loading at Northshore Road was approximately 900 to 1,000 lbs/day.
- The Southern Nevada Water Authority (SNWA) is conducting dewatering for their weir construction. The Demonstration Replacement Weir is located at downgradient of historic perchlorate plumes and the fault zone where groundwater that carries historic perchlorate discharges from stream gravels and bank storage. The dewatering adds somewhat amount of perchlorate to the stream surface water under following constraints:
 - Dewatering for each of the weirs will be managed under applicable NPDES permits issued by the NDEP. The permits restrict the dewatering discharge returned to the Las Vegas Wash (based upon the season) to 80 lbs/day perchlorate during the winter (December 1 thru May 30) and 25 lbs/day during the summer (June 1 thru November 30);
 - Monitoring is occurring within the LV Wash, Lake Mead, and below Hoover Dam to help adjust the dewatering amount and season so the additional perchlorate load can be mixed with the least observable increase in perchlorate concentrations within Lake Mead and the Lower Colorado River; and
 - Discharge limitations and monitoring conditions designed to limit the perchlorate mass from all discharges to amounts that should not appreciably degrade water quality within Lake Mead and the Lower Colorado River [i.e., downstream concentrations of Hoover Dam should not increase by more than ~ 1 ug/L (1 parts per billion (ppb)) above the then existing range in perchlorate concentrations (~ 0.6 to 1.3 ppb)].

Lake Mead (SNWA Intakes)

- The perchlorate concentration of raw water measured at SNWA River Mountains and Alfred Merritt Smith treatment plants ranges from 0.6 to 2.5 ppb in 2014. The perchlorate concentration at SNWA River Mountains Treatment Plant ranges from 1.3 to 1.6 ppb for October 2014.

Willow Beach:

- The perchlorate concentrations measured at Willow Beach in the Colorado River system continue to remain at or less than ~ 2.1 ppb since December 2008 and have been measured at ≤ 4 ppb since June 2004. The perchlorate concentration at Willow Beach for September 2014 was 0.8 ppb.

Whitsett Intake:

- MWD has reported perchlorate concentrations < 2.0 ppb for all samples collected between July 2008 and July 2014. Since May 2011, the measured perchlorate concentration has been reported at \leq 1.1 ppb. The perchlorate concentration at Whitsett sampling point during September 2014 was 1 ppb.

NERT (formerly Tronox LLC (formerly Kerr-McGee)):

- The Fluidized Bed Reactor (FBR) perchlorate treatment system continues to operate. Perchlorate concentrations in the treated water discharge are routinely < 18 ppb.
- Perchlorate removal rates for the Nevada Environmental Response Trust (NERT) remediation system are typically reported between approximately 1,300 and 2,000 lbs per day. NERT reported ~ 1,439 lbs/day removal rate for September 2014.
- ~ 4,303 tons (total) of perchlorate have been removed from the environment through September 30, 2014 as follows:
 - 447 tons from the seep area;
 - 1,490 tons from the Athens Road Well Field; and
 - 2,366 tons from the On-site Well Field.
- NERT is currently investigating optimization of current groundwater treatment system and extraction well fields. Additionally, NERT will be optimizing the current groundwater monitoring and sampling work plan.
- NERT is investigating the feasibility of completing the soil flushing and PRB pilot studies started by Tronox prior to bankruptcy.
- NERT switched the operator from Veolia to Envirogen on July 24, 2013.

AMPAC:

- AMPAC has replaced the existing In-Situ Bioremediation (ISB) system with an FBR treatment system. The FBR system commenced start-up in August 2012 and was operational mid-October 2012.
 - The 6 year operation of the ISB system moved about 478 million gallons of groundwater, removing approximately 56,000 lbs of perchlorate.
 - The FBR treatment system is capable of treating an approximate combined 800 gpm of perchlorate-impacted groundwater from multiple well fields;
 - The FBR treatment system is still being optimized mechanically and operationally. As of June 14, 2014, the system was running at 697 gallon per minute (gpm), which equates to about 1,374 lbs/day.

- For comparison, the ISB operated at 140 gpm removing 32 lbs/day.
- The new groundwater extraction well field in the vicinity of the former Pepcon plant site near Gibson Road and American Pacific Drive is tied into the FBR treatment system. The new well field is within the Valley AutoMall area and close to the Pepcon source area. The “source area” wells are designed to extract perchlorate-impacted groundwater from shallow and deep water-bearing zones to accommodate remediation in this area. AMPAC has thirteen extraction wells running now with five extraction wells in the source area and eight extraction wells in shallow aquifer. The flow rate from shallow aquifer is about 320 gpm with perchlorate mass removal of about 50 lb/day, while the flow rate of five Auto Mall wells is about 360 gpm with perchlorate mass removal about 1,200 lbs/day, so the five Auto Mall wells account for more than 95% of the total perchlorate mass removal.
- AMPAC has negotiated an agreement with NERT for the treatment of sludge generated from the AMPAC FBR treatment system.
- A NPDES permit has been issued for the discharge of the treated effluent to the Las Vegas Wash. The discharge limitation for perchlorate is 18 ppb.
- NDEP approved AMPAC’s request to discharge treated groundwater to the Las Vegas Wash via bypass of the Dissolved Air Filtration (DAF) and Media Filters with conditions on August 30, 2013.

Nationally:

- March 2004: The Cal/EPA’s Office of Environmental Health Hazard Assessment (OEHHA) published a 6 ppb public health goal (PHG) for perchlorate.
- January 2005: The National Academy of Sciences’ (NAS) National Research Council (NRC) issued their report. The NAS NRC concluded that an oral reference dose (RfD) of 0.0007 milligrams per kilogram per day (mg/kg/day) would be a health protective reference dose.
- February 2005: The U.S. EPA adopted this RfD.
- October 2005: The New Jersey Drinking Water Quality Institute submitted a report to the New Jersey (NJ) Department of Environmental Protection (DEP) recommending adoption of a health-based State MCL of 5 ppb. The proposed 5 ppb State MCL is based upon the 0.0007mg/kg/day RfD recommended by the NAS NRC in January 2005 and adopted by the U.S. EPA in February 2005. A 20 % relative source contribution term and a 67 kg body weight of a pregnant adult were used to derivate the proposed State of NJ MCL.
- January 2006: The U.S. EPA Office of Solid Waste and Emergency Response (OSWER) released new guidance in to states, regions, and stake holders entitled *Assessment Guidance for Perchlorate*. The January 2006 guidance replaces earlier interim guidance issued by the U.S. EPA in June 1999 and January 2003. The January 2006 guidance indicates that using the 0.0007 mg/kg/day RfD leads to a Drinking Water Equivalent Level (DWEL) of 24.5 ppb. This

guidance also indicated the appropriate preliminary remediation goal (PRG) for perchlorate is 24.5 ppb.

The NDEP is evaluating the January 2006 guidance from U.S. EPA. The NDEP will continue to use the Provisional Action Level of 18 ppb for the foreseeable future. The 18 ppb Provisional Action Level is incorporated into both the Tronox NPDES permit and the AMPAC UIC permit.

- July 2006: Massachusetts promulgated a 2 ppb State Drinking Water standard for perchlorate. This followed action by the Massachusetts Department of Environmental Protection (DEP) wherein they rejected the NAS NRC recommendations to allow for the application of an additional uncertainty factor in their updated perchlorate health assessment.
- August 2006: A California based drinking water standard [Maximum Contaminant Level (MCL)] of 6 ppb was proposed in August 2006. The state of California held a hearing regarding the proposed legislation for a California MCL for perchlorate on October 30, 2006. The public comment period closed on November 3, 2006. The California MCL is to be set as close to the PHG as economically and technically feasible.
- September 2007: The California Department of Health Services (CDHS) announced on September 19, 2007 that the California MCL for perchlorate was set at 6 ug/L with an effective date of October 18, 2007.
- January 2008: The U.S. Food & Drug Administration (FDA) released a Total Dietary Study on perchlorate. The Total Dietary Study is a comprehensive evaluation of perchlorate concentrations in a wide variety of foods. The study found perchlorate exposure from food across a wide range of age groups, with the highest estimated exposure occurring in 2-year olds at approximately 50 – 56 % of the 2006 RfD.
- October 10, 2008: US EPA determined that they will not move forward with creating a national primary drinking water regulation for perchlorate. US EPA will publish a final determination for perchlorate regulation after the 30-day comment period. The final determination will also include a health advisory for perchlorate to help State and local public health officials with technical information to address local contamination.
- January 2009: EPA released an Interim Drinking Water Health Advisory for Perchlorate of 15 ppb. EPA is seeking the advice of the National Academy of Science before making a final determination on perchlorate.

The NDEP will continue to use the Provisional Action Level of 18 ppb for the foreseeable future.

- August 2009: EPA released a Federal Register Announcement for Perchlorate Supplemental Request for Comments on August 19, 2009. NDEP submitted comments to the EPA by the September 18, 2009 deadline. MWD, SNWA, Tronox, and AMPAC were also among those that provided comments to EPA. Supplemental comments were provided later following an extension to the September 2009 submission deadline.

- April 2010: The US EPA, Office of the Inspector General (OIG), issued a peer reviewed report on April 19, 2010 entitled “Scientific Analysis of Perchlorate”. The OIG report concludes that a meaningful opportunity to lower the public’s risk is better achieved by addressing moderate to mild iodide deficiencies (which occurs in ~ 29% of the pregnant and nursing population) than by lowering the drinking water limit for perchlorate to a number less than 24.5 ppb. Focusing on proper dietary iodide levels in pregnant and nursing women would be the most effective approach to increase total iodine uptake (TIU) to healthy levels during pregnancy and nursing. This can be achieved through using iodide fortified prenatal vitamins. Increasing TIU would reduce the frequency and severity of permanent mental deficits in children.
- January 2011: The California Office of Environmental Health Hazard Assessment (OEHHA) released a draft technical support document on January 7, 2011 for a proposed, revised public health goal (PHG) for perchlorate. The proposed revised California PHG for perchlorate is 1 ug/L (ppb). The current California PHG for perchlorate is 6 ppb. California developed their current State Maximum Contaminant Level (MCL) of 6 ppb for perchlorate based upon the current PHG of 6 ppb. OEHHA is charged with review and revision of published PHGs every five years based on the availability of new scientific data. California PHGs are to be based exclusively on public health considerations. The draft revised PHG is based on:
 - new data on environmental exposures to perchlorate;
 - possible effects of perchlorate on infants; and
 - further consideration of infants as a susceptible population.

OEHHA solicited comments on the draft report during a 45-day comment period which extends through February 23, 2011. On December 7, 2012 OEHHA released a revised draft Technical Support Document that incorporated changes following a public comment period and peer review. OEHHA solicited comments on the revised draft through January 22, 2013. There is no final release on for a proposed, revised public health goal (PHG) for perchlorate when checked on October 23, 2014. Additional information can be found at:

<http://www.oehha.ca.gov/water/phg/120712Perchlorate.html#coms>

- February 11 2011: US EPA reversed an earlier decision not to regulate perchlorate by announcing in the February 11, 2011 Federal Register (FR) that it now intends to develop a National Primary Drinking Water Regulation (NPDWR) for perchlorate. The Office of Groundwater and Drinking Water (OGWDW) will be following the Safe Drinking Water Act (SDWA) requirements to:
 - Establish a Maximum Contaminant Level Goal (MCLG);
 - Determine a feasible level for an MCL;
 - Estimate the health risk reduction costs and benefits of alternative MCLs;
 - Determine if benefits justify the costs at the feasible level; and
 - Determine if affordable compliance technologies are available to small systems.

EPA has up to 24 months following the February 11, 2011 “determination” to issue a proposed drinking water regulation under the SDWA. A final NPDWR is required within 18 months of the “proposed” drinking water regulation. As such, proposed and final NPDWRs for perchlorate are expected by February 2013 and late 2014, respectively.

Representatives of the NDEP Bureau of Safe Drinking Water and Bureau of Corrective Actions are participants in a national Workgroup developed by the US EPA to help evaluate several documents designed to support the selection of the MCLG and MCL.

The Science Advisory Board (SAB) issued a Final Report, dated May 29, 2013, to advise EPA on how best to proceed w/ establishing a health protective standard. The report is entitled “*SAB Advice on Approaches to Derive a Maximum Contaminant Level Goal for Perchlorate*.” EPA currently is evaluating the report recommendations. Consequently, the schedule for a NPDWR for perchlorate appears to continue to slip.

Interested individuals should visit the SAB website at <http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/CECEAA071CC61DA985257A9300620F2F?OpenDocument>

to obtain copies of the SAB Report.

- May 2011: The US Government Accountability Office (GAO) issued a report to congressional requesters entitled “Safe Drinking Water Act – EPA Should Improve Implementation of Requirements on Whether to Regulate Additional Contaminants.” The report includes 17 specific recommendations for EPA including that the EPA Administrator require:
 - Development of criteria to identify contaminants that pose the greatest health risks;
 - Improvements in its unregulated contaminants testing program; and
 - Development of policies or guidance to interpret the broad statutory criteria.

EPA Agreed w/ two of the 17 recommendations and indicated that developing guidance and the other recommendations are not needed. GAOs recommendations were provided to better assure the public of safe drinking water.

The GAO report includes information on Perchlorate and finds:

- The 4 ppb reporting limit for EPA Method 314 is relatively “insensitive” which could lead to incorrect estimates of exposure;
- Limitations and Uncertainties related to adjusted data (creatinine adjustment) were not transparently acknowledged. These adjustments introduced uncertainties into the exposure assessment;
- The process and analyses EPA relied on to support its 2008 preliminary determination on perchlorate were atypical, lacked transparency, and limited the Agency’s independence in developing and communicating its scientific findings.

Any Questions?

