

**LAKE MEAD WATER QUALITY FORUM**  
**January 23, 2007**  
**Meeting Summary**

**I. Introductions – Forum members and participating audience members introduced themselves.**

**II. Status Reports:**

**1. Perchlorate Update – Todd Croft (NDEP – Las Vegas)**

**LV Wash:**

- The perchlorate mass flux passing Northshore Road during the last three months ranged between 100 and 175 lbs./day.
- This is about an 80 to 85% reduction from pre-remediation values when the mass flux at Northshore Road was approximately 900 to 1,000 lbs./day.
- Elevated Wash flows and discharges from construction dewatering projects periodically contribute additional, short-duration loading to the LV Wash which contributes to the variable mass-flux values observable in the Northshore Road data.

**Willow Beach:**

- The perchlorate concentrations measured at Willow Beach in the Colorado River system continue to remain low and have been measured at < 4 parts per billion (ppb) since June 2004. For 10 of the 12 months in 2005 and 2006, Willow Beach concentrations were reported below 3 ppb.
- Perchlorate concentrations at Willow Beach were reported at 1.7, 1.6, 2.6, and 2.8 ppb for September, October, November, and December 2006 respectively.

**Colorado River:**

- Water Quality in the Colorado River System, with respect to perchlorate, continues to improve.
- The concentrations have mirrored the Willow Beach measurements.
- Prior to initiation of remediation in November 1999, downstream concentrations were measured at ~ 9 to 10 ppb.
- These values have declined steadily with increased remediation efforts by Tronox and initiation of remediation by AMPAC.

- Monthly perchlorate concentrations have been reported at < the 4 ppb detection limit provided by the Metropolitan Water District (MWD) of Southern California water quality laboratory for all samples collected between June 2004 and December 2005.
- MWD reported a perchlorate concentration of 2 ppb for November 2005 and 2.3 ppb for April 2006 after lowering the detection limit to 2 ppb in November 2005.
- MWD has reported concentrations < 2 ppb for all other samples collected between November 2005 and October 2006.

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

- Tronox' 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 Tronox remediation system are typically reported between 1,700 and 2,000 lbs. per day.
- Removal of perchlorate from the environment through December 2006: ~2,153 tons total; 377 tons from the seep area; 613 tons from Athens Road; and 1,163 tons from the on-site system.
- A single new primary FBR has been operating since late August 2006 to augment the four existing primary FBR's. This change increased the plants chemical capacity by approximately 25% and now allows the treatment of perchlorate-bearing solution from the on-site, lined AP-5 pond. This modification increased the overall flow between 1 and 2 gpm as the AP-5 solution is very concentrated. The plant continues to function with the existing four secondary FBR's to treat effluent from the five primary FBR's.
- The second modification to the FBR Perchlorate Treatment System that was placed in service in late August 2006 is focused at improving effluent clarity. A continuous backwash Parkson sand filter is now operating to remove solids present in effluent from the dissolved air flotation system (DAF's). The existing plate & frame filter press was retained to manage the solids following dewatering in thickening tanks. The effluent quality for treated effluent discharged to the Las Vegas Wash is improved now that the sand filter is removing additional solids.
- Tronox completed installation, development, and testing of a single new extraction well (ART-9) within the Athens Road Well Field during the first half of 2006. This well is constructed deeper into a caliche-filled portion of the secondary paleo-channel. ART-9 became fully operational in early September 2006 and is used in place of existing well pair ART-6 & ART-6A in an effort to capture additional perchlorate mass. Operation of ART-9 is intended to increase mass capture by reducing the perchlorate mass flux historically migrating beyond the Athens Road Well Field. An additional 80 pounds per day of perchlorate was captured by ART-9 through the end of September 2006.

## AMPAC:

- Work also is proceeding towards remediation of perchlorate-containing groundwater emanating from the former Pepcon facility in Henderson, Nevada. AMPAC submitted a Mitigation System Workplan on February 1, 2005 for the remediation of perchlorate-impacted groundwater near the leading edge of their plume in the vicinity of Athens Road and Boulder Highway. The NDEP provided workplan concurrence in April 2005. The workplan includes provisions to: (1) extract groundwater near Athens Road (Athens Road and Athens Pen Well Fields); (2) Convey the extracted groundwater through underground piping to an injection well field further to the north; (3) amend the perchlorate-impacted water with nutrients to promote perchlorate degradation and biocides to limit fouling of the injection wells; and (4) inject the amended water for in-situ biodegradation of perchlorate. The plan includes provisions for monitoring to evaluate the performance of the Mitigation System and contingencies to ensure the Mitigation System meets performance goals.
- The Mitigation System has been activated in two phases. The first phase was activated on June 12, 2006 and allowed recover of groundwater within the Athens Road Well Field ; conveyance of approximately 200 – 300 gpm of flow through buried conveyance piping; activation of the injection well field; and systematic monitoring of the performance monitoring well network down gradient of the injection well field. This system operated as an Interim system through late December 2006 while the long-term ISB building and Athens Pen Well Field were constructed, equipped, and permitted. The temporary/interim In-situ Biological (ISB) Treatment System was used to filter the extracted well water, periodically add a biocide to the filtered water, and control the addition of electron donor at the injection well field.
- Start-up of the Interim ISB System was initiated on June 12, 2006 following placement and connection of several electrical transformers. The Interim ISB System achieved continuous operation by June 19, 2006 by processing approximately 200 gallons per minute (gpm) of flow from the Athens Road Well Field on a 24/7 basis. The extracted and re-injected water initially contained approximately 2.5 ppm perchlorate (approximately 5 pounds per day). The extracted water was mixed with an electron donor (sodium benzoate) and a biofouling control agent (chlorine dioxide) and re-injected into four of the six injection wells. AMPAC increased the flow to approximately 330 gpm with a corresponding increase in perchlorate concentration and mass in the fall of 2006 when additional extraction wells were activated along Athens Road. Degradation of perchlorate to non-detectable concentrations (<6ppb) was achieved in the lead (first/closest) performance monitoring well by July 24, 2006.
- Activation of the second phase occurred in late December 2006 with the transfer of operations to the long-term ISB building, decommissioning of the interim ISB System, and activation of the Athens Road & Athens Pen Well Fields. Activation of the Athens Pen Well Field will allow for an additional 60-65 gpm of groundwater extraction further northeast of the Athens Road Well Field.

**Perchlorate Modeling:**

- McGinley & Associates, Inc. (MGA) initiated work during the 3rd Quarter of FY07 on perchlorate modeling efforts. This work will result in development of a detailed two-dimensional groundwater flow and particle tracking model of the Athens Road Well Field area within a portion of the Tronox Perchlorate Plume.
- This model approach was selected as a result of several project advancements that have occurred in the Henderson area since the “Refined Las Vegas Wash Initial Perchlorate Model Project” was placed on hold in 2005 pending continued funding from U.S. EPA Region 9. The FY07 modeling approach is anticipated to yield a greater understanding of remedial efforts and conditions in the Athens Road vicinity, and support decision-making efforts regarding remediation effectiveness and optimization.
- The FY07 model constructed with U.S. EPA Grant Funds, and an existing detailed AMPAC model prepared by AMPAC’s consultant for an area coincident with Athens Road farther to the west of the Tronox Athens Road Well Field, may be used at a later date in conjunction with a larger, coarser numerical model of the region currently under development by other entities. The larger model area is expected to cover an area south of the Las Vegas Wash extending to approximately Warm Springs Road to the south, Olsen Street to the east, and Wiesner Way to the west. Once fully constructed, the coarser numerical model developed by other entities may be used in conjunction with the existing Las Vegas Wash numerical model developed by MGA in 2003, to provide an improved model suite for predicting perchlorate mass decline in the Las Vegas Wash as a result of groundwater interception and treatment. Perchlorate mass flux measurements at North Shore Road in the Las Vegas Wash are routinely compared with the 2003 model predictions of mass decline over time, to track and evaluate overall perchlorate remediation system performance.
- A degree of discrepancy exists between predicted and observed mass flux within Las Vegas Wash. The results of FY07 modeling for the vicinity of Athens Road may also provide insight into the reasons for the discrepancy and thereby improve the overall perchlorate monitoring and remediation efforts. Operating the various models in conjunction with each other may require additional resources and funding dependent upon the connectivity afforded by each model and the remediation objectives.

**Nationally:**

- The Cal/EPA’s Office of Environmental Health Hazard Assessment (OEHHA) published a 6 ppb public health goal (PHG) for perchlorate in March 2004. A California based drinking water standard [Maximum Contaminant Level (MCL)] of 6 ppb was recently 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.

- The National Academy of Sciences' (NAS) National Research Council (NRC) issued their report in January 2005. 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.
- The U.S. EPA adopted this RfD in February 2005.
- In January 2006, the U.S. EPA Office of Solid Waste and Emergency Response (OSWER) released new guidance 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 this new guidance. We 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.

- On 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.
- In 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.
- Senator Boxer proposed two pieces of legislation to the U.S. Senate on January 4, 2007. Both Senate Bills (S 24 & S 150) would amend the Safe Drinking Water Act if enacted. The two bills provide for:
  - establishing a health advisory for perchlorate early in 2007;
  - establishing a national primary drinking water regulation for perchlorate by December 31, 2007;
  - required monitoring of public water systems; and
  - required public notification of perchlorate concentrations in the public water supply system and public notification of the potential health effects of perchlorate.

## **2. Selenium Subcommittee:**

Kathy Sertic mentioned that the Selenium Subcommittee last met on September 21, 2006. Additional monitoring and research needs were discussed. This proposal was developed and presented to the Las Vegas Wash Coordination Committee. Members of the subcommittee were asked to briefly meet after this meeting to discuss the date for the next subcommittee meeting.

## **3. Las Vegas Wash Coordination Committee (SNWA)**

Mr. Seth Shanahan of SNWA reported that several activities had occurred since the last Forum and Committee meetings. The 10<sup>th</sup> erosion control structure has been completed in the Wash. The weir has a bridge that can be accessed by pedestrians. Bids are being accepted for the upper diversion weir which is located at the farthest western point along the Wash. The structure will also have a bridge and a bypass channel to accommodate flood flows. The Fall 2006 “green-up” took place in September. This was one of the largest events ever for the Wash, with about 400 volunteer workers replanting 10 acres. A total of 135 acres have been re-vegetated to date. Another “green-up” is scheduled for March 10, 2007 with a goal to plant about 14 acres. People interested in volunteering should contact Debbie VanDoormalen at (702) 822-3370. The 2006 annual report is being prepared and is expected to be completed by April 2007. Other reports are being developed including a botanical inventory of the Las Vegas Wash, revegetation master plan, water quality and wetland studies along the demonstration pond at the City of Henderson Treatment Facility. The next Coordination Committee meeting is scheduled for January 31<sup>st</sup> at 9:00 am.

## **III. Presentations**

- 1. Zebra Mussel Infestation—Kent Turner (NPS)**
- 2. Projected Lake Mead Water Levels—Terry Fulp (BOR)**
- 3. Lake Mead Study Update—Bryan Moore (NPS)**
- 4. Proposed Selenium Research Activities—Peggy Roefer (SNWA)**
- 5. SCOP Update—Doug Karafa (Clean Water Coalition)**

These presentations are available on the NDEP website at [ndep.nv.gov/forum](http://ndep.nv.gov/forum)

## **IV. Other Issues**

Nothing discussed in this area

## **V. Next Forum Meeting**

The next Lake Mead Water Quality Forum meeting was scheduled for April 10, 2007.

## **VI. Adjourn**

The meeting was adjourned at 2:55 p.m.