State of Nevada
Nevada Division of Environmental Protection
Bureau of Corrective Actions
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Southern Nevada Perchlorate Cleanup Project

- NEW! **October, 2008 —** Preliminary Regulatory Determination for Perchlorate HTML — *USEPA*
- NEW! **October, 2008 —** Fact Sheet — Preliminary Regulatory Determination — *USEPA*
- NEW! **September, 2008 —** EPA Unlikely to Limit Perchlorate — *washingtonpost.com*

PERCHLORATE:
Both a naturally occurring and man-made chemical used as a component of rocket fuel and fertilizer, perchlorate was first detected in the Lower Colorado River in 1997. Currently, there is no federal drinking water standard for perchlorate. Due to possible environmental health concerns that perchlorate interferes with thyroid function, the Nevada Division of Environmental Protection (NDEP) along with the Southern Nevada Water Authority (SNWA), US Environmental Protection Agency (EPA), the City of Henderson and Kerr-McGee, began to investigate the source of the perchlorate.

When the sources of perchlorate had been identified, remediation plans were enacted to remove perchlorate from groundwater and surface water. Perchlorate entering the Las Vegas Wash has been reduced approximately 90% since 1997. As of August 2008, approximately 2,638 tons of perchlorate have been removed from the environment. NDEP continues to monitor perchlorate levels reported in the Lower Colorado River, which is below the safety limit set by EPA in February 2005.

SOURCES: The sources of the perchlorate were traced upstream to the Las Vegas Wash, which discharges into Lake Mead. Perchlorate

PROJECT TIMELINE

1997
- Initial discovery of perchlorate in the Lower Colorado River and aqueducts
- Source traced back to Las Vegas Wash

1998
- Plume characterization
- On-Site capture (KM)
- In-situ Bioremediation pilot testing (AMPAC)

1999
- Seep capture (KM)
- Temp Ion-Exchange (IX) system (KM)

2000
- Pilot plants constructed (KM)
- Bench scale testing (AMPAC)

2001
- Full-Scale groundwater treatment system (ISEP-PDM) construction (KM)

was entering the Las Vegas Wash through contaminated groundwater and surface water stemming from a manufacturing facility owned and operated by Kerr-McGee Chemical LLC (currently Tronox LLC).

Perchlorate-contaminated groundwater was also found to originate from the former Pacific Electrochemical Production Company (Pepcon), owned by American Pacific Corporation (AMPAC) (see map below). The U.S. Navy, Western Electrochemical Company, and American Potash and Chemical Company have owned and operated on the current Tronox facility. Perchlorate was produced at this facility from 1945 until 1998. Perchlorate was manufactured at the AMPAC facility from 1958 until 1988 when an explosion destroyed the Pepcon plant.

CURRENT REMEDIATION SYSTEMS: Tronox (TRX) currently operates a remediation system that extracts perchlorate-contaminated groundwater for ex-situ treatment using bioremediation to reduce the situ treatment using bioremediation to reduce the perchlorate concentration followed by discharge into the Las Vegas Wash. The discharge water from this remediation system has been consistently less that the Nevada Interim Action Level for perchlorate of 18 micrograms per liter or parts per billion (ppb).

AMPAC currently operates an in-situ remediation system where perchlorate-contaminated

- All well fields & infrastructure installed (KM)
- On-Site slurry wall constructed (KM)
- Groundwater modeling (AMPAC)

2002
- ISEP-PDM: construction completed (KM)
- One-Pass IX System replaces ISEP-PDM (KM)

2003
- Expansion of Seep area well field (KM)
- Full-scale Fluidized Bed Reactor (FBR) system constructed (KM)

2004
- FBR system operational (KM)
- Aquifer testing (AMPAC)

2005
- In-Situ Bioremediation (ISB) system installation (AMPAC)

2006
- FBR system expansion and optimization (TRX)
- Well field optimization (TRX)
- ISB system operational (AMPAC)

2007
- Athens Road well field modeling (NDEP)
- ISB system optimization (AMPAC)

2008
- Groundwater capture evaluation (TRX)
- Re-injection optimization (AMPAC)
- PCE issues: GAC columns added to ISB system (AMPAC)

groundwater is extracted and amended with nutrients followed by re-injection into the subsurface near the Las Vegas Wash. This system has achieved the reduction of the perchlorate concentration in the re-injected groundwater from 18 micrograms per liter or parts per million (ppm) to non-detectable concentrations of less than 6 ppb by the first performance monitoring well.

RESULTS: Sampling of groundwater and surface water is conducted by SNWA, Tronox (TRX), AMPAC and the Southern California Metropolitan Water District (MWD). Surface water is sampled in the Las Vegas Wash, Lake Mead and points on the Colorado River downstream of Lake Mead.

Concentrations in the Las Vegas Wash have decreased by more than 90 percent since 1997. Sampling data from the Willow Beach, AZ sampling point on the Colorado River, approximately 11 miles downstream from Hoover Dam, shows a reduction from a high of 9.7 ppb in June 1999 to 1.8 ppb in May 2008.

Sampling data from the Northshore Road sampling point in the Las Vegas Wash downstream from Lake Las Vegas shows a reduction from a high of 1,200 ppb in October 1998 to 61 ppb in May 2008. NDEP continues to work with EPA, SNWA, MWD, City of Henderson, Tronox, AMPAC and BMI to develop opportunities to further refine groundwater capture and treatment technologies.

Defining a Perchlorate Drinking Water Standard

NDEP Monitoring Data

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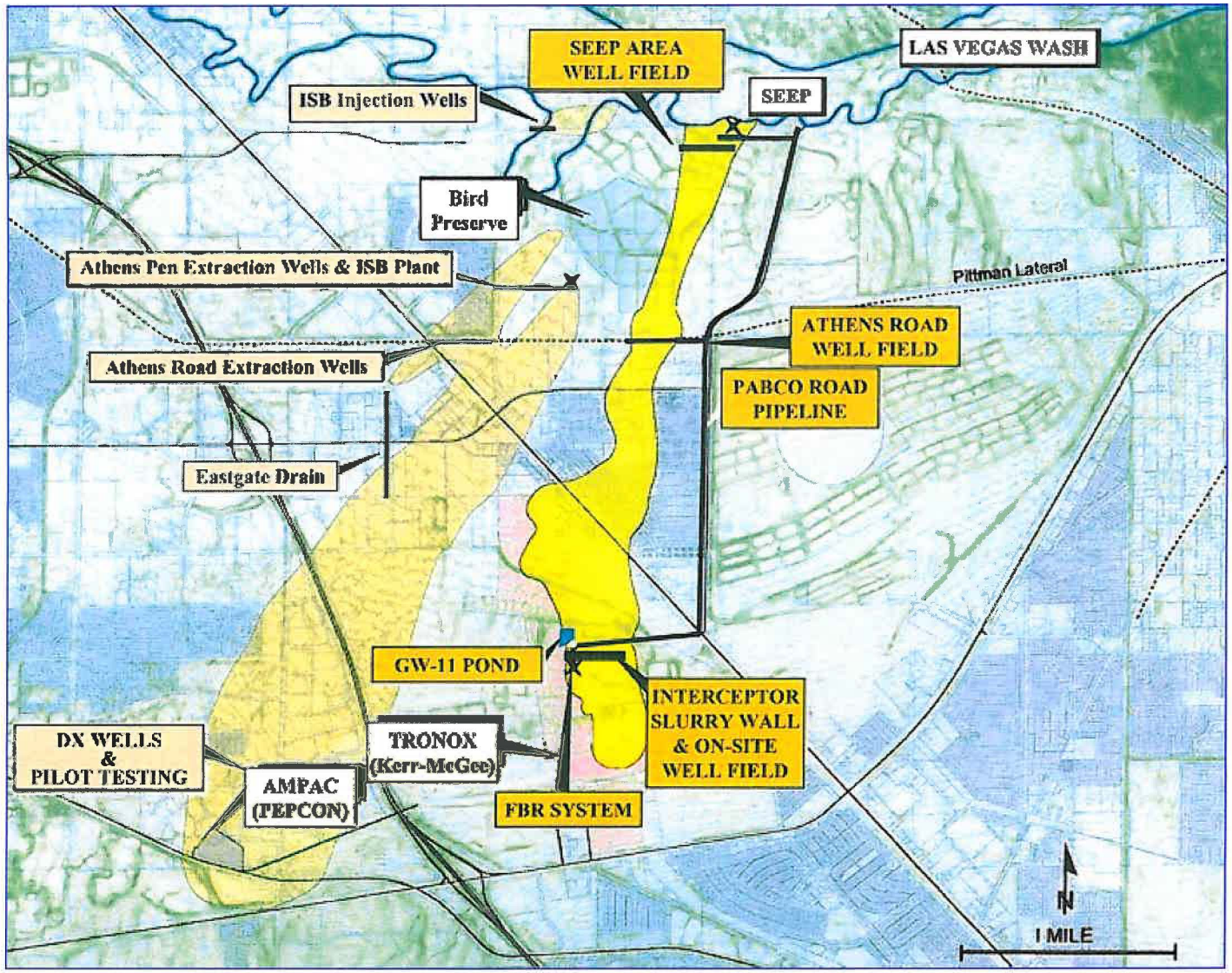

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