

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
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Perchlorate in Henderson, NV-Significant Controls Are Operating
July 2004

Source and Problem Description

*Kerr McGee Chemical Company (KMCC) - perchlorate production was initiated in 1945; full commercial production of ammonium perchlorate began in 1951 under prior owners/operators; Kerr McGee acquired the property in 1967.

*Perchlorate contaminated ground water from Kerr McGee plume flows north about 3 miles from KMCC to Las Vegas Wash (LVW). KMCC is the most significant source of perchlorate entering LVW. Prior to controls, the KMCC plume released about 900 pounds per day (average) to LVW.

Kerr McGee Control Strategy and Status

*Control Strategy: capture and treat perchlorate at three locations:

- 1) on KMCC property where perchlorate is most concentrated,
- 2) at Athens Road about midway between KMCC and Las Vegas Wash where there is a narrow subsurface paleo-channel that makes effective capture possible, and
- 3) near LVW where capture will have the most immediate impact on reducing releases to LVW.

*Current Status (see attached annotated photograph for additional details):

- 1) on KMCC property - **source control achieved in October 2001**; slurry wall (1700 feet long & 60 feet deep) and 22 extraction wells captured an average of 1050 pounds per day in 2003 (“virtually complete capture”).
- 2) at Athens Road - 8 extraction wells began regular operation in October 2002; they captured an average of 790 pounds per day in 2003 (an estimated 90 to 95% of the mass flow).
- 3) near Las Vegas Wash - seep and 9 extraction wells capture an estimated 60-80% of mass flow. As expected, mass removal rates at this location have decreased dramatically due to perchlorate removal by the upstream wells at Athens Road (from about 700 lbs/day in April/May/June 2003 to about 150 lbs/day in June 2004).

*Water Treatment - total of 1000 gpm of water captured from the three locations is treated using 3 ion exchange units and a new biologically-based fluidized-bed reactor (FBR), then discharged back to LVW. The ion exchange units treat about 200 gpm of the water from the seep area and are 99+% efficient; the treated water contains 500 to 2000 ppb perchlorate. The new FBR treatment plant is undergoing start-up/shakedown. It has a treatment capacity of about 1000 gpm (it is currently treating only about 800 gpm), and the perchlorate concentrations in the treatment plant effluent are about 18 ppb. The FBR will eventually replace the 3 remaining ion exchange treatment units.

*Summary - engineered controls are in place and **removing 1700-2000 pounds (almost 1 ton) per day** of perchlorate from the Kerr McGee plume that flows towards Las Vegas Wash. As of late July 2004, these control systems have removed more than 1300 tons of perchlorate from the environment.

Remaining Issues

*Las Vegas Wash Gravels - There is a reservoir of perchlorate in the gravels underlying Las Vegas Wash and beyond KMCC’s last capture point; this perchlorate surfaces into LVW within 2 miles downstream of the seep capture area; it currently adds about 100-200 pounds per day to LVW. Modeling performed for NDEP indicates that most perchlorate in the Wash gravels will flush out by the end of 2004. The October 20, 2003 final report of these results concluded that perchlorate in the Wash gravels would clear before controls could be installed.

*There Could Be Other Small Sources of Perchlorate - There are on-going investigations about the existence and significance of possible additional sources of perchlorate downstream of the seep area.

Next Steps

*Ensure that KMCC operates existing controls at maximum efficiency.

*Continue to evaluate the effectiveness of Kerr McGee’s control strategy; require additional controls if necessary.

*NDEP to continue to investigate the possibility that other small sources of perchlorate might exist; work

began in early 2003.

*Evaluate results of PEPCON pilot scale in-situ bioremediation plant, and develop strategy to intercept and treat this perchlorate plume before it reaches Las Vegas Wash. Intercept plume in 2005.

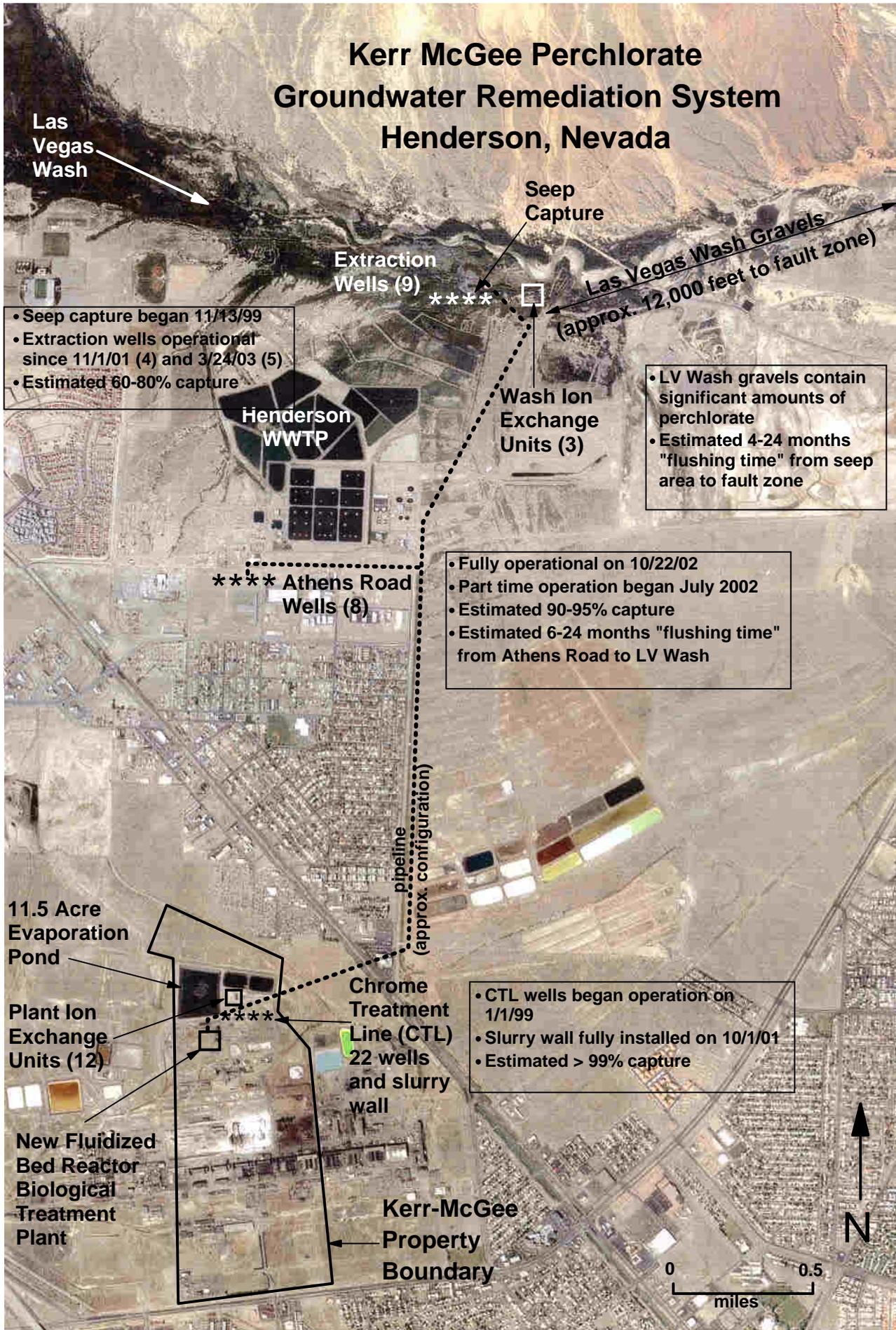
Estimated Travel Times and Flushing Times

It takes time for ground water to travel from one capture point to the next (travel time). Even after a source of perchlorate is reduced or eliminated, it takes time for clean water to flush out the contaminated ground water (flushing time).

*Athens Road to Las Vegas Wash - travel time is estimated to be 7 months; flushing time to reach 4 ppm is estimated to be 21 to 35 months (3 to 5 travel times)

*Las Vegas Wash Gravels - travel time is estimated to be 6 months; flushing time is estimated to be 18 to 30 months (3 to 5 travel times)

Kerr McGee Perchlorate Groundwater Remediation System Henderson, Nevada



Las Vegas Wash

Seep Capture

Extraction Wells (9) *****

Las Vegas Wash Gravels
(approx. 12,000 feet to fault zone)

- Seep capture began 11/13/99
- Extraction wells operational since 11/1/01 (4) and 3/24/03 (5)
- Estimated 60-80% capture

- LV Wash gravels contain significant amounts of perchlorate
- Estimated 4-24 months "flushing time" from seep area to fault zone

Henderson WWTP

Wash Ion Exchange Units (3)

***** Athens Road Wells (8)

- Fully operational on 10/22/02
- Part time operation began July 2002
- Estimated 90-95% capture
- Estimated 6-24 months "flushing time" from Athens Road to LV Wash

pipeline (approx. configuration)

11.5 Acre Evaporation Pond

Plant Ion Exchange Units (12)

New Fluidized Bed Reactor Biological Treatment Plant

Chrome Treatment Line (CTL) 22 wells and slurry wall *****

- CTL wells began operation on 1/1/99
- Slurry wall fully installed on 10/1/01
- Estimated > 99% capture

Kerr-McGee Property Boundary

