

OVERVIEW OF LAS VEGAS VALLEY PERCHLORATE REMEDIAL EFFORTS

**Prepared for:
Perchlorate Task Force Meeting
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Perchlorate Manufacturing Operations Henderson, NV



Pepcon (AMPAC): 1958 – 1988

- May 1988: Destroyed in Explosion
- March 1998: Purchased Manufacturing Line & Customer Base from Kerr-McGee

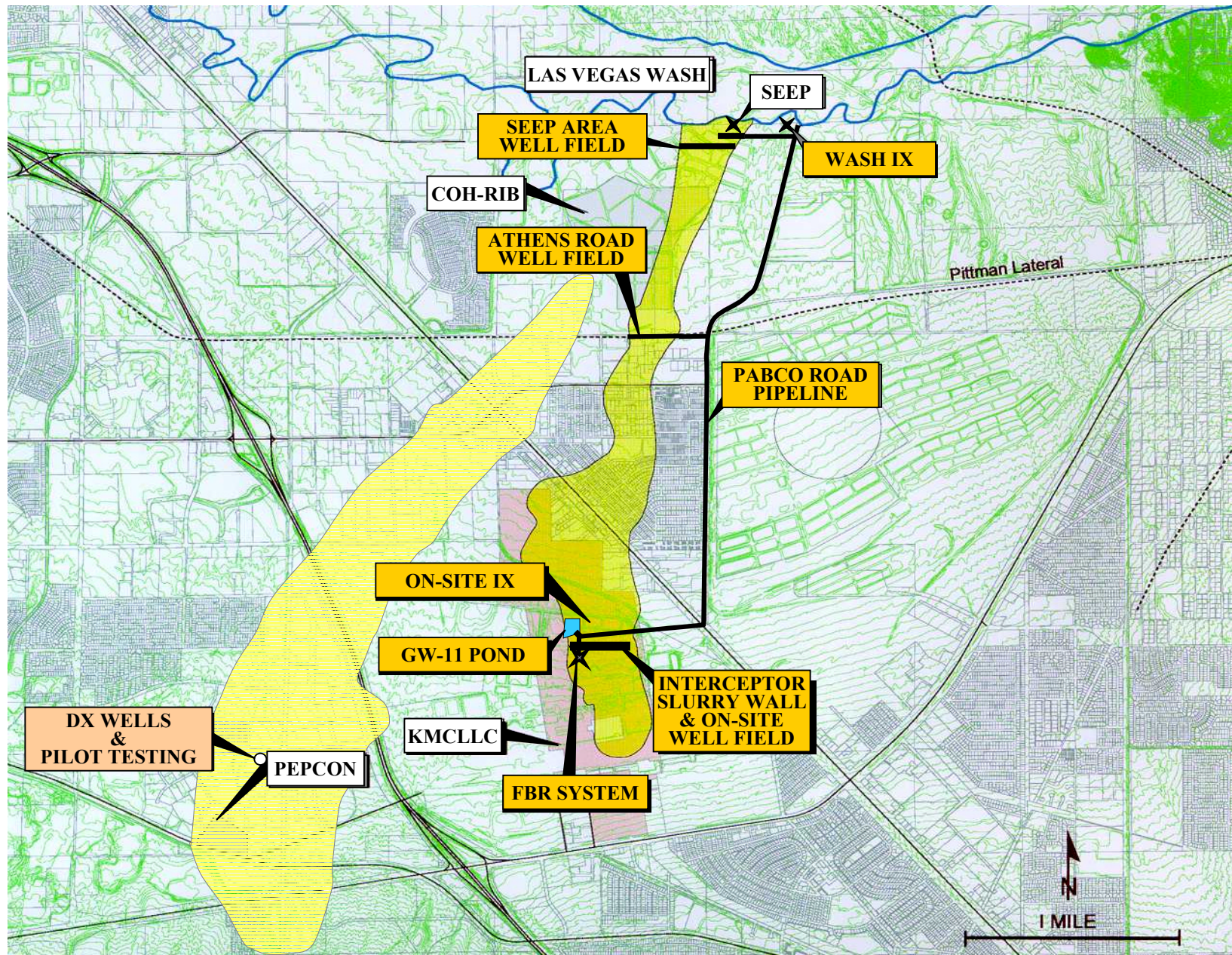
US Government – Navy (1945 – 1962)

Kerr-McGee & Predecessors (1945 – 1998)

- July 1998: Curtailed Perchlorate Production
- March 2002: Process Shut Down



Perchlorate Plumes & Remediation Infrastructure



1997

- Initial Discovery – Source traced back to Las Vegas Wash

1998

- Plume Characterization
- On-Site Capture (Kerr-McGee)

1999

- Seep Capture (Kerr-McGee)

2000

- Seep Area Characterization
- Pilot Plants Constructed
- ISEP-PDM Design Initiated

2001

- Full-Scale GW Treatment System (ISEP-PDM) Constructed
- All Well Fields & Infrastructure Installed
- Permitting Finalized
- On-Site Slurry Wall Constructed

2002

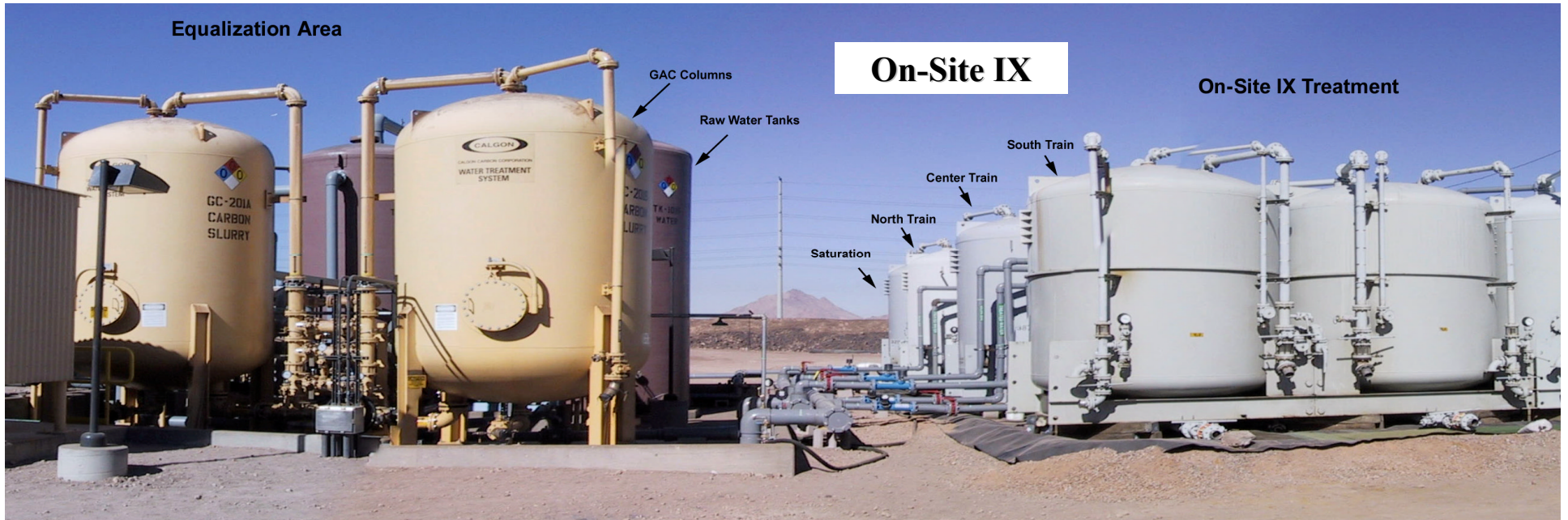
- Full-Scale Plant (ISEP-PDM): Construction Completed
- Start-up Initiated
 - Heat Exchanger Fouling
 - Reactor Pressure Spikes
 - Corrosion
- One-Pass IX System Replaces ISEP-PDM
- All Collection Points Operating (October 2002)

2003

- 5 Additional Seep Area Wells Installed
 - Operating March 2003
 - Compliments the 4 Existing Seep Area Wells
- Full-Scale Ex-Situ Fluidized Bed Reactor (FBR) Biological Treatment System
 - Will Replace ISEP-PDM & IX
 - Design, Permitting, & Construction Initiated

2004

- FBR Full-Scale Operation Planned by Summer 2004



Perchlorate Remedial Systems



Capture & Treatment

Recent Past

Wash IX: ~ 300 gpm @ ~ 30 - 120 ppm

- Seep Area Collection

On-Site IX: ~ 700 gpm @ ~ 200 - 300 ppm

- Athens Road
- Seep Area Collection
- On-Site Pond with Return Flow

Current

Full-Scale System: ~ 850 - 1,000 gpm @ ~ 250 ppm

- Athens Road Well Field
- On-Site Pond
- On-Site Well Field
- Seep Area Collection - GW & Surface

**Perchlorate Removal Rate:
June 2004**

Location	Mass (Pounds per Day)
Seep Area	156
Athens Road	757
On-Site	1,044
Total	1,957

**Perchlorate Removed from the Environment:
Through June 2004**

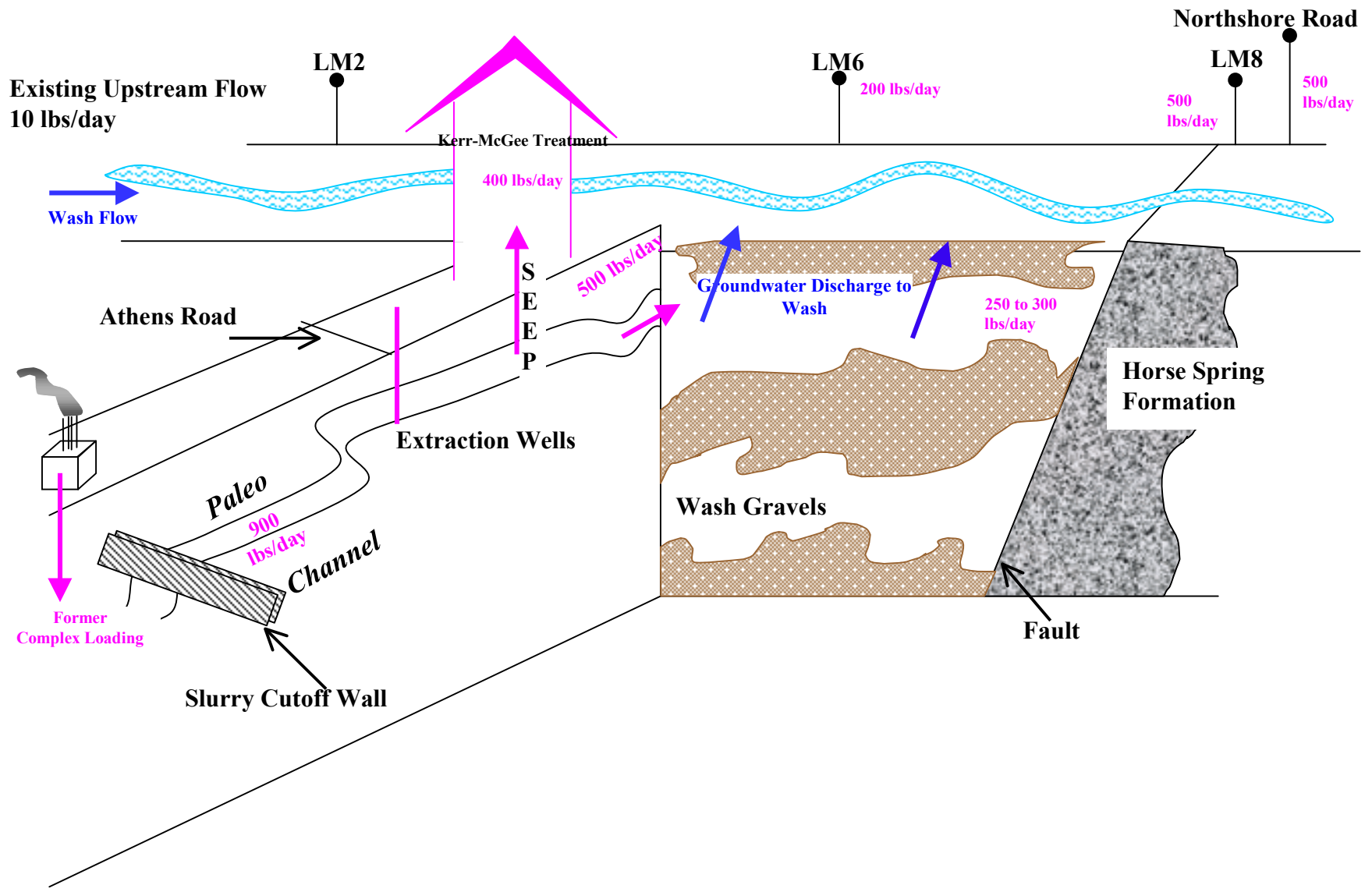
Location	Mass (Tons)
Seep Area	312
Athens Road	265
On-Site	706
Total	1,283

AMPAC Pilot:

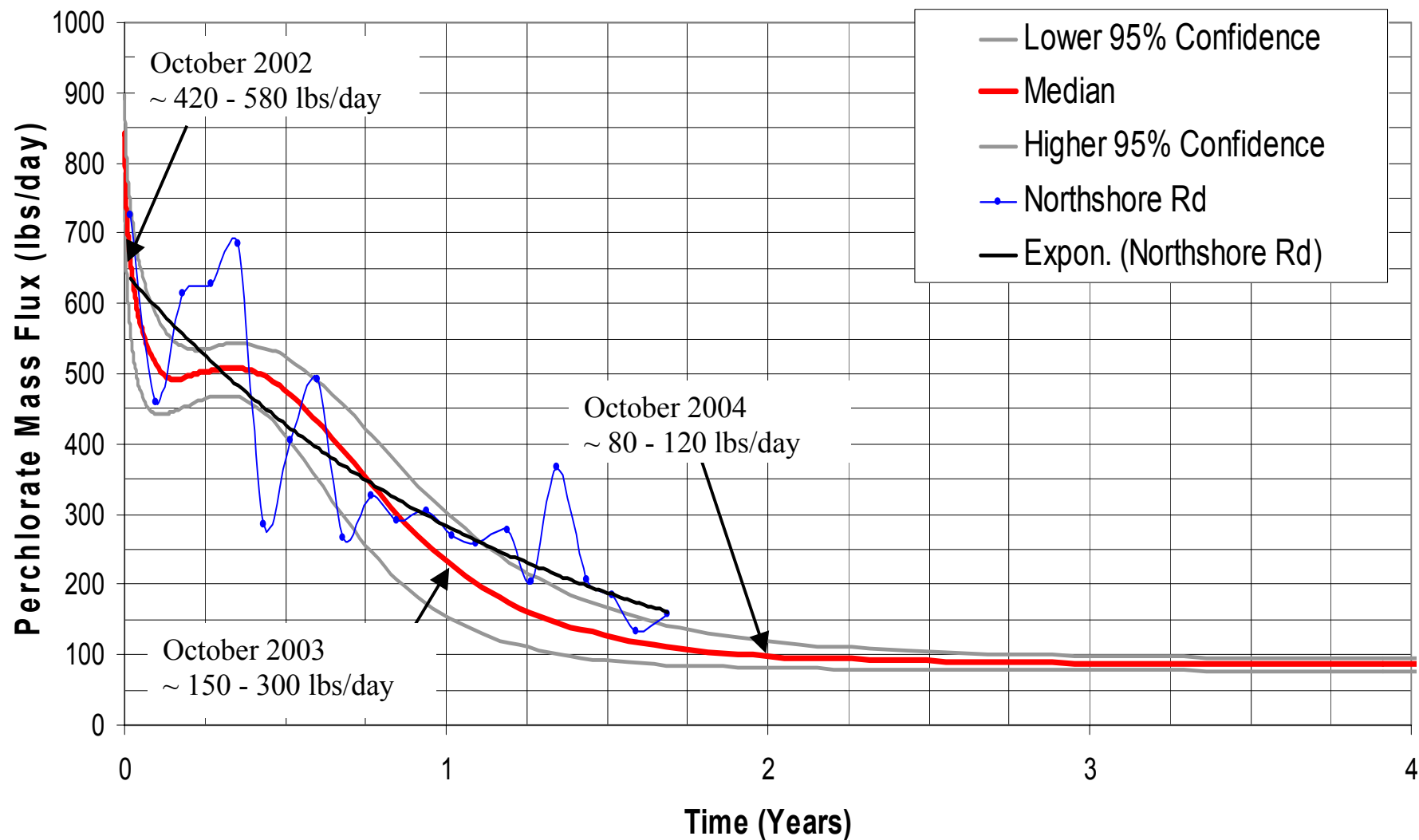
Biodegradation of Perchlorate

- Flow Rate - 10 GPM
- Approximately 600 ppm perchlorate near source area
- Carbon Source – Ethanol/Citric Acid/Potassium Oleate
- Bio-fouling Control – Ultrasonic/Citric Acid/ Chlorine Dioxide
- Degraded ~ 600 ppm to < 2ppb in approximately 110 days
- Evaluated Several Electron Donors
- Corrected Chemical and Biological Fouling Issues

Conceptual Model of Perchlorate Loading to the Las Vegas Wash Prior To October 2002 Capture and Treatment

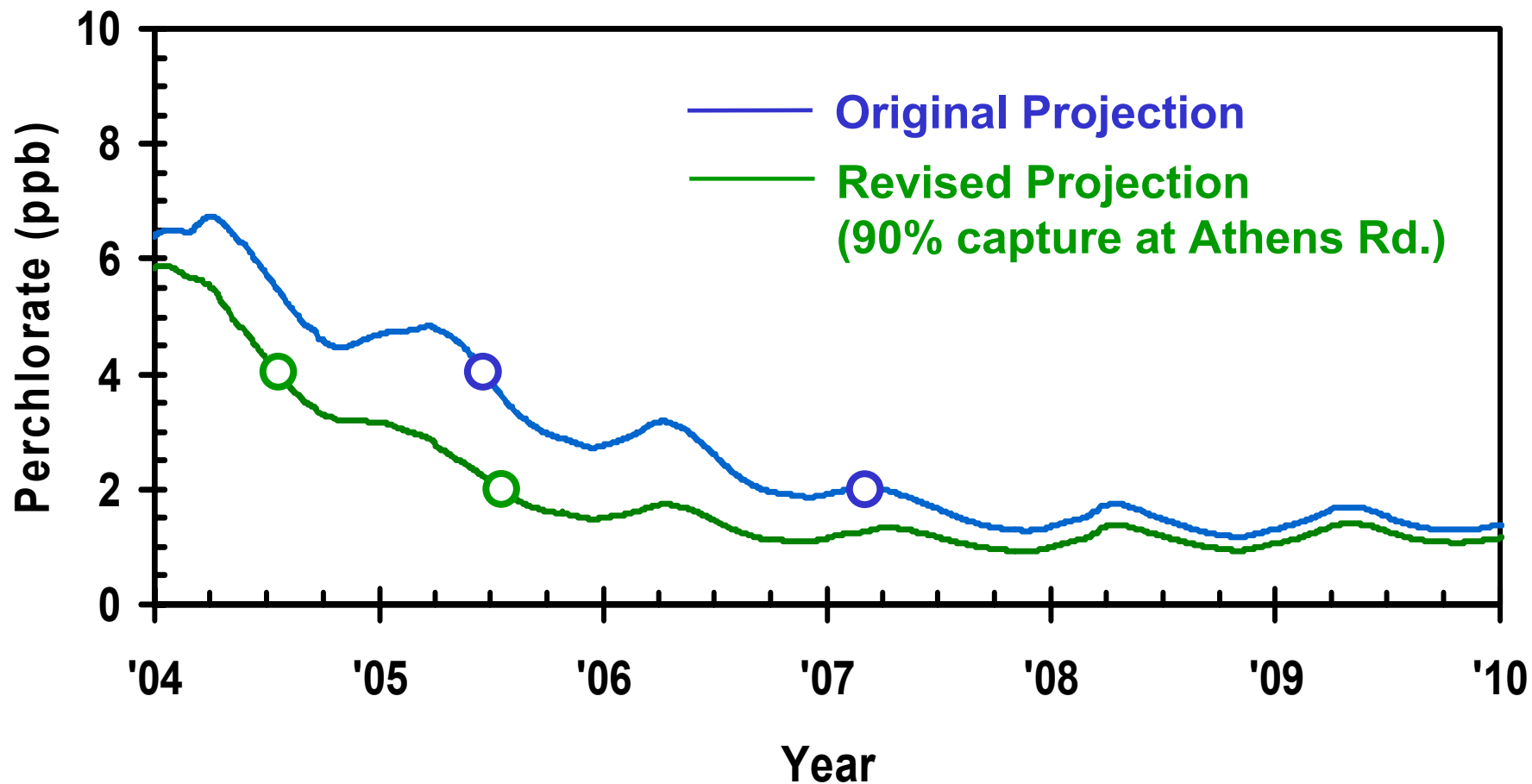


Breakthrough Curve: 90% Efficient Model Results, Mass



Predicted Perchlorate at Whitsett Intake*

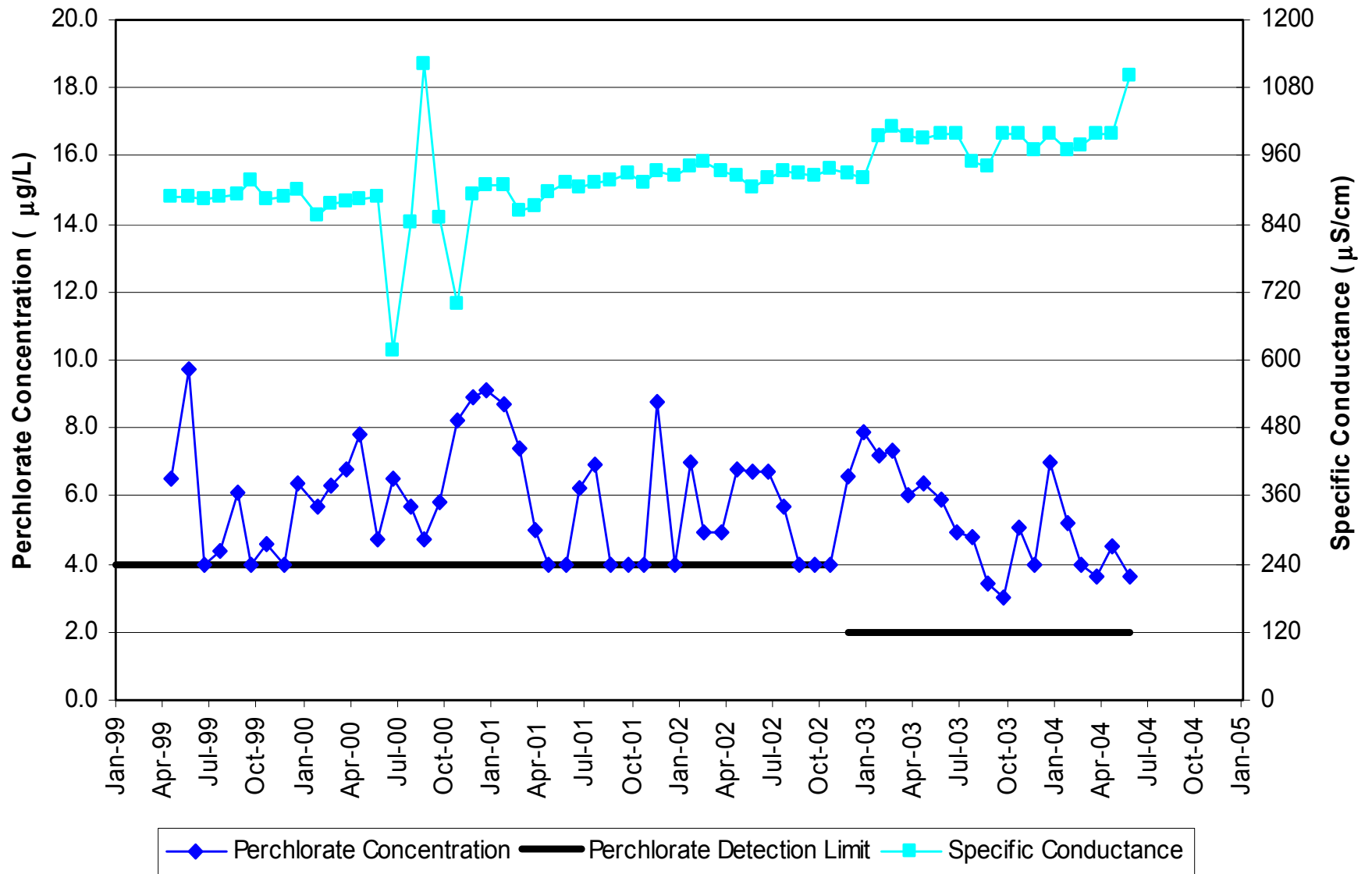
Medium Lake Mead Storage Condition



*Provided by Metropolitan Water District and Flow Science

Willow Beach Sampling Point

Perchlorate Concentration ($\mu\text{g/L}$)



On-Going Activities

- Investigation of LV Wash & BMI Areas to Evaluate Other Potential Perchlorate Sources
- Continued Evaluation of Remedial Technologies
- Consideration of Opportunities to Further Refine Capture & Treatment

Entities Involved

- US Environmental Protection Agency
- NV Division of Environmental Protection
- Southern Nevada Water Authority
- Metropolitan Water District
- City of Henderson
- Kerr-McGee
- AMPAC
- BMI