



Texas Produced Water Recycling

Railroad Commission Recycling and Conservation
Update and Discussion

*Austin, Texas
May 22, 2014*

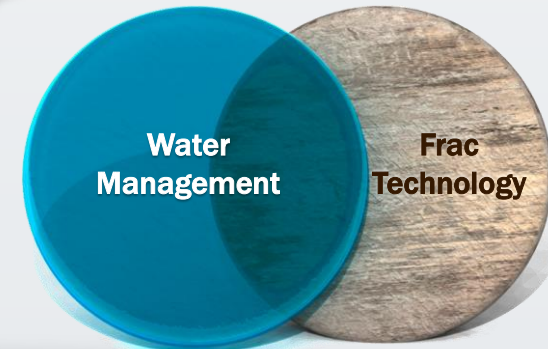
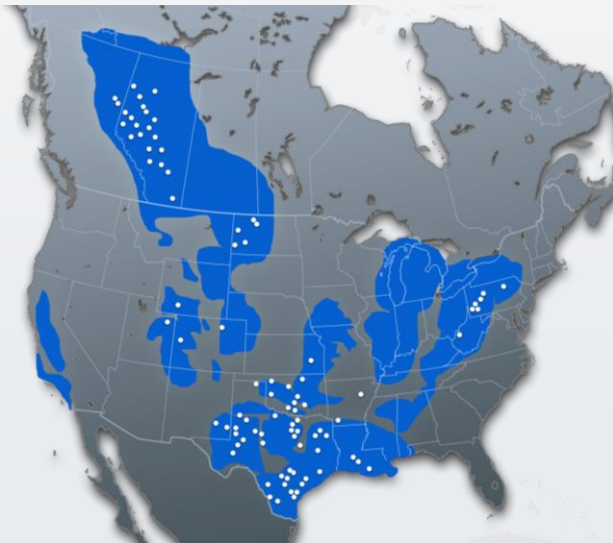
INCREASING **PRODUCTION**, REDUCING YOUR **FOOTPRINT**.®

Mission & Locations

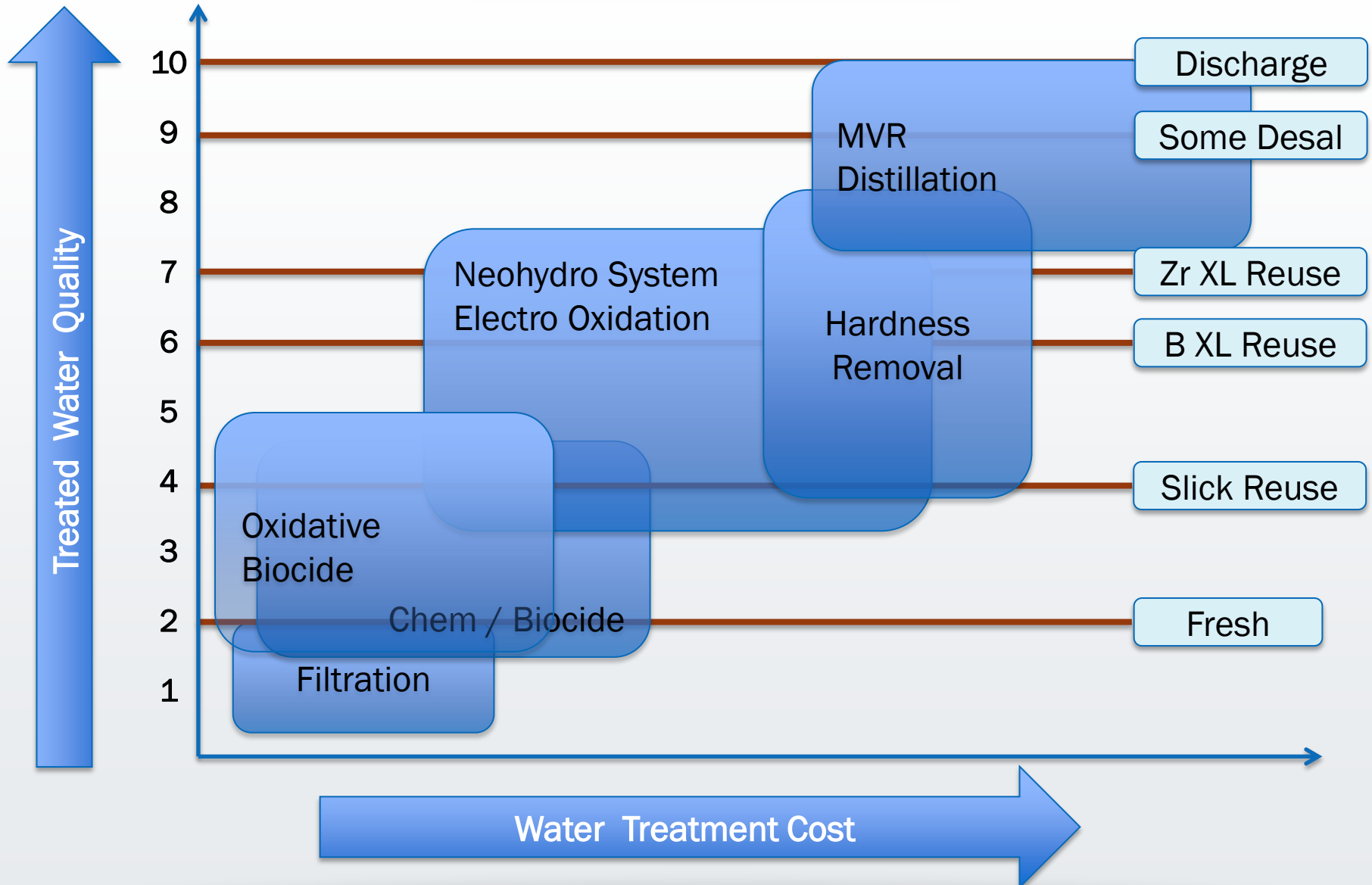
Our Mission

Our mission is to provide customized fluids and environmental solutions that maximize oil and gas production and reduce costs.

Our Locations



Rockwater Treatment Options



Recycle Operations in Upton County, TX

Filtration

- Micron size depends on source water quality or Frac Reuse Standards
- Socks available from 500 - 1 micron
- Multi-stage Filtration to 5 micron or 1 micron to remove the smallest solids is possible

Chemical Biocides

- Consultation and water testing
- Wide range of fast, slow, long and short term bacterial kill solutions

On-site Oxidant Generation

- Safe and cost effective alternative to Chlorine Dioxide



Recycle Operations in Dimmit County, TX

Neohydro[®] Electro-Oxidation Clean Brine System

- Source water, brine water, frac flowback water, and produced water all be treated to Customer specs. Treats water with up to 200,000 TDS
- Coagulates Sediment to < 1 micron
- Treated, Brine, and Fresh water Blending
- Hub & Spoke water transfer operations eliminates 100s of truck trips

Treated Water Quality

- Bacteria – 99.9+% reduction
- TSS – 99% reduction
- TPH – 99% reduction
- Turbidity – Less than 10 NTU
- Iron – 90%+ to non-detect
- Metals (strontium, barium, etc) 40% to 90% reduction
- Clean Water Yield – up to 98.5%



- **Proven Produced Water Treatment Technologies**
 - Electro-Oxidation Systems have proven to be very effective creating a high quality clean brine for slickwater and cross-linked frac fluid applications.
- **Ability to Match Treatment Method with Frac Fluid Requirement**
 - Treat to the condition needed for the specific frac fluid. No need to spend more than necessary.
 - A strong understanding of frac fluid chemistry is essential to operations.
 - A trusting relationship between the Operator, treatment providers and pressure pumping service company is vital.
- **Ability to Quickly Respond to Variations in Operating Conditions**
 - Able to manage / adjust to variable influent water quality to maintain high clean brine targets.
 - Requires reliable on-the-fly water quality testing.
- **Project Size and Local to Maximize Economic Benefits**
 - Small pilot projects simply do not have the scale to overcome initial costs of operations
 - Site locations must be accessible to enough produced water and nearby completion activity
- **Complementary Water Management Services**
 - Seamless interaction with water storage, water transfer, trucking, frac and flowback operations.

Complete Water Management Services Covering All Texas Shale Basins



- Water Sourcing, Transfer, Storage
- Pond / Storage Aeration, Remediation
- Biocide & Oxidant Treatment
- Filtration, Chemical Treatment

- Clean Brine Treatment
- Electro-Oxidation, DAF, Weirs, Tanks
- Slickwater, Linear, Hybrid Frac Validation
- Cross-Link Gel Frac Validation

The logo for Rockwater Energy Solutions features the word "ROCK" in a bold, brown, sans-serif font, followed by "WATER" in a bold, blue, sans-serif font. A blue arc above the "W" in "WATER" connects to the "R" in "ROCK". Below "ROCKWATER" is the phrase "ENERGY SOLUTIONS" in a smaller, blue, sans-serif font. The entire logo is centered on a white background that is part of a larger graphic of a water droplet.

ROCKWATER[®]

ENERGY SOLUTIONS

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