PETRO H2O RECOVERY

Texas Desalination Association

Technology Pitch

September 13, 2018

PETROH2O Development

RODI systems

Overflow Energy Booker, Texas

PHR RODI LLC (PHR), dba PetroH2O Recovery

www.petroh2o.com

About Us

PETRO H2O RECOVERY

- Midstream Treatment O&G
- Surface Discharge
- Beneficiary Re-Use
- FracReady™

JV Partners

RODI systems

- Systems Integration
- Project Testing, Construction, Commissioning
- Technology R&D

Overflow Energy — Booker, Texas

- Largest Privately Owned SWD Well operator in U.S.
- Well Testing & Transport

PETRO H2O Development

- Capital Funding
- Business Development
- Project Management
- M&A

Proprietary Tech Partners

Electro-Oxidation

AquaPulsar™

Ultrafiltration

cembrane
clean water for life

Desalination/Extraction
High TDS <50K

aquafortus™-NTR
Maximum Non-Thermal Recovery

PETRO H2O RECOVERY

Non-Thermal ZLD

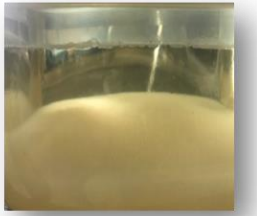
NOT Forward Osmosis

U.S. Patent Pending

aquafortus™-NTR

Maximum Non-Thermal Recovery

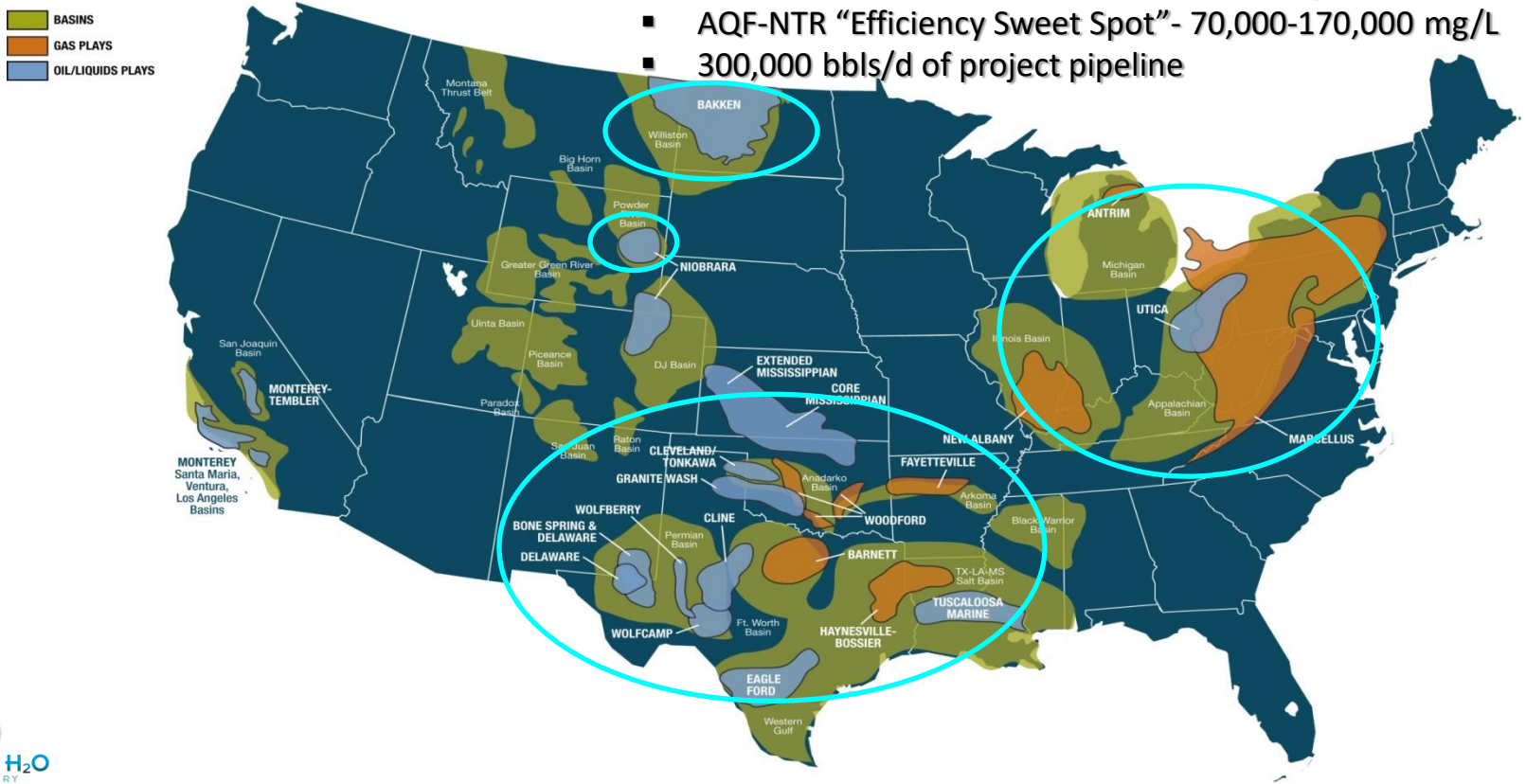
Electro-Oxidation → cembrane The WorkHorse™ Filtration → Desalination → Up to 98% Recovery Reuse & Surface Discharge



PETRO H2O RECOVERY

Why Aquafortus in O&G?

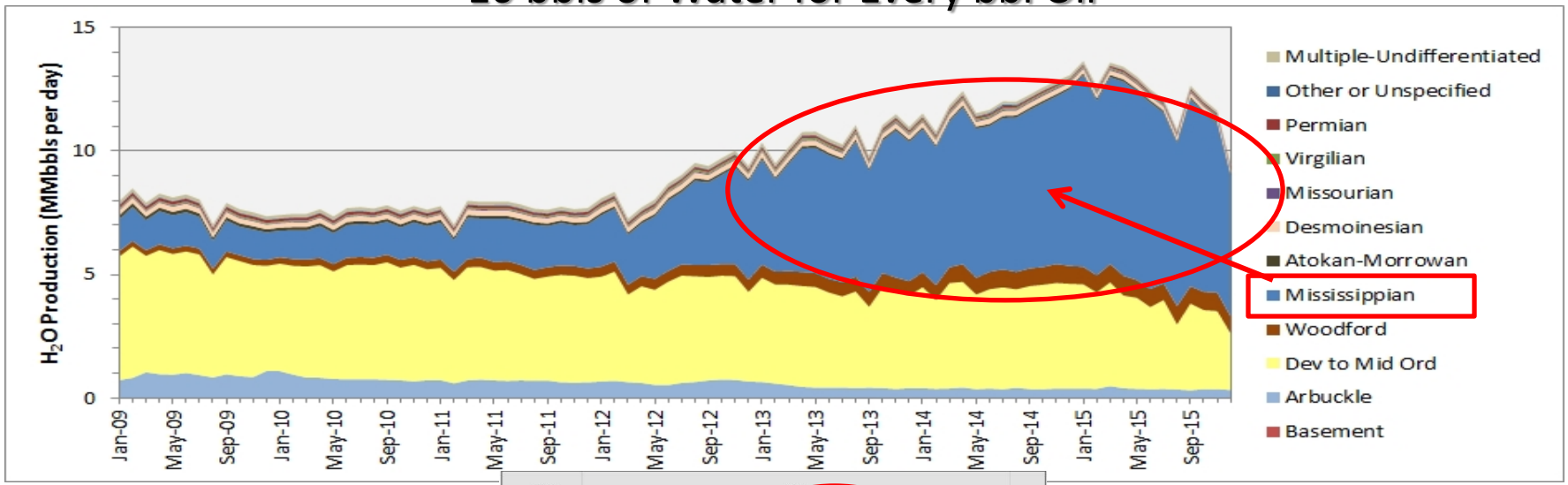
- ~60 million bbls/d-2.5BGD Produced Water
- ~80% of Produced Water is 50,000 PLUS mg/L in TDS
- AQF-NTR “Efficiency Sweet Spot”- 70,000-170,000 mg/L
- 300,000 bbls/d of project pipeline

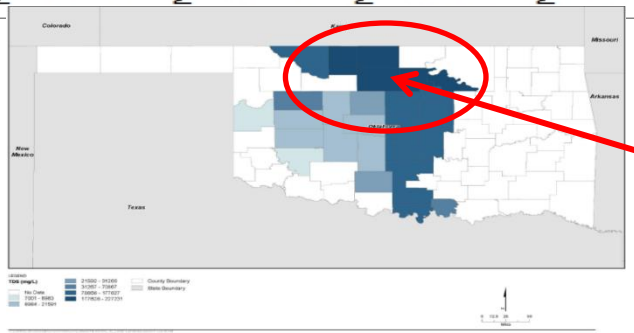


PETRO H2O RECOVERY

One Basin Example

10 bbls of Water for Every bbl Oil





TDS
70,000-177,000 mg/L

Ref: 2017 PWWG Study Oklahoma

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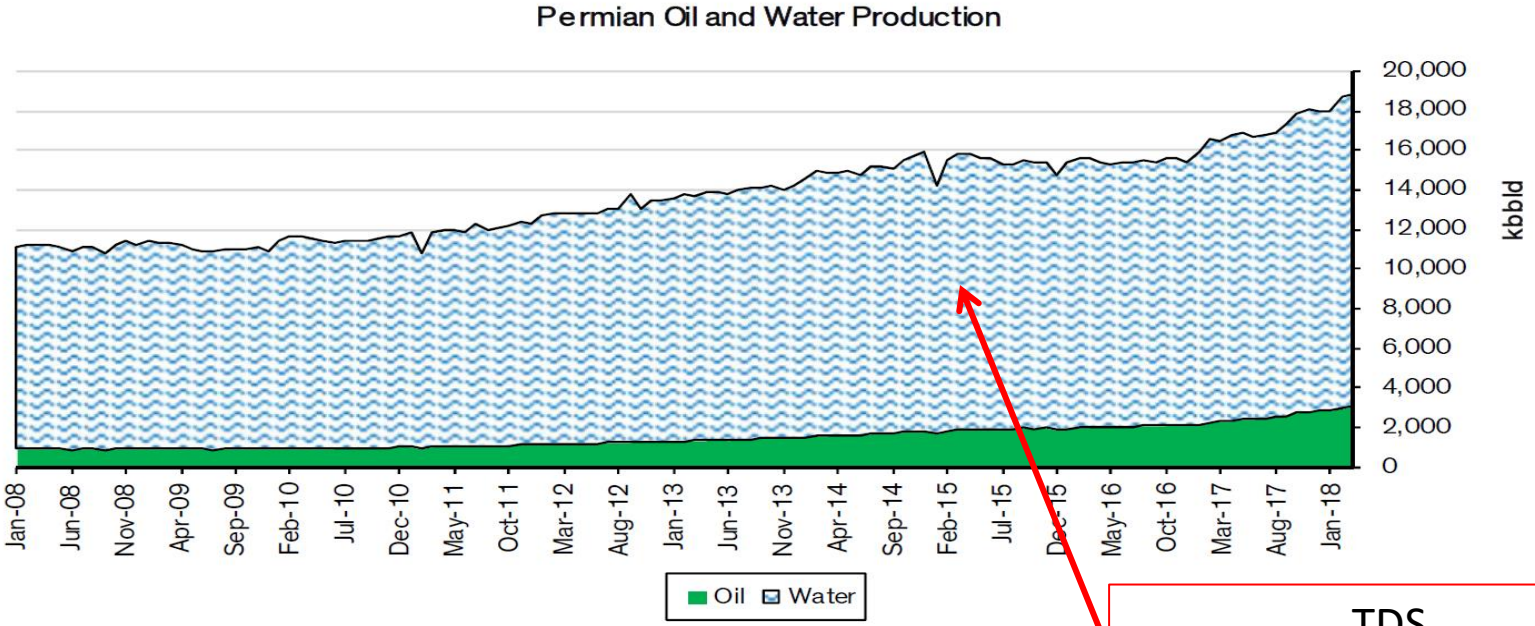
Another Basin Example

3mmbbl/d in oil, but 16mmbbl/d in water



Source: DI Desktop, Bernstein analysis

TDS
90,000-220,000 mg/L

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About Aquafortus

One minute video-See link

https://petroh2o.com/news

Tech Comparison

	HIGH CONCENTRATION PLATFORMS			
	Evaporator	Crystallizer	Competing FO	Aquafortus
Energy-use (kwhr/m^3)	45	90	90	**10**
Concentration (mg/l TDS)	250k	∞ Salt crystals	300k	∞ **Salt crystals**
Process Complexity	Simple	Simple	Complex	**Simple**
OPEX p.a. (per MGD capacity)	$3.08M	$4.45M	No data - nascent company	**$2.0M**
CAPEX (per MGD capacity)	$9.2M	$19.6M	No data - nascent company	**$7.5M**

Ref: Dr Michael Mickley, Survey of High-Recovery and Zero Liquid Discharge Technologies for Water Utilities, (Watereuse Foundation, 2008). Basu, The Dawn of Membrane Forward Osmosis: A Tiny Industry Targeting Multi-billion-dollar Markets.

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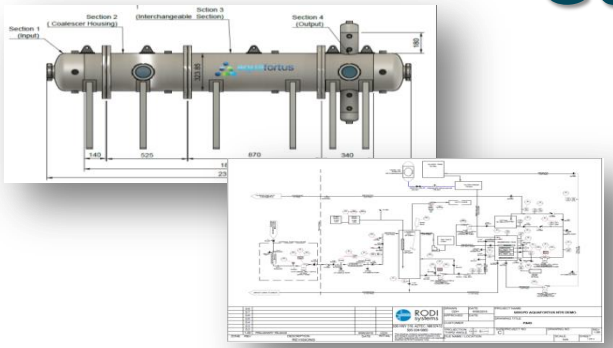
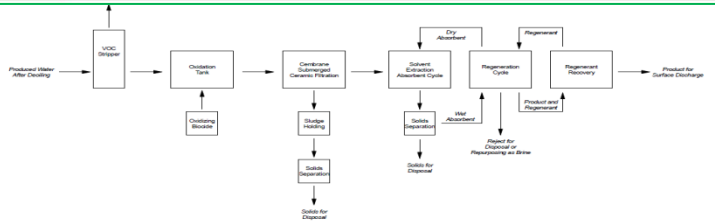
Current Status



aquafortus™-NTR
Maximum Non-Thermal Recovery

TRL	Description
One	**The idea** Basic principles have been observed. Research begins into potential applications
Two	**Invention begins** Technology concept is formulated. Speculative, practical applications suggested
Three	**Active R&D is initiated** Analytical studies and experiments validate critical functions and/or components
Four	**Components validated in laboratory** Basic technological components are integrated to establish that they work together
Five	**Components validated in relevant environment** Basic technological components are integrated and tested in a simulated environment
Six	**Advanced prototype tested in relevant environment** More advanced system model or prototype demonstrated in a simulated environment
Seven	**Advanced prototype tested in operational environment** Advanced field-testing of the actual system prototype in an operational environment.
Eight	**Completed technology proven through test and demonstration** Technology completed and qualified in its final form and under expected conditions
Nine	**Completed technology proven through successful commercial operations** Actual application of the technology in its final form and under normal conditions



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THANK YOU

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