

Leveraging economic data for water management optimization in West Texas

Tyler Hussey PWS Permian – September 20th, 2017

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Lower for Longer

Permian Oil Production

- Current: 2.5 MMBPD¹
- Projected Potential: Bigger than Ghawar Field (>5 MMBPD;160 Billion BBL?)²
- **OPEC Cutback**

• Weak compliance

1.8 MMBPD

	1.	EIA
Ð	2.	Scott Sheffield quote ref. in Permania – Forbes.com

Under \$60/bbl until after 2020

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Oil Price Factors

- Current Supply
- Future Supply
- Oil Demand

2016 Distribution of Global Oil Production¹



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Adaptation to Market

F1: DEVELOPMENT IN WELLHEAD BREAKEVEN PRICES FOR KEY SHALE PLAYS



Source: Rystad Energy NASWellCube

Source: Zero Hedge and Rystad Energy

\$50-55/bbl F2: AVERAGE WTI BEP FOR NEW SHALE WELLS PER PLAY 📕 Bakken 📕 Eagle Ford 📓 Niobrara Permian Delaware 📕 Permian Midland Tight Tight 100 80 USD/bbl 60 40 20 0 Yeso Wolfcamp Bakken/Three Forks Shale Delaware Sands Northern DJ Basin Greater Green River Basin EFS Oil, East EFS dry gas EFS wet gas/condensate Wattenberg DJ Basin EFS Oil, West Spring/Avalon Sprayberry Wolfcamp EFS East Texas Permian tight oil (other) Niobrara shale (others) Powder River Basin Bone :

Source: Rystad Energy UCube

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THE PRODUCED WATER SOCIETY PERMIAN OPERATIONS

UpstreamWater

- Licensed exclusively from Texas A&M
- Operator's input perspective
- Model "what if" conditions
- Forecast costs and savings over time
- Address economic uncertainties
- Assist in planning and decision making



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Sourcing

+ Storage

Transportation

Treatment

Disposal

Treated Water

Revenue

-





Case Study

General Info

- Permian Basin
- Field Planning Project
- Low/Med/High Rig Schedules

Objective

Assist in determining which case was more advantageous:

- 100% Disposal
- 100% Reuse
- Mix of Disposal and Reuse

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Case Study

Considered Data

- Production Rates
- Completion Demand
- Facility Locations
- Regional Costs
- Client Goals





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Case Alpha 100% Disposal

Privately owned vs Commercial SWD

- Trucking used as primary transportation
- Considered range of commercial injection costs







Case Bravo Reuse/Disposal Mix

High PW Completions Makeup

- Reuse in completions operations
- Minimal treatment

THE PRODUCED WATER SOCIETY

- Treatment volume dependent on demand
- Additional PW disposed by SWD







Treatment Savings



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Case Charlie 100% Reuse

Beneficial Reuse

- Minimal + Extensive Treatment
- Reuse in completions
- Additional PW treated for reuse in local beneficial use markets







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Main Takeaways

- Expect lower for longer
- Cost reduction is critical
- Leverage data for optimizing cost savings

Future Work

- UpstreamWater Further
 Development
- Working operators and treatment companies

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