



# NORTHSHORE

## ENERGY SERVICES

### Lifecycle Water Management for the Unconventional Oil and Gas Industry



Appalachian Basin Operations – Brownsville, PA  
Permian Basin Operations – Ft. Stockton, TX

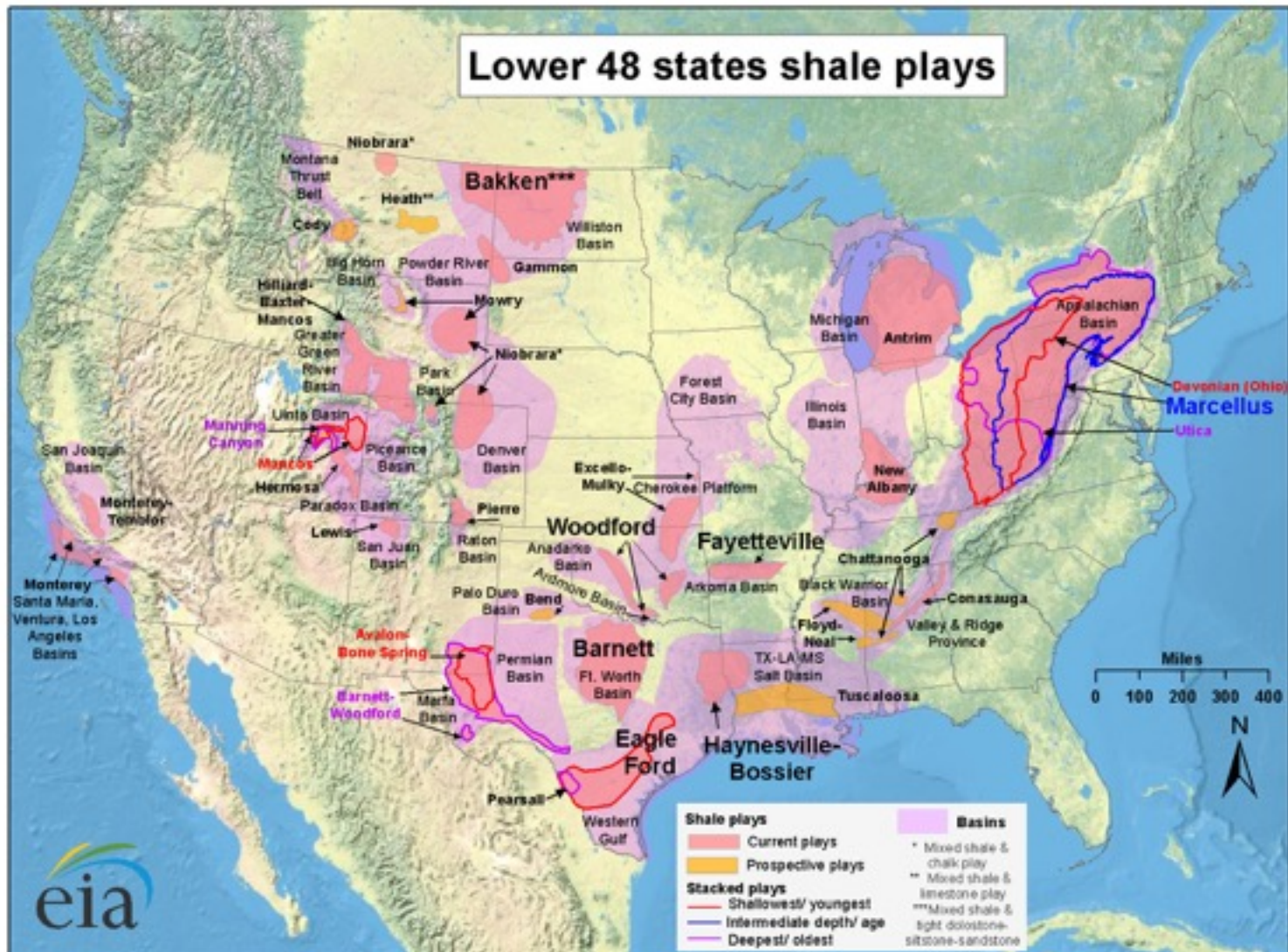
# Summary

- North Shore Energy Services is a technology leader of unconventional oil and gas fluid management services
- Brine Box™ technology is recognized as a solution for “recycling” of flowback, produced and drilling water for hydraulic fracturing operations
- Technology leader in multiple shale oil and gas play water management
- FrackView™ and North Shore Incident Management system ensure 24/7/365 safe and effective treatment performance
- Brine Box™ is available to be deployed in shale plays throughout North America and the World

# The NorthShore Advantage

- Brief introduction to shale water management and North Shore Energy Services
- The Brine Box technology platform
- The value proposition for the oil and gas industry
- Clients and Experience
- Questions and Answers

# Water Management Needs in US Shale Formations



Source: Energy Information Administration based on data from various published studies.  
 Updated: May 9, 2011

# Proprietary Multi-Staged Treatment Technologies

## Brine Box™



Multi-staged solids removal technology

Multi-staged hydrocarbon and metals removal technology

UV disinfection and chemical monitoring technology

# On-Site Fluid Recycling Technology Brine Box™

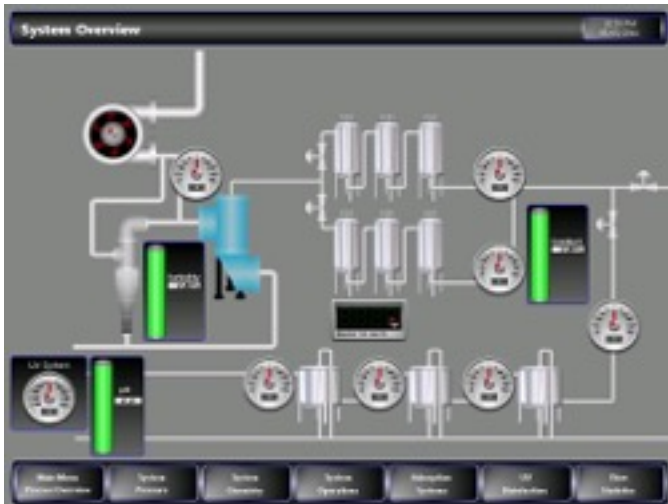
Some actual results of Brine Box™ treatment technology

Parameter	WV Site 115 Influent	WV Site 115 Treated	TX Site 228 nfluent	TX Site 228 Treated	PA Site 122 Influent	PA Site 122 Treated
pH	6.2	6.5	6.8	6.8	7.1	7.0
Total Suspended Solids	2115 ppm	<10 ppm	3710 ppm	<10 ppm	3217 ppm	18 ppm
TDS	123,110 ppm	91,144 ppm	103,450 ppm	94,403 ppm	142,900 ppm	118,455 ppm
Total Organic Carbon	119 ppm	<1 ppm	414 ppm	< 1 ppm	144 ppm	< 1 ppm
Iron	29 ppm	<1 ppm	44 ppm	< 1 ppm	44 ppm	< 1 ppm
Barium	67 ppm	<10 ppm	ND	ND	23 ppm	< 10 ppm
Calcium	112 ppm	27 ppm	53 ppm	< 10 ppm	111 ppm	18 ppm
Sulfate	45 ppm	18 ppm	31 ppm	11 ppm	77 ppm	24 ppm



# FrackView™

- Control and monitoring screens for ease of operation and monitoring and wireless communication with NSE's cloud network.



# Brine Box™ Quick Facts

- Brine Box™ system for international deployment
- Ruggedized construction
- Fully automated for FrackView™
- Generator system supplied with each unit
- Battery back-up system to power electronics for monitoring during generator downtime





# Actual Brine Box™ Visual Treatment Results



WV Disposal Well –  
Before and After



TX Disposal Well –  
Before and After

# On Site Treatment with Brine Box™ Client Benefits

- Substantial costs savings over off-site treatment, in PA we can reduce water costs by at least 50%, often far more. In the Permian Basin we can provide savings by reducing fresh water costs dramatically
- Designed to operate on-site at the SWD, thus drastically reduces trucking related charges
- Treatment water is 100% capable of reuse in all oil and gas related fluid requirements including hydraulic fracturing operations, thus reducing surface intake requirements
- Completely automated for safe and secure treatment 24 hours per day if required
- Daily treatment capacity starts at 2,500 barrel per day and can scale up to 25,000 barrel per day or more
- Secure on-line monitoring of the treatment operation including water quality data available 24/7/365 via the web
- Savings of between \$250,000 and \$400,000 per well when factoring the entire lifecycle approach to water

# North Shore Energy

## Current Projects and the Future

Over the last decade have recycled flow back and produced water in Permian Basin, Eagle Ford, Marcellus and Utica formations

Clients and partners have included but not limited to Pioneer Natural Resources, Southwestern Energy, EOG and a variety of others via our service partner network

We are currently in the permitting phase with our working partners Mon River Dock Company in Fredericktown, PA for a fixed flow back and produced water recycling facility in Southern Washington County PA. Brine Box technology will be employed to provide clean brine and provide the lowest per unit cost

Brine Box technology has been employed in more shale plays than any other technology making us the “technology leader”.



# NORTHSHORE

## ENERGY SERVICES

### **Locations and Contact Information**

PA Demonstration Site, Lab and  
Site of Proposed Permanent Treatment Facility:  
Mon River Dock Company,  
810 Low Hill Road,  
Brownsville PA 15417

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