While one of the smallest and last segments of the process to bring a new or replacement pipeline online, it can be one of the most important.

**Water Procedures:**

- Pipelines are filled with water
- Pipe is then pressurized
- Spike tests must be administered
- If pipeline holds pressure during the period, water is removed
- If pipeline loses pressure out of margin acceptable margin, test repeated
- Water discharged
The Marcellus/Utica play is particularly impacted by new challenges in the pipeline landscape that other markets in the past have not faced.

**New challenges:**

- Pipelines are increasing in diameter
- Pipelines and spread segments are longer
- Terrain in the Marcellus/Utica is uniquely difficult
- Tighter environmental regulations than elsewhere in the country
- Limited completion window due to climate
- Competition for equipment services
Inefficiencies

Current models create inefficiencies that cost operators and prime construction contractors time and money.

Inefficiencies:

- Responsibilities are subbed to third-party contractors and marked up
- Storage is often split over dozens/hundreds of frac tanks
- Limited focus by individual contractors
- Failure to cross-utilize resources
- Poor communication, contractors working in silos
- Lack of global view exasperates costs and causes issues
Potential Issues

Legal and regulatory hurdles are abundant in water management, here are just a few of the potential problems.

**Issues:**

- Withdraw permits, limitations – secondary options
- Discharge permits, method, cleanliness
- Managing water sources (municipalities, local)
- Managing water storage (tanks)
- Trucks, routes, and bonding
- Consistency in source
- Contaminants
Midstream Services offered by Rockwater

Source
We have access to fresh water sources from thousands of operators, municipalities, and local landowners.

Transfer Pipe or Truck
Truck and transfer services your water from source to site in the most economical manner available.

Water Storage
High-capacity temporary storage (1.9MM gallons) with one day setup and simplified operations.

Disposal
Rockwater can dispose of water safely and legally making our operation turnkey from acquisition to dispersion.

De-chlorination & Filtering
the water used in tests to appropriate standards eliminating chlorine and other contaminants from discharge.

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More than just cutting a check.

• Weighing out costs of acquiring local natural sources vs. municipal.

• Weighing costs of delivery and remediation, alternative methods.

• Abiding by all local restrictions and managing flow accordingly.

• Securing any flow meters, applying deposits, keeping local sources abreast of developments, ensuring they are paid quickly and correctly, equipment returned properly.
Water Transfer

Is hauling water always the best choice?

• Trucking may ultimately be the best choice, but there are other options that may be cheaper, faster and more efficient.

• Weighing cost advantages alongside hassle and risk will help to determine best delivery method.

• Utilizing pipeline R/W could make transferring through temporary above ground pipelines
Above Ground Storage Tanks (ASTs) / “Lake Tanks” provide mass storage with several advantages unique to our topography.

**Advantages**

- Smaller footprint than equivalent frac tanks
- Single flow point
- Used to store, receive, and mix
- Load/Unload 10+ trucks
- Single day rig up/down
- 78a Compliant - PA
- Less manpower, more cost effective than other models
- Mobile
- Availability constraint
Mass Storage

Below is a to-scale diagram of four 41,000 bbl ASTs compared with the equivalent amount of frac tanks.
Reducing Equipment, Ensuring Success

- Water returns from hydrostatic line testing and is tested as it enters the AST (inline or periodic).
- Sodium thiosulfate is dosed into the AST once water has been collected per results.
- Water & sodium thiosulfate is mixed in the AST by an aerator; re-tested, re-dosed as needed.
- After de-chlorinating, water is flushed into one of two frac tanks where a final test is collected.
- Failed batches are returned for re-dosing & re-testing.
- De-chlorinated water then passes through to a second tank and on to carbon filters.
De-Chlorination

Redundancy and Caution

• Activated carbon filters (three in tandem) will ensure that any remaining chlorine has been completely removed.

• System provides four failsafe measures

• Three smaller filters avoids channeling and allows for switch-outs and carbon changes on-the-fly.

• Water then flows to the diffuser and distributes across the environment.

• Chlorine tests can be performed instantly, results are less than 10 minutes
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Résumé

• Williams Leidy/Atlantic Sunrise/Transco
• Sunoco Mariner East II
• ETC Rover
• Pipeline replacement work in:
  • Ohio
  • Vermont
  • New York
  • Maryland
  • Michigan
  • Pennsylvania
  • West Virginia
  • Virginia
  • Louisiana
  • Texas
  • California
  • Utah
  • And more…
Summary

Take-Aways

• Water management should be handled by water service companies

• Consultants should have a global view of the project

• Single source management keeps costs low and utilization of resources high

• Cause and effect of changes in scope, plan and anomalies are better handled when one team controls the resource

• Smaller teams can better use their time and assets by utilizing a water management service company
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