E&P WATER MANAGEMENT

A STRATEGIC APPROACH FOR A CRITICAL INPUT

ALVAREZ & MARSAL

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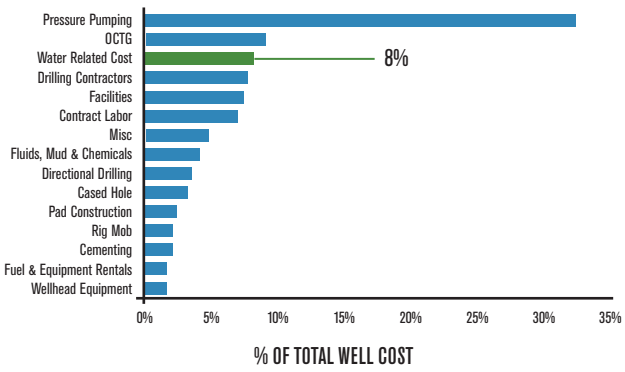
Leading operators develop comprehensive strategies and a structured approach to managing water for each operating area – achieving 30-50% cost reductions in the water category alone. While strategies vary by operator and basin, the most successful focus on the full lifecycle water cost with an operating model and systems and technology to support the approach.

CASE FOR ACTION

Water has long been an essential component of E&P operations; however, with the surge in shale-based production and increase in the use of hydraulic fracturing over the last 10 years, water usage has greatly increased and brought significant complexity in managing end-to-end water operations.

As water usage has increased, so have water-related costs, making it one of the largest Drilling and Completions ("D&C") cost categories (Figure 1) in many North American basins. Even as water-related costs exceed $1 million per well, they are not commonly managed with the same rigor as other D&C categories (e.g., Pressure Pumping, OCTG, Drilling Contractors, etc.). Operators and service providers continue to make investments in infrastructure in an attempt to cut long-term water costs; however, the lack of visibility into the full cost of water-related activities impairs even the best operators' ability to accurately forecast infrastructure investment needs, drive allocation decisions over time, and reduce cost per well.

FIGURE 1: D&C Related Well Costs by Category[1]



CRITICAL ELEMENTS OF AN E&P WATER MANAGEMENT STRATEGY

An E&P water management strategy should not be a stand-alone analysis. Instead, it should be considered as an essential element of the Field Development Plan. Most operators complete comprehensive plans and reviews for subsurface conditions like gathering and marketing, as well as HSE and regulatory compliance. Operators should apply the same rigor to water as part of their field development plans and answer questions like:

- What type of water is required and how much?
- Where will water be sourced from and how will it be purchased?
- What infrastructure and/or service agreements are required to transfer and store current and forecasted volumes?
- How will volumes be measured, tracked, and reported to partners and regulatory entities?
- Who is responsible for coordinating water management activities from source through reuse or disposal?
- How will demand planning be tied to the drilling and completions schedules?
- Are there unique regulatory implications or reporting requirements to consider?
- How will the approach to water management evolve as wells mature?

FULL LIFECYCLE WATER COST APPROACH

Many operators have a firm grasp on water source and disposal costs per barrel, however these two activities typically account for less than one third of all water expenses. Storage (e.g., ponds, temporary tanks, etc.), transfer pumps and rentals, and hauling make up the majority of

water costs, but are often buried in other non-water related sub-accounts like facilities construction and rentals. Miscalculation of true water costs can hinder a company's ability to make informed strategic decisions. To effectively manage water costs, operators must focus on: 1) creating a fit-for-purpose operating model and 2) aligning systems and technology to support a full lifecycle water cost approach.

FIT-FOR-PURPOSE OPERATING MODEL

At its core, a comprehensive water strategy includes a fit-for-purpose operating model, largely driven by the operator's acreage position (e.g., contiguous vs. disconnected), available source water and disposal capacity, and regulatory requirements. The optimal operating model considers these factors as well as rig count, third party sourcing and distribution opportunities, and the organization's appetite for vertical integration. When addressing these conditions, operators should consider factors such as transferring water via pipe or hauling to utilize temporary or permanent infrastructure, allocation of capacity (internally or contracting out to a third party), and determining whether to recycle or dispose of flowback. These decisions shape the required investment in terms of human resources, capital, dollars, and suppliers.

SINGLE POINT OF ACCOUNTABILITY

Some operators find that appointing a water lead, or "quarterback", responsible for managing the interdependencies across all water activities and projects aids in addressing what is often a decentralized and fragmented organization of processes and accountability. As operators continually become more efficient and strategic in managing water, they are moving from ad-hoc sourcing and disposal to an end-to-end, closed-loop model that can quickly move water across a system in order to accommodate fluctuating demand.

WATER AS A SERVICE

The most progressive E&P operators and service companies are moving toward a service based model to provide water "as a service." These operators and service providers are actively pursuing water management programs that require greater capital investment, making the long-term bet on infrastructure because:

1. Investment in infrastructure reduces the need for water wells, ponds, hauling and temporary source or landowner payments
2. Lateral distribution lines eliminate feeder ponds and pond-to-pond transfer rentals
3. Pond-to-location transfer costs can be minimized by aligning infrastructure with detailed development plans

SUPPORTING SYSTEMS AND TECHNOLOGY

Lastly, in order to manage the cost of water, it is imperative for operators to know the number of barrels that are being hauled, transferred, and recycled as well as the costs associated with each piece of the value chain. Capturing costs and volumetric data in the appropriate format may require changes to measurement, SCADA, invoice processing, and payment processes and/or solutions. Additionally, the general ledger must be structured in a way that allows operators to accurately capture, allocate, and summarize all water-related costs by cost driver (e.g., ponds, transfer). A recent Alvarez & Marsal study involving several operators found that 35-45% of water costs fall outside of existing water sub accounts.

TAKEAWAYS

Cost, availability of resources, and compliance pressures continue to drive operators to adopt holistic water lifecycle strategies starting with water provisioning all the way through water recycle and re-use. A comprehensive water strategy focused on the full lifecycle cost of water can address the growing complexity in water operations and drive significant value across the life of core assets. Leading operators are looking to control their own destiny by establishing a clear strategy, securing water supplies, building infrastructure, and appointing dedicated resources to manage the interdependencies of demand planning, sourcing water, distribution and logistics, construction, and ever changing drilling programs as they relate to water.

Sources:

1. A&M analysis of 2014 well costs of several Eagle Ford Operators

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