“Old black water, keep on rollin’... won’t you keep on shinin’ on me?” While probably not exactly what the Doobie Brothers had in mind while writing their iconic song Black Water, produced water – and the operational hurdles it creates – has many US exploration and production companies (E&Ps or producers) expressing the same sentiment, as they continue to welcome that rollin’ black water, and the issues that come with it, as a byproduct of the success they have experienced in developing unconventional oil and gas resources, predominantly shale plays, in the US.

Many E&Ps are facing a seemingly endless volume of produced water – typically a combination of formation water and frac water – in their unconventional resource operations. In the early days of such operations, E&Ps were focused on acquiring and holding acreage, optimising drilling and completion operations, and securing takeaway capacity for produced hydrocarbons – with the flood of water that would eventually be produced from these developments left as little more than an afterthought.

As time passed, the continuous flow of produced water served as an opportunity for specialised midstream and services companies, along with their investors, to develop stand-alone businesses to help these E&Ps. Soon, massive amounts of private equity capital looking for infrastructure investments in the energy sector – recently estimated at US$34bn per year – helped spur the creation of integrated water businesses aimed at stemming the tide of produced water that continued to roll.

This article discusses the evolution of such water businesses, typical commercial structures that have been utilised therein, and issues and areas of consideration when undertaking transactions involving such businesses.

The produced water problem

While relatively moderate volumes of water have always been involved in conventional well development and production, the industry’s somewhat recent ability to develop unconventional resources, through horizontal drilling and multi-stage hydraulic fracturing, has caused a significant increase in the amount of produced water for which E&Ps have been forced to find suitable offtake solutions.

Contrary to popular belief, in general, conventional wells generate greater amounts of produced water than unconventional wells comparatively speaking – in the Permian basin, for example, conventional wells produce 13 times more water than oil, while unconventional wells produce just 3 to 5 times more water than oil.

Despite this disparity, produced water from conventional operations has historically been reinjected into producing reservoirs to aid in enhanced oil recovery operations. In contrast, produced water resulting from unconventional operations cannot be reinjected directly into the low-permeability formations from which it came; instead, it must either be treated and recycled or injected into separate disposal wells drilled specifically for that purpose.

The prolific Permian Basin serves as a good example of how produced water considerations can potentially impact almost every aspect of development and production operations.

Larger well designs coupled with the evolution of hydraulic fracturing techniques contribute to ever-growing projections – as of January 2019, the basin’s existing 5,500 wells were projected to require 2.75 Bbbl of water to complete, with wells expected to produce more than 15 MMbbl/day of produced water.

In the Delaware Basin alone, the second-largest component basin of the Permian Basin, produced water volumes could rise from an estimated 1.9 Bbbl in 2019 to 4.8 Bbbl in 2024. The result has been water management costs for E&Ps amounting to about 15% of total well costs, with total spending expected to double to US$22bn over the next five years.

Solving the problem

In the age of conventional well dominance, storage tanks and transportation and disposal by truck served as the standard options available to producers that had little interest in the large capital outlay associated with building...
producer-owned saltwater disposal systems. With the significant increases in produced water volumes and producers seeking unconventional development, there has been a need for midstream companies to build new infrastructure to handle the growing volumes. This has led to the development of business models designed specifically for the produced water market, offering a range of services to producers.

Transaction structures

In negotiating the terms of the transaction, the parties will enter into a services agreement whereby the producer grants the midstream company the exclusive right to provide transportation and disposal services for water produced from the specified area or specified wells for a certain period of time, commonly referred to as a dedication.

Alternatively, a producer and a midstream company may elect to form a joint venture to provide the midstream company with the capital and expertise necessary to operate the joint venture entity and provide the services required to handle the produced water. In this arrangement, the parties will typically enter into a services agreement that specifies the obligations of each party and the scope of services to be provided.

Commercial considerations

As discussed above, water transportation and disposal services are critical to the efficient management of produced water volumes. Producers will seek to:

- Ensure certainty of produced water volumes to avoid any disruptions to operations or development schedules.
- Obtain favourable provisions for temporary or permanent releases from the dedication for any volumes of produced water that may be released due to operational needs.
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Midstream company’s objectives

In contrast, midstream companies will seek to:

- Ensure that the dedication is sufficiently long in duration or geographically broad, to provide flexibility as volumes increase.
- Ensure that the dedication is not too long in duration or geographically broad, to provide flexibility as volumes increase.
- Minimise capital expenditures, either by expanding the system or connecting to additional wells drilled by the producer, or by shifting some or all of the capital costs to the producer.
- Minimise risks borne by the midstream companies involved in these transactions – the key is understanding the joint venture structure and how the parties allocate the risks and rewards associated with the produced water business.