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WELLS FARGO SECURITIES

Water: The Next Big Wave For Midstream

An Emerging Midstream Asset Class

Midstream/MLPs
Natural Gas

- **Catch The Next Big Wave For Midstream.** Water management services have historically been the purview of oilfield service and E&P companies. But things are changing. While still early days, midstream companies are taking a larger role in the water business, primarily focused on produced water handling, disposal and recycling. As private equity and public midstream companies have stepped in, the water business has evolved over time from a model of trucks, spot volumes, and a mostly in-house function performed by E&P companies to an outsourced, full service model, underpinned by acreage dedications and, in some cases, minimum volume commitment contracts. There are currently 11 publicly traded midstream companies that provide water services with many more private equity backed companies in the wings. This report is meant to serve as a mini-primer and provide a brief overview of the water market, including its evolution, size, economics, and ultimately, how investors may value these assets.

- **Salt Water Disposal (SWD) Economics.** Expected returns in the SWD business in most basins (e.g. Midland, DJ, and Bakken) appear on par with gathering and processing at roughly 5x EBITDA (20% IRR). The exception is the Delaware where we estimate returns for new SWD wells are currently in the 1-2x EBITDA range (suggesting returns north of 50%). The reason is due to the higher water-to-oil ratio in the Delaware of 5-6x versus 1-2x in other basins. However, we believe returns in the Delaware could diminish over time as competitors enter the market. Like gathering, there are fewer barriers to entry in SWD.

- **What's Water Worth?** We believe that the freshwater delivery function is very much an oilfield service-like activity and therefore believe it should garner an E&P/oilfield service multiple in the 5-7x range. Saltwater disposal looks more like traditional gathering and processing in terms of contract structure and returns on investment (see preceding bullet). However, SWD has some unique long-term risks, most notably seismic and potential future regulatory and environmental. For this reason, we believe the SWD business should trade at a discount to gathering and processing. G&P MLPs currently trade at an EV-to-EBITDA multiple on 2020E of 9x. Thus, for the time being, we believe SWD should be valued at a 1-2x turn discount to G&P. The one exception is the Delaware basin where, as we noted, returns are significantly better and therefore we believe that assets in this basin should trade inline with G&P at 9x EBITDA.

- **Risks To The Water Business.** (1) *Seismic*. Seismic activity linked to SWDs could lead to increased regulatory scrutiny. (2) *Regulatory / Environmental.* Increased scrutiny of freshwater delivery and SWD practices could increase pressure on states to limit freshwater access and/or saltwater disposal activity. A shift to recycle technology could increase the cost of operations. (3) *Low Commodity Prices / Reduced Drilling.* Fresh water delivery volumes are directly tied to drilling and completion activity levels. Thus, a slowdown in drilling could impact cash flows. (4) *Low Barriers To Entry.* A potential increase in competition could erode margins.

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Overview Of Water Basics

What Is The Water Business?

Water plays a key role in the drilling and hydraulic fracturing (fracking) of an oil/gas well and is produced over the life of a well. Midstream companies primarily participate in two segments of the water management services market: (1) freshwater delivery for use in drilling and fracking of new wells (an oilfield service function) and produced water handling, recycling and disposal (generally a midstream-like service). Our report primary focused on the latter. For freshwater delivery, the source is typically surface water (rivers, streams, etc.) that is delivered to well sites to create drilling and fracking fluids used in the drilling and completion of new wells. As the well produces, flowback and produced water returns to the surface during the productive life of the well and needs to be removed. Flowback and produced water are treated and either reinjected as part of a secondary recovery process, recycled for re-use in the drilling process or disposed of in what are commonly referred to as "saltwater disposal (SWD) wells". SWD wells are drilled to deeper formations to dispose of produced water. For a more detailed description of the different types of water management services, please see the section entitled "Water 101" on page 14.

Exhibit 1. Types Of Water Management Services

Water Service	Description
Acquisition / Sourcing	Obtaining water used for drilling and completion operations
Transfer	Moving water via a system of mobile/fixed pipelines
Storage	Storing water in tanks, containment ponds, pits, etc.
Pre-treatment	Treatment of water prior to use in fracking
Treatment	Removing/treating solids, salts and other elements from flowback and produced water
Frac Flowback Services	Handling recovered flowback and monitoring/testing the well and liquids produced
Hauling	Transporting primarily by truck fresh water to the well site as well as delivering flowback/produced water from a well site to a disposal site
Injection Disposal	Injecting produced water as part of a secondary recovery project or into disposal wells

Source: Wells Fargo Securities, LLC

Evolution Of The Water Business – From Trucks To Pipelines

The water business has evolved over time from a model of trucks, spot volumes, and a mostly in-house function performed by E&P companies with minimal barriers to entry to an outsourced, full service pipeline contract model. These changes have occurred gradually over time as E&P companies have become more willing to outsource this function and as midstream companies have become more sophisticated and capable of providing these services. The business has also evolved in the sense that most midstream water companies now provide both freshwater delivery and produced water services to their clients (as well as a host of related services such as treating).

Exhibit 2. Water Services Evolution

From trucks….

…to pipelines

Source: NGL Energy Partners, LP and Wells Fargo Securities, LLC

Water functions associated with oil and gas production are still mostly performed in-house by E&P companies. However, outsourcing to third parties has increased in recent years and the move from a spot business largely serviced by trucks to a contracted business largely serviced by pipelines has only occurred in the last 5-7 years. In the early part of the decade, most produced water was gathered via truck. The trucks were mostly independently owned and operated with no contracts for water disposal. Water companies would drill salt water disposal wells but the trucks were (in some cases) independent of the owners of SWD wells. Thus, a company drilling a SWD well had no contractual assurance that produced water (how much or how often) would be brought to the well. (As we understand it, SWD operators would compete to attract truck drivers with better food trucks or donuts and coffee).

In recent years, private equity and some public midstream companies have made significant investments in the water business driving significant change in the operations and structural contracting of the business. Fresh water delivery and produced water businesses have transitioned to more pipeline (vs. truck) deliveries, underpinned by acreage dedications and, in some cases, minimum volume commitment contracts. The change has been driven by a number of factors including

(1) the shift to horizontal from vertical drilling, requiring much greater amounts of water to frac and yielding much larger volumes of flowback and produced water
(2) the shift to pad drilling which concentrates larger volumes in fewer areas making pipelines more economic and feasible
(3) the lower cost of pipeline rates versus truck
(4) the increased safety and reliability of pipelines versus trucks and
(5) the ability of water service providers to connect to multiple SWD wells, enhancing overall reliability for water takeaway.

Today, water disposal is largely driven by risk management – producers are still looking for price and value, but also focused on facilities that offer redundancies (power generators, additional wells/compression on site, backlog of permits) and a one-stop shop solution for water (gathering, transportation, injection, sourcing).

Salt Water Disposal (SWD) Economics

SWD Returns Vary By Basin – Returns In The Delaware Are Highest Across Midstream

Returns on capital invested in the SWD business vary by basin, but overall are much higher in the Delaware than in other producing regions. In the Delaware, we estimate that capex invested in SWD could generate an EBITDA multiple of 1-2x (suggesting returns north of 50%). In contrast, in the Midland, DJ, and Bakken, we estimate SWD economics are closer to traditional G&P at around 4-6x EBITDA.

We calculated SWD economics based on cost and gathering rate figures provided by public midstream water companies and our own calculations around well connect spending (see our Weekender entitled "Well Connect Capital" dated 6/7/19 for further details on our methodology).

- **SWD Well Cost.** We've assumed that the average cost to drilling a salt water disposal well is $4MM in the Delaware Basin, $5MM in the Midland Basin, $3MM in the DJ, and $2.5MM in the Bakken.

- **Well Connect Spending.** After an SWD well is drilled, companies must spend capital to tie produced water gathering lines to the SWD well. In our analysis, we calculated well connect spending to fill up an individual SWD well. We did this by taking total capacity of each SWD well and divided this by the average IP rate of water from an individual oil well (12 months into its life). To calculate water IP rates, we used the IP rates of crude wells based on data from our E&P team (lead by Nitin Kumar) multiplied by our assumed water-to-oil ratios (based on feedback from water companies). This results in the number of oil wells required to fill the SWD well. We then multiplied by an average well connect cost of $200K/well to derive an aggregate well connect cost figure per SWD well.

- **Produced Water Gathering Rates.** We've assumed produced water gathering rates of $0.80/Bbl in the Delaware, $0.80/Bbl in the Midland, $0.90/Bbl in the DJ, and $0.80/Bbl in the Bakken.

- **EBITDA Margins.** We calculate the SWD business generates an EBITDA margin of approximately 65%.

Exhibit 3.Estimated SWD Economics By Region

Key Assumptions	Delaware	Midland	DJ	Bakken
SWD cost ($MM)	**$4.0**	**$5.0**	**$3.0**	**$2.5**
SWD capacity (MBbls/d)	25	30	15	12
(/) Average IP rate of crude well after 1 yr (MBbls/d)	0.5	0.2	0.2	0.2
(X) Average water to oil ratio	5.0	1.5	0.9	1.5
(/) Average water IP rate of well after 1 yr (MBbls/d)	2.3	0.3	0.2	0.4
Number of wells to fill SWD	11	93	74	32
(x) Average well connect cost per well ($K)	$200	$200	$200	$200
Well connect spending over life of well ($MM)	**$2.2**	**$18.6**	**$14.8**	**$6.5**
Produced water gathering & disposal rate ($/Bbl)	**$0.80**	**$0.80**	**$0.90**	**$0.80**
EBITDA margin (%)	**65%**	**65%**	**65%**	**65%**
Economics (Single Disposal Well)				
Total SWD capacity (MBbls/d)	25	30	15	12
(x) Assumed utilization (%)	90%	90%	90%	90%
Produced water volumes (MBbls/d)	23	27	14	11
Produced water gathering & disposal revenue ($MM)	$6.6	$7.9	$4.4	$3.2
(-) Operating expenses ($MM)	$2.3	$2.8	$1.6	$1.1
Produced water EBITDA ($MM)	$4.3	$5.1	$2.9	$2.0
Total investment: SWD + well connects ($MM)	$6.2	$23.6	$17.8	$9.0
Annual EBITDA ($MM)	$4.3	$5.1	$2.9	$2.0
Produced water EBITDA multiple	**1.5x**	**4.6x**	**6.2x**	**4.4x**

Source: Company data and Wells Fargo Securities, LLC estimates

SWD Economics In The Delaware Stands Out From Other Regions

As noted, SWD returns in the Delaware are well above other regions at 1-2x EBITDA versus an average of 5x EBITDA for other basins. We believe the reason is largely due to the higher water-to-crude ratio found in the Delaware, which effectively serves to lower well connect spending. We estimate that it only takes ~10 oil wells to fill a SWD well in the Delaware Basin. In contrast, we calculate ~30-100 well connects are required to fill a SWD well in other regions. If the water to crude ratio in the Delaware was in-line with other regions (e.g. 1:1), we estimate SWD economics would drop to around 4x EBITDA.

Returns In The Delaware Could Diminish Over The Long-Run

While expected returns for produced water gathering are currently very high in the Delaware, we believe returns could diminish over time as new competitors enter the market. Like gathering, there are few barriers to entry to the water business. Currently, we see a mismatch between expected ROIC on SWD investments in the Delaware of 50%+ versus the risk profile of the investment (i.e. in-line or slightly above G&P risk). Typically, crude and gas gathering investments in the Permian generate lower returns in the 5x EBITDA range (20% IRR), suggesting returns in the SWD space in the Delaware could narrow over time in-line with these lower thresholds.

Saltwater Disposal Contract Mix

The SWD business is evolving to have contracts that, in many cases, mirror those in the gathering & processing business. Most sizable public and private water companies have underwritten SWD expansions under long-term, fixed-fee contracts with acreage dedications. Contracts have been structured to eliminate commodity sensitivity (e.g. skim oil revenue) in exchange for a fixed fee rate. Additionally, volumetric volatility is decreasing as water companies are investing to transport produced water to SWD wells via pipeline rather than trucks. Given all these developments, SWD contracts appear to have a very similar risk profile as G&P contracts, in our view. In fact, an argument could be made that the risk profile of water could potentially be lower than that of G&P due to lower decline rates (see following section). The one big caveat is that water gathering and disposal carries significantly larger tail risks (e.g. seismic and regulatory), which aren't present in the traditional G&P business.

Exhibit 4. Contract Comparison – G&P Versus SWD Services

Parameter	Natural Gas / Crude Oil Gathering & Processing	Water Gathering & Disposal
Term	5-20 years	~5-10
Regulatory jurisdiction	States	States
Contract support:		
Acreage dedications	✓	✓
MVC	✓	✓
Cost of service	✓	✓
Build out obligations	✓	✓
Commodity exposure [1]	Crude oil, natural gas, NGLs	Crude oil, natural gas
Contract type	Fee	Fee
Asset type	Pipelines / Compression	Trucks / Pipelines / SWDs
Counterparty	E&P	E&P
Phase in cycle	Mature	Early

Note 1: Some crude oil gathering companies assume ownership of the barrels at the well and transfer ownership back to producer at the terminus of the gathering system. Processing contracts could be POP or KW, which expose the processor to fluctuations in the price of gas and NGLs.
Source: Wells Fargo Securities, LLC

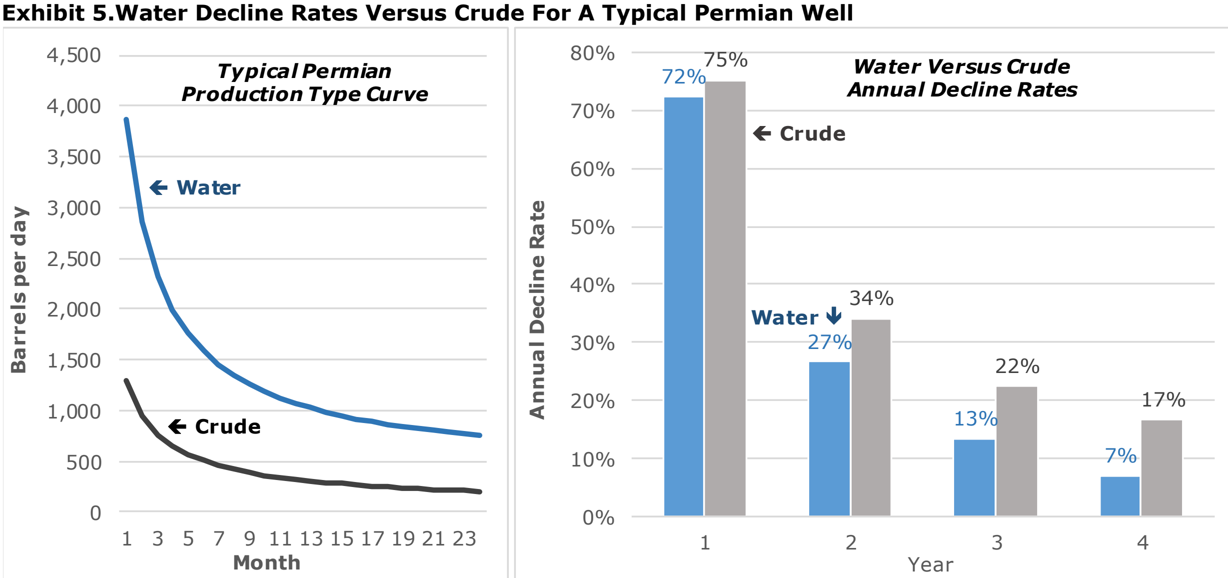
SWD Could Potentially Be Less Capital Intensive Than Traditional Oil & Gas Gathering

According to some consultants, the water-to-crude ratio could increase over the life of a well. There isn't a clear consensus on this topic as several management teams we polled indicated that the water-to-crude ratio remains constant over the life of well. Additionally, it's also unclear whether this occurs in every basin or just certain regions. Notwithstanding, if the ratio does potentially increase as some studies suggest, it would imply that produced water gathering and disposal could be more capital efficient than traditional oil and gas gathering.

Capital intensity for gathering businesses is measured by two key variables: (1) decline rate and (2) IP rate of new wells – please see our Weekender entitled "Well Connect Capital" dated 6/7/19 for details. Shallower decline rates and bigger IP rates tend to lead to lower capital intensity. Produced water gathering beats oil gathering in both of these categories. As explained below, we estimate the annual decline rate of water volumes from a typical Permian well after four years is only 7% versus 17% for oil volumes. Additionally, the IP rate for water is significantly higher than crude given the water-to-oil ratio can be 3-6x initially.

The following Exhibit plots a typical Permian crude well production type curve for both oil and water. In this example, we assumed the water to oil ratio increases from 3 initially to 4.5-5.0 by the end of year 4. The rising water-to-crude ratio signifies that water production is declining at a shallower pace than oil production. Based on our calculations, the decline rate for water volumes is comparable to crude production at first, but the gap becomes more pronounced over time. By year 4, we estimate the decline rate for water volumes could fall to 7% versus 17% for oil volumes.

Exhibit 5.Water Decline Rates Versus Crude For A Typical Permian Well

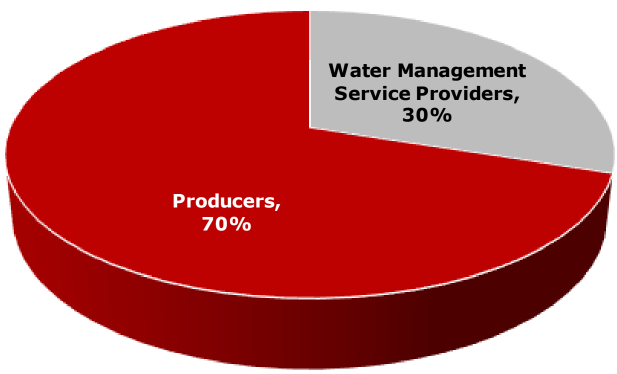


Source: Company data and Wells Fargo Securities, LLC estimates

Players In The SWD Market

Saltwater disposal services are provided by third parties (oilfield-service or midstream companies) or managed internally by producers. According to Spears and Associates, SWD assets are predominantly operated and owned by producers (i.e. more than 70% vs. third-parties' market share of less than 30%). In some regions, third party offerings significantly exceed the share held by producers (e.g., DJ, Eagle Ford), while in other basins, E&Ps still retain the majority of these functions (e.g., Permian).

Exhibit 6. Saltwater Disposal Segment – Producers Versus Third Parties



Source: Spears and Associates and Wells Fargo Securities, LLC

We believe the SWD services industry is still in the early stage of its development, and expect that third-party service providers will gain market share over time. Similar to the migration of traditional gas and crude oil gathering services from in-house producers to either sponsored or independent midstream operators, we expect water-related assets to be increasingly held and developed primarily by midstream entities. This would allow producers to (1) focus on their core competencies, (2) use proceeds from monetization of water assets to reduce debt, buy back shares or fund growth programs, (3) realize lower water services costs as efficiencies of scale would allow third party midstream operators to deliver, transport, recycle and dispose of water more efficiently, in our view, and (4) potentially benefit from valuation uplift as these assets are likely to trade at higher multiples as stand-alone companies, than as an integrated operation within an E&P.

Recent transactions support our view that third-party water management services providers will gain market share (see Exhibit 9 for a list of acquisitions). In addition, more producers are signing contracts for water services with traditional midstream operators (e.g., CEQP signed an agreement with Enerplus and is expanding its Bakken water gathering system by 30 MBbls/d). Companies that already have an established footprint and relationships with producers are best positioned to gain market share, in our view. Some E&Ps may consider placing their water business into a separate midstream entity, which would allow them to maintain control over this mission critical process, while at the same time partially monetize the assets at multiples that are likely higher than E&P stand alone valuations [i.e. FANG trades at an EV/EBITDA (2020E) of 5.0x, which compares to RTLR's 8.8x].

We have compiled a list of various participants in the water management services space (including saltwater disposal service providers). We have identified three groups of companies – (1) Oilfield service providers, which also offer water management services (mostly publicly traded entities), (2) Pure-play water management companies (primarily private entities), and (3) midstream companies, whose portfolios include water management services (mostly publicly traded companies).

Exhibit 7. List Of Non E&P Companies With Water Management Services Assets

Midstream Company	Ticker
3Bear Energy	Private
Antero Midstream Corp.	AM
Crestwood Equity Partners LP	CEQP
Cypress Energy Services	CELP
Enable Midstream Partners LP	ENBL
EnLink Midstream LLC	ENLC
EQT Midstream Partners LP	EQM
Hess Infrastructure Partners LP	Private
NGL Energy Parters LP	NGL
Noble Midstream Partners	NBLX
Oasis Petroleum	OMP
Rattler Midstream LP	RTLR
Summit Midstream Partners LP	SMLP
Tallgrass Energy LP	TGE
Western Midstream Partners LP	WES

Oilfield Services Company	Ticker
Basic Energy Services	BAS
Exterran Corporation	EXTN
Gravity Oilfield Services Inc.	Private
Key Energy Services	KEG
Mesquite	Private
Secure Energy Services Inc.	SES-CA
Stallion Oilfield Services	Private
Superior Energy Services	SPN
Tetra Technologies	TTI

Water Management Company	Ticker
American Water Works Company, Inc.	AWK
Aqua Terra Water Management	Private
Buckhorn Waste Services	Private
Fountain Quail Energy Services	Private
Goodnight Midstream	Private
H2O Midstream	Private
Hillstone Environmental Partners	Private
Hydrozonics	Private
Layne Water Midstream	Private
Midland Basin Partners	Private
Nuverra Environmental Solutions	NES
Oilfield Water Logistics	Private
On Point Oilfield Holdings	Private
Produced Water Transfer	Private
Select Energy Services	WTTR
Solaris Water Midstream	Private
WaterBridge Resources	Private
Waterfield Midstream, LLC	Private
White Owl Energy Services Inc.	Private

Source: Wells Fargo Securities, LLC

Public Midstream Companies Involved In Water

We count 11 publicly traded midstream companies that provide water management services. Water represents as little as 1% to as much as 71% of total EBITDA for these companies. Companies include: AM, CEQP, CELP (Not Covered), ENBL, EQM, NGL, NBLX, OMP, RTLR, TGE, and WES. As noted, there are numerous private equity backed water companies that could IPO in the coming years as the asset class emerges.

Exhibit 8. Public Companies Under Coverage With Water Operations

Ticker	Water Delivery	Produced/Flowback Gathering	Produced/Flowback Recycling	Produced/Flowback SWD	Water % Of Total EBITDA ('20E)
AM	✓		✓		**24%**
CEQP		✓			**13%**
ENBL		✓			**1%**
EQM	✓				**6%**
NGL	✓	✓	✓	✓	**51%**
NBLX	✓	✓			**37%**
OMP	✓	✓		✓	**21%**
RTLR	✓	✓	✓	✓	**71%**
TGE	✓	✓	✓	✓	**NA**
WES		✓		✓	**NA**

Source: Company reports and Wells Fargo Securities, LLC estimates

Water Transactions In The Market

We have compiled water transaction data from 2015-present based on available information. We estimate the median acquisition multiple of all deals is 6.6x, while the median multiple of transactions since the start of 2017 is 5.6x. (*Note: the list includes water assets on both the sourcing side of the business, and the gathering and disposal side*). As a reference, the median G&P acquisition multiple since 2015 has been 8.5x, while the median multiple since the start of 2017 is 8.4x. We estimate the total value of the deals we have identified (and for which such disclosures were available) is $5.4B, of which $3.9B represents deals consummated since the start of 2017. (Caveat: This is likely an incomplete list of transactions which we hope to improve upon over time).

Exhibit 9. Water Services Transactions (2015-2019YTD)

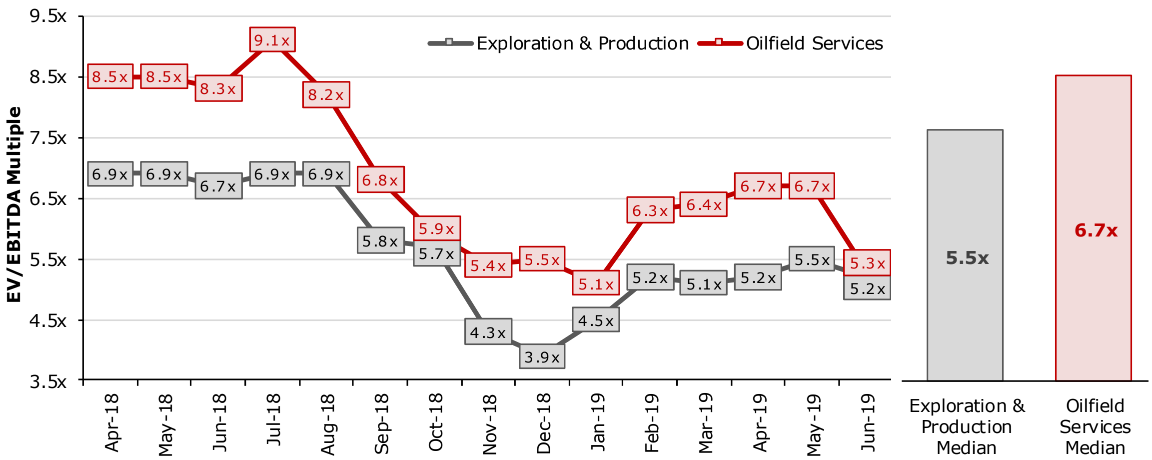
Date	Acquirer	Seller	Region	Price ($MM)	EV/EBITDA Multiple
6/18/15	American Water Works Company, Inc. (AWK)	Rex Energy Corporation (Private)	Marcellus/Utica	$130	9.0x
9/18/15	Antero Midstream Partners LP (AM)	Antero Resources (AR)	Marcellus/Utica	$1,050	8.8x
11/5/15	Rice Midstream Partners LP (RMP)	Rice Energy (RICE)	Marcellus/Utica	$200	5.4x
12/16/15	Tallgrass Energy Partners, LP (TEP)	Whiting Petroleum Corp. (WLL)	DJ	$75	10.0x
12/12/16	Solaris Water Midstream, LLC (Private)	Water Midstream Partners LLC (Private)	Permian	NA	NA
3/10/17	Select Energy Services, Inc. (WTTR)	Gregory Rockhorse Ranch, Inc. (GRR)	Permian	$60	4.8x
3/28/17	Rockwater Energy Solutions, Inc. (Private)	Crescent Companies, LLC (Private)	NA	$207	NA
6/14/17	H2O Midstream (Private)	Encana Oil & Gas (USA) Inc. (ECA)	Permian	$32	NA
6/15/17	Goodnight Midstream (Private)	Black Mountain Disposal / MTN Energy	Permian	NA	NA
7/18/17	Select Energy Services, Inc. (WTTR)	Rockwater Energy Solutions, Inc. (Private)	MidCon, Marcellus/Utica	$516	5.6x
7/26/17	Tallgrass Energy Partners, LP (TEP)	NA	DJ	$7	NA
8/8/17	Goodnight Midstream (Private)	Wyatt Water Solutions, LLC (Private)	Eagle Ford	NA	NA
8/22/17	WaterBridge Resources LLC (Private)	EnWater Solutions, LLC (Private)	Arkoma	NA	NA
2/7/18	Tallgrass Energy LP (TGE)	Buckhorn (Private)	Bakken	$95	5.0x
4/5/18	TETRA Technologies, Inc. (TTI)	SwiftWater Energy Services, LLC (Private)	Permian	$72	4.0x
6/5/18	Solaris Water Midstream, LLC (Private)	Vision Resources, Inc. (Private)	Delaware Permian	NA	NA
6/21/18	Gravity Oilfield Services Inc. (Private)	McKenzie Energy Partners, LLC (Private)	Bakken	NA	NA
9/10/18	NGL Energy Partners LP (NGL)	Private	Permian	$93	5.2x
10/5/18	Nuverra Environmental Solutions (NES)	Clearwater Three, LLC and Clearwater Five, LLC	Marcellus/Utica	$42	5.6x
10/8/18	NRC Group Holdings, LLC (Private)	Quail Run Services, LLC	Eagle Ford, Permian	NA	NA
10/31/18	WaterBridge Resources LLC (Private)	Halcon Resources Corp. (HK)	Permian	$200	10.0x
11/12/18	Tallgrass Energy LP (TGE)	NGL Energy Partners LP (NGL)	Bakken	$91	9.5x
12/11/18	Hess Infrastructure Partners LP (HIP)	Hess Corp. (HES)	Bakken	$225	NA
12/20/18	WaterBridge Resources LLC (Private)	NGL Energy Partners LP (NGL)	Delaware Permian	$239	12.0x
1/3/19	WaterBridge Resources LLC (Private)	Concho Resources Inc. (CXO)	Permian	NA	NA
2/8/19	Intrepid Potash, Inc. (IPI)	Dinwiddie Jal Ranch	Delaware Permian	$53	4.1x
3/11/19	TPG Capital (Private)	Goodnight Midstream (Private)	Permian, Bakken, and Eagle Ford	$930	9.0x
3/21/19	Gravity Oilfield Services Inc. (Private)	MBI Oil & Gas, LLC (Private)	Bakken	NA	NA
5/1/19	Tallgrass Energy LP (TGE)	Central Environmental Services (Private)	Marcellus/Utica	$52	NA
5/1/19	WaterBridge Resources LLC (Private)	PDC Energy, Inc. (PDCE)	Delaware Permian	$125	NA
5/7/19	Bison (Private)	Cobalt Environmental Solutions (Private)	SCOOP, Merge	NA	NA
5/14/19	NGL Energy Partners LP (NGL)	Mesquite Disposals Unlimited, LLC (Private)	Delaware Permian	$890	7.5x
5/17/19	GIC (Private)	Five Point Energy LLC (Private)	Permian/Arkoma	NA	NA
6/3/19	Gravity Oilfield Services Inc. (Private)	Pyote Water Systems III, LLC (Private)	Permian	NA	NA
				Median transaction multiple	**6.6x**

Source: Company reports and Wells Fargo Securities, LLC

What Is Water Worth?

Given that water is still an emerging asset class (on its own) and there are only a few public comps, the question being debated in the market is at what EV-to-EBITDA multiple should water be valued? We believe that the freshwater delivery function is very much an oilfield service-like activity. Fresh water delivery volumes and cash flows are entirely dependent on drilling and completion activity. As such, these volumes are very much tied to E&P development. Thus, we believe the freshwater delivery business should garner an E&P/oil service multiple in the 5-7x range.

Exhibit 10. Historical Valuation Multiples – E&P / Oilfield Services



Source: Wells Fargo Securities, LLC estimates

Saltwater disposal, as the business has evolved, looks more like traditional gathering and processing than it had previously. More and more of the SWD business is being handled via acreage dedications, central delivery points, and minimum volume commitment contracts. While contract length is still relatively short (rarely above 5 years), the overall characteristics appear similar to most G&P contracts. In addition, returns on investment for SWD are similar to G&P (in all basins except the Delaware) at 4-5x EBITDA. However, SWD has some unique long-term risks, most notably seismic (and potential future regulatory and environmental risk) that could dictate a discounted multiple relative to G&P assets (which don't carry those risks to the same degree).

The other reference point to consider is transaction comps. On the one hand, some private equity water transactions have been completed at EBITDA multiples in the 9-10x range. However, the most recent water acquisition by NGL of Mesquite was consummated at 7.5x (and improving to 6x in the second year). Further, RTLR (~71% of 2020E EBITDA is water of which 85% is produced), priced at an implied EV/EBITDA multiple of 8.0x and currently trades at a 2020E multiple of 8.8x. (If you assume the 20% of the business tied to G&P and pipelines trades at 10x, this water business trades at an implied multiple of 8.5x).

Taking all these factors together, we believe midstream water assets (SWD) should trade at a discount relative to G&P assets. G&P MLPs currently trade at an EV-to-EBITDA multiple on 2020E) of 9x (~10x for large-cap G&P and ~8x for small-cap G&P). Thus, for the time being, we believe SWD should be valued at a 1-2x turn discount to G&P.

Water In The Delaware Is Different

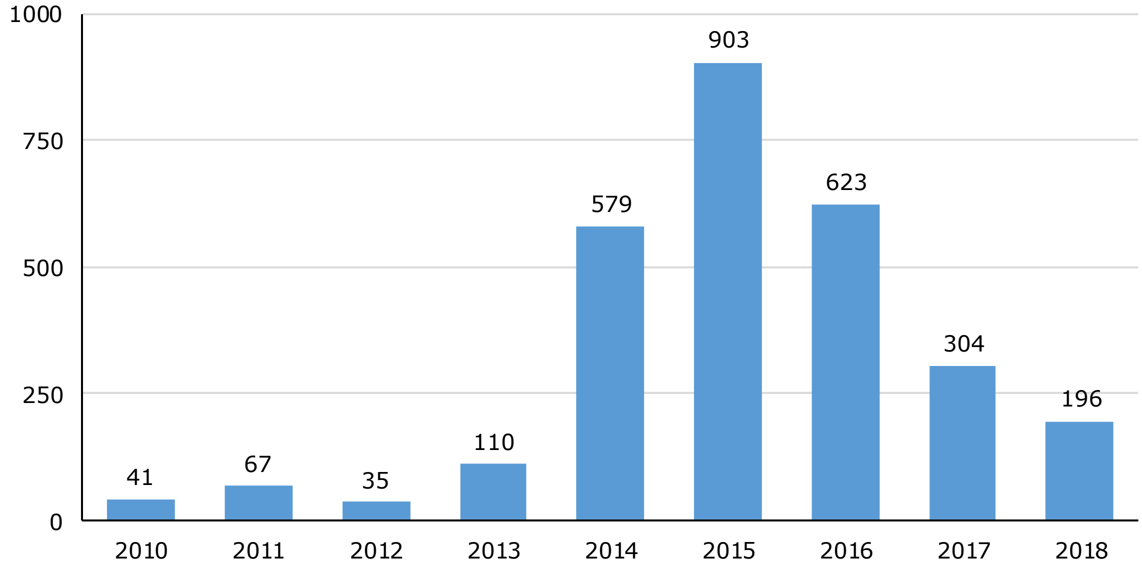
We think the SWD water business in the Delaware should be valued in-line with G&P at 9x and at a 1-2x premium to SWD water businesses in other regions. The reason is due to the significantly higher returns that produced water investments in the Delaware currently generate. As noted, we estimate the expected ROI for produced water investments in the Delaware is 1-2x EBITDA versus 5x for other basins. The reason is due to the higher water-to-oil ratio in the Delaware of 5-6x versus 1-2x in most other basins.

Risks To The Water Business

Seismic. Seismic activity in certain parts of the country has been linked to saltwater disposal wells. This could lead to increase regulatory scrutiny and ultimately, limit the ability to drill additional wells and utilize existing wells.

From 2010-2015, the number of earthquakes occurring in the state of Oklahoma increased by over 2,100%, leading some scientists to claim that the drilling of saltwater disposal wells had been the cause. As a result, the Oklahoma Corporation Commission (OCC) issued multiple directives to disposal well operators to limit disposal activity or shut down wells in areas of high seismic activity. Since 2015, the number of earthquakes has decreased. Regulation around saltwater disposal well drilling and the amount of produced water than can be disposed of could increase, adding costs to the business or in a worst case, limiting the ability of water companies to manage produced water volumes.

Exhibit 11. Seismic / Earthquake Activity In Oklahoma Since 2010



Source: Oklahoma Geological Survey and Wells Fargo Securities, LLC

Regulatory / Environmental. While the permitting for salt water disposal wells has been mostly uninhibited (except in certain regions such as New Mexico), this could change given the above noted seismic risk. Regulators could limit the number of permits granted for new SWD wells. As environmental activism increases, this could drive increased scrutiny of freshwater delivery and SWD practices and create pressure on states to limit freshwater access and/or saltwater disposal activity. If this occurs, we believe water companies could be forced to move to recycle technology, which could increase the cost of operations.

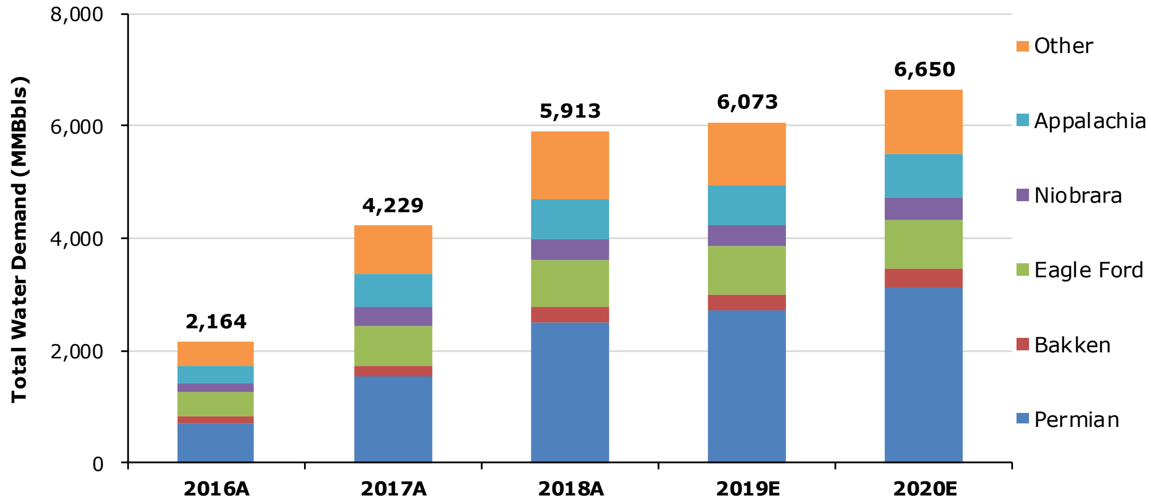
Low Commodity Prices / Reduced Drilling Activity. Fresh water delivery volumes are directly tied to drilling and completion activity levels. Thus, a slowdown in drilling and completions, due to lower commodity prices could impact cash flows for this segment of the business.

Low Barriers To Entry. We believe the water business has relatively low barriers to entry (i.e., favorable/lax current regulatory environment and modest capital requirements). A potential increase in competition could erode margins and result in less favorable economics for current water solutions providers.

Size Of The Water Market – Volume Perspective

In order to estimate the size of the overall water management services market (from a volume perspective), we have focused on two primary areas – (1) demand for water used for drilling and completions, and (2) produced water. Our estimates are based on completion and crude oil production forecasts provided by our Oilfield Services and E&P teams. In aggregate, our oilfield services team estimates total water demand (which includes fresh and recycled water) will increase by a 3% and 9% in 2019 and 2020, respectively. The growth in water demand is primarily driven by increasing water intensity per well (5-6% per year) and assumed increase in well completions in 2020.

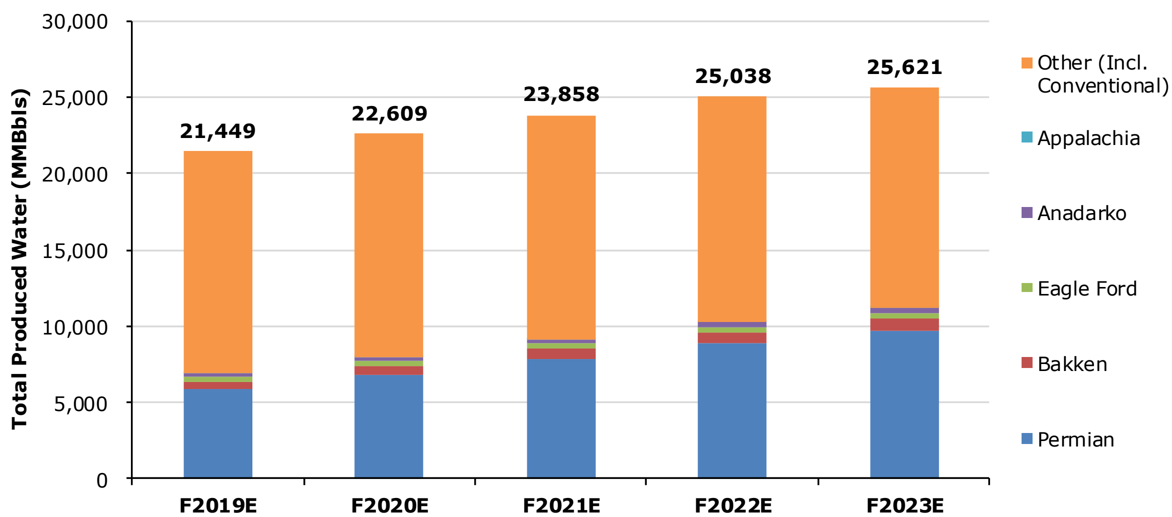
Exhibit 12. Water Demand For Drilling & Completions By Region – Recent History And Forecast



Source: Wells Fargo Securities, LLC estimates

We estimate that produced water volumes will grow at five year CAGR (2019-2023) of 4.5% to 25,621 MMBbls in 2023E. The increase in produced water is primarily driven by growing crude oil production from shale basins, partially offset by a decline in production from conventional wells. To note, conventional wells produce significantly more water than shale formations. A significant portion of produced water (65-70%) is reinjected in enhanced oil recovery operations, some is recycled and reused for drilling and completions, and the remaining (~20%) is disposed of into SWD wells.

Exhibit 13. Estimated Produced Water Volumes By Region



Source: Wells Fargo Securities, LLC estimates

Water 101– Key To The Exploration, Development And Production Of Oil And Gas

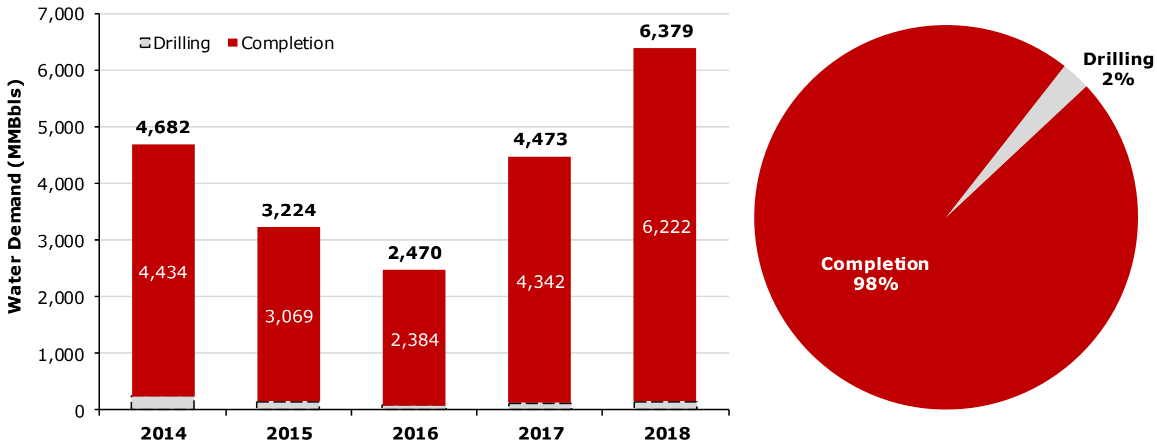
Water plays a key role in the drilling and hydraulic fracturing (fracking) of an oil/gas well and is produced over the life of a well.

- In the drilling process, water is mixed with materials and chemicals to create water-based drilling fluid/mud (most commonly used vs. oil or synthetic-based fluids). This mixture is added to the wellbore to facilitate the drilling process (e.g. suspends cuttings, controls pressure/stabilizes, lubricates/cools, etc.).
- In unconventional drilling, fracking is a stimulation technique used to create cracks in the rock formation, enabling more hydrocarbons to flow into the wellbore for extraction. Water is mixed along with proppants (e.g. sand, ceramics, etc.) and chemical additives to create fracking (frac) fluid, which

is injected at high pressure into the ground. We note that water demand related to fracturing (vs. drilling) accounts for the majority of drilling and completion water requirements (i.e. 98% of ~6.4B Bbls in 2018 based on Spears and Associates data).

- Lastly in the production phase, water is used in water flooding (injection of water into a reservoir), which is a secondary recovery method to increase production after the reservoir's pressure has been depleted.

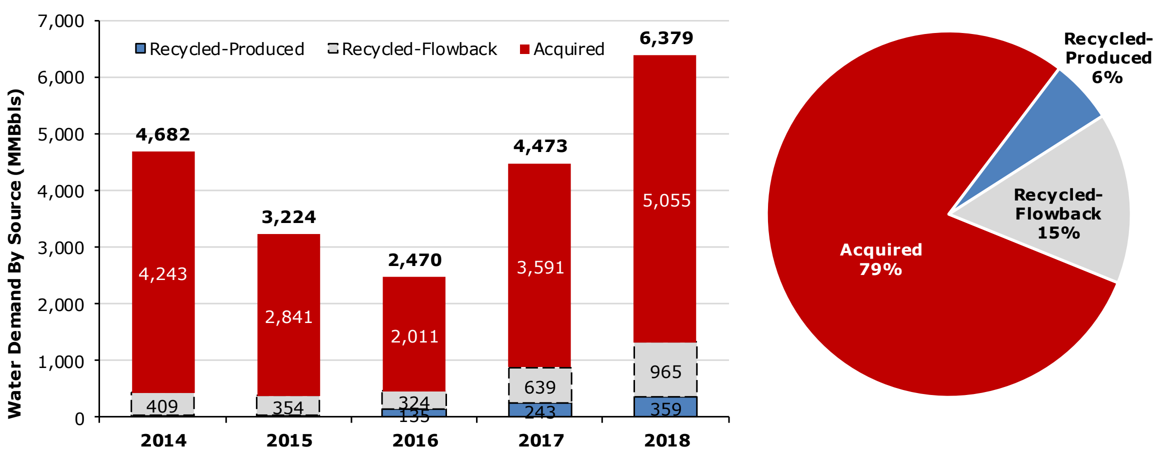
Exhibit 14. Drilling/Completion Water Requirement



Source: Spears and Associates and Wells Fargo Securities, LLC

Currently, water used for drilling and completion is primarily obtained through water acquisition (i.e. ~5.1B Bbls or 79% of the total in 2018). Only a small percentage is sourced from recycled flowback or recycled produced water (i.e. 965MM and 359MM Bbls or 15% and 6%, respectively, in 2018 according to Spears and Associates data).

Exhibit 15. Sources Of Drilling/Completion Water Requirement



Source: Spears and Associates and Wells Fargo Securities, LLC

Key Determinants Of Water Usage For Fracking

Drilling and completion water requirements have significantly increased with the shift to unconventional resource development and advances in well completion techniques. In general, water usage for fracking depends on:

Type of well - horizontal vs. vertical. The amount of water required for drilling fluids can increase more than three folds (e.g. approximately 10,000 Bbls for a horizontal well, up from 3,000 Bbls for a shallow vertical well per Spears and Associates).

Length of laterals/ number of frac stages per well. Longer lateral sections in wells result in an increase in the number of frac stages (i.e. multi-stage frac vs. single stage frac). This, in turn, increases the amount of water usage. According to Spears and Associates, the amount of water needed for frac jobs on newly drilled wells can range from about 5,000 Bbls for a single-stage frac on a vertical well to more than 500,000 Bbls of water for a multiple-stage frac job on a horizontal well.

Type Of Frac Fluid. Water usage also depends on the frac job type, which varies in cost, applications and chemical additives. Currently, the three most common type of frac fluids used include slickwater, linear gel and cross-linked gel with slickwater fracs requiring high water volumes to move the proppant. A conventional gel frac job would be pumped at 20 to 40 barrels per minute while a slickwater job is typically pumped at 60 barrels of fluid per minute or more according to Spears and Associates.

Given the variability of these aforementioned factors among the different producing regions, there is a notable difference in the amount of frac water typically used for a well for different shale plays (e.g. ~550,000 Bbls per well in the Utica vs. ~210,000 Bbls per well in the Bakken.

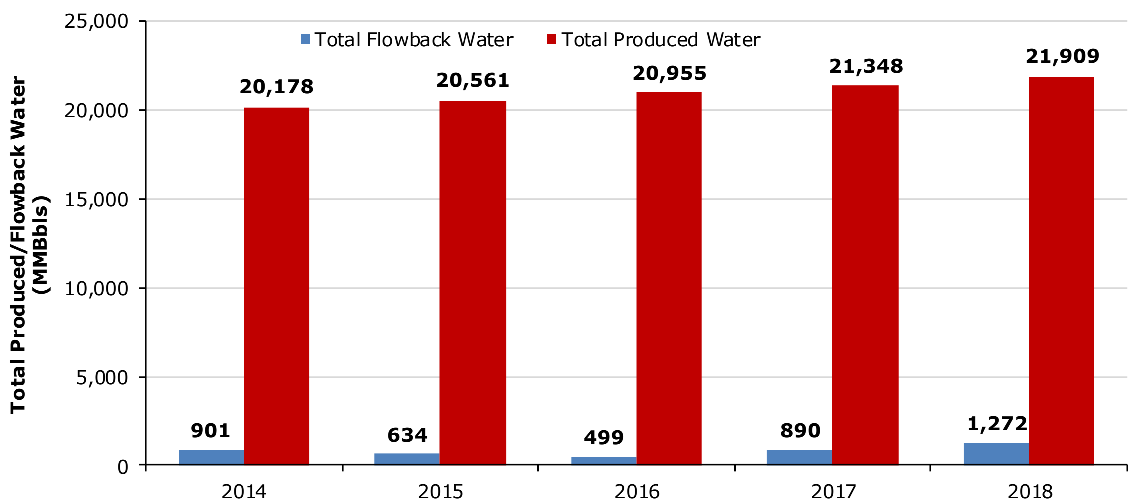
Exhibit 16. Frac Water Consumption For Horizontal Wells (Bbls/Well) By Region

	Water Consumption (Bbls/Well)					CAGR
Region	**2014**	**2015**	**2016**	**2017**	**2018**	**2014-18**
Permian	175,000	200,000	300,000	350,000	425,000	**25%**
Bakken	210,000	210,000	210,000	210,000	210,000	**0%**
Eagle Ford	135,000	150,000	225,000	260,000	325,000	**25%**
Niobrara	75,000	90,000	150,000	200,000	250,000	**35%**
Mid Continent	200,000	200,000	200,000	250,000	325,000	**13%**
Marcellus	150,000	175,000	250,000	300,000	400,000	**28%**
Utica	200,000	225,000	325,000	400,000	500,000	**26%**
Haynesville	100,000	100,000	150,000	200,000	250,000	**26%**

Source: Spears and Associates and Wells Fargo Securities, LLC

Approximately 20-40% of the water pumped into the well during the frac job (flowback water) is recovered during the first several weeks. A large percentage of the remainder, as well as pre-existing water in the formation, returns to the surface as produced water over the life of the well. The amount of total produced water that the industry handles annually is significantly higher than the total amount of flowback water (i.e. 21.9B Bbls vs. 1.3B Bbls in 2018 according to Spears and Associates).

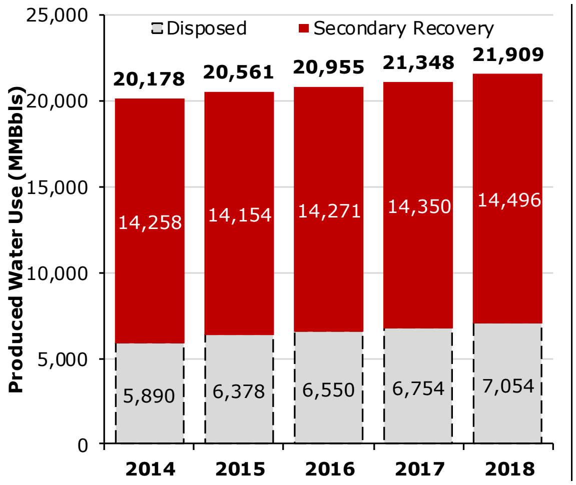
Exhibit 17. Total Produced Water Versus Total Flowback Water

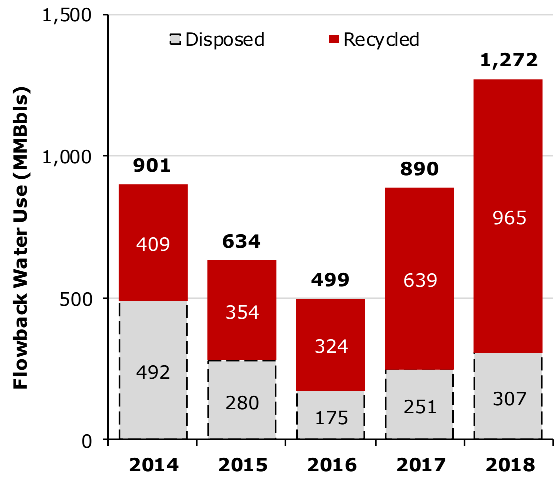


Source: Spears and Associates and Wells Fargo Securities, LLC

Currently, the majority of produced water is used for secondary recovery (e.g. 14.5B Bbls or 66% total in 2018) versus disposed of (e.g. 7.1B Bbls) according to Spears & Associates. In contrast, the majority of flowback water is recycled (e.g. 965MM Bbls or 76% of total in 2018) versus disposed of (e.g. 307MM Bbls).

Exhibit 18. Produced Water/ Flowback Water Options





Source: Spears and Associates and Wells Fargo Securities, LLC

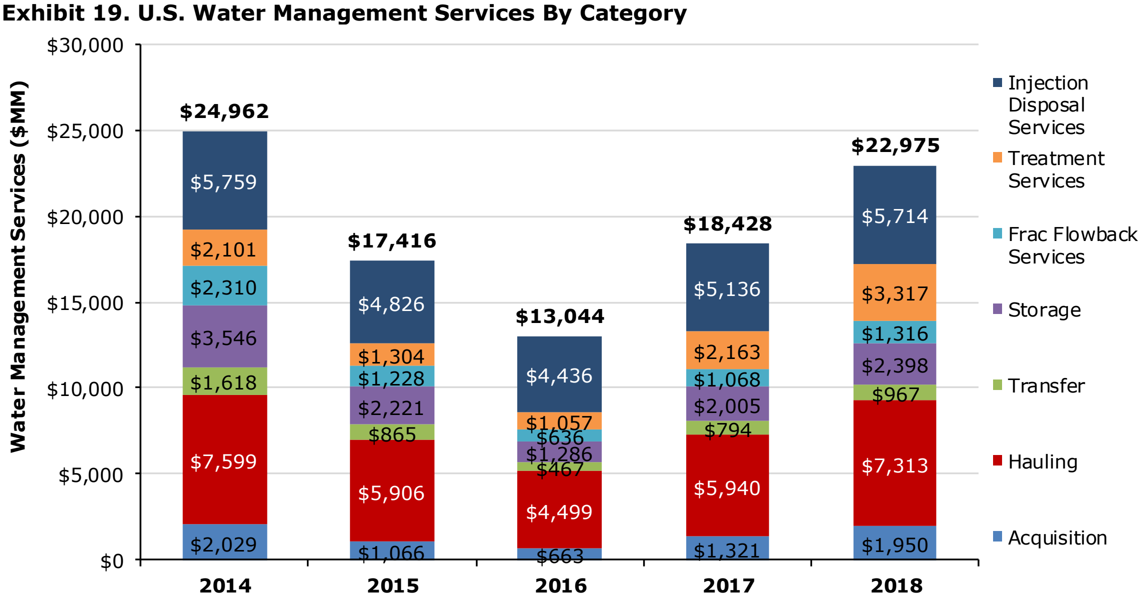
The U.S. Water Management Services Market

The water management services market provides the following services related to water during the drilling, completion and production of oil and natural gas:

- Acquisition/sourcing
- Transfer
- Storage
- Treatment
- Frac flowback services
- Hauling
- Injection disposal services

Water hauling and injection disposal services account for the two largest market segments (i.e. $7.3B and $5.7B, respectively, out of the total U.S. water management services market of approximately $23.0B in 2018 according to Spears and Associates).

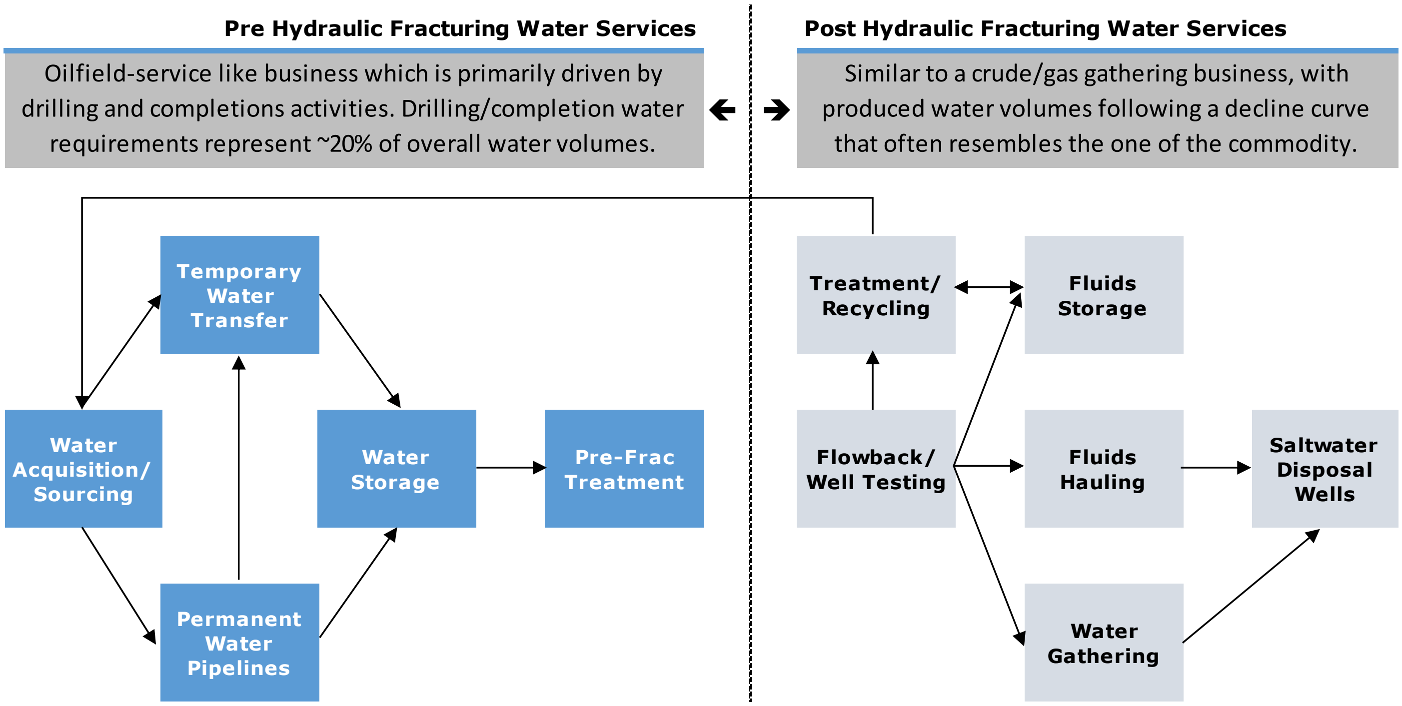
Exhibit 19. U.S. Water Management Services By Category



Source: Spears and Associates and Wells Fargo Securities, LLC

One way to categorize water related services is to classify activities as before or after the fracking process with the latter generating more stable cash flow streams, in our view.

Exhibit 20. U.S. Water Management Services



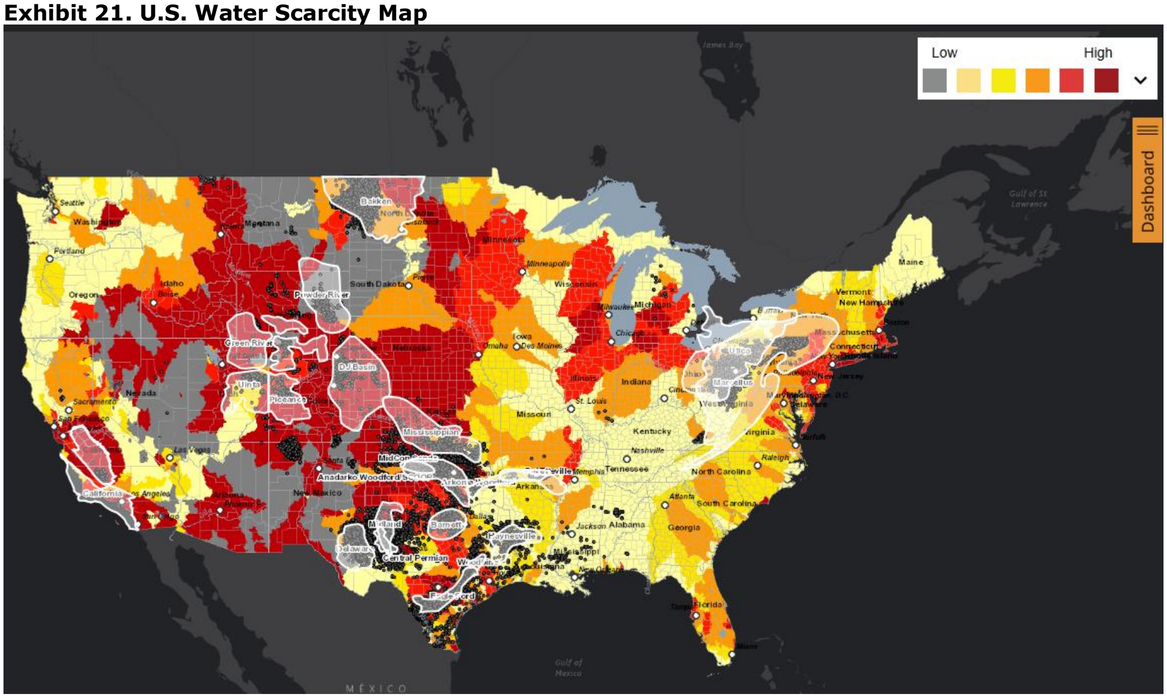
Source: Select Energy Services and Wells Fargo Securities, LLC

1) Acquisition / Sourcing

Water used for drilling and completion operations (e.g. drilling and frac fluids) can be obtained from various sources. They include: surface water (e.g. rivers, streams, lakes, ponds), subsurface water (potable/non-potable groundwater contained in aquifers), industrial supplies (e.g. water treatment plants, industrial waste water) and recycled water from flowback or produced water.

Currently, freshwater volumes accounts for the majority of the U.S. water acquisition market although that may decrease over time based on Spears and Associates' forecast (e.g. 79% in 2018 vs. 21% from recycled water, decreasing to 75% in 2023E vs. 25% from recycled water). The consulting firm also estimates the cost to acquire raw water approximates $0.25-0.75 per Bbl excluding the cost of delivery to the location. The water source(s) used and cost are highly correlated with a location's surface rights (e.g. state's water rights/permitting/use agreements) and water availability/scarcity levels.

Exhibit 21. U.S. Water Scarcity Map



Source: Water scarcity concerns map www.ceres.org/shalemap and Wells Fargo Securities, LLC

2) Transfer

Water used for drilling and fracking can be trucked via a hauling service (see details on hauling on page 18) or transported to the wellsite through a water transfer system. The latter delivers water from a water source through temporary or permanently installed pumps and pipelines to storage at the wellsite. According to Spears and Associates, transfer providers charge usage fees (including a set up cost and daily rental rate) of $40,000 per well.

3) Storage

Water used to create drilling fluid or frac fluid is stored at a location in frac tanks (~500 Bbl capacity), local artificial containment ponds (~9,000 Bbls to 40,000 Bbls), regional artificial containment ponds (more than ~100,000 Bbls) or an earthen pit. Storage providers charge operators for renting storage units (e.g. average of $40,000-$50,000 per well for artificial containment pond usage and a daily rate of $20-40 to rent a frac tank based on Spears and Associates estimates). Storage providers also charge for the cost of liners installed to prevent damage/containment when units are used to store frac flowback fluids (e.g. $12,000-$15,000 per well for vertical wells and $25,000-$30,000 per horizontal well/pad according to Spears and Associates).

4) Treatment

Water treatment results in the removal of contaminants and undesirable components and/or the conditioning of water via physical, chemical or thermal means. Pre-treatment services account for more than half of the water treatment services market (e.g. 58% of the total in 2018 according to Spears and Associates). Frac water pre-treatment entails adding additives to water that is mixed along with chemicals and proppants (i.e. frac fluid) that is pumped into a well. Flowback as well as produced water can also be treated before it is disposed of or used in the secondary recovery of oil and gas wells.

Spears and Associates notes that the vast majority of wastewater undergoes only minimal treatment through filtration. Water treatment, which is correlated with recycling, will likely increase over time in regions where transportation costs are high, disposal options are limited and regulatory requirements are high (e.g. Northeast).

Recycling Wastewater. As noted in Exhibit 15, only a small percentage of drilling/completion water requirements are currently met by using recycled flowback and produced water (e.g. approximately 21% in 2018 volumes based on Spears and Associates estimates), which we expect will increase over time given the aforementioned reasons. In a closed loop system, produced water is gathered at an operator's well site and delivered to the new location for use to create frac fluid. The water typically needs to be treated first to remove oil, solids, and some total dissolved solids. Operators must weigh the cost of transporting/treating wastewater for re-use versus the economics of just acquiring freshwater and disposing produced water locally.

5) Frac Flowback Services

As previously noted, approximately 20-40% of the water pumped into the well during the frac job (flowback water) is recovered during the first several weeks. A frac flowback service company provides specialized equipment to handle the recovered flowback and monitor/test the well and liquids produced. According to Spears and Associates, "the capital cost to assemble a new frac flowback "package" or "spread" is estimated to be about $2MM."

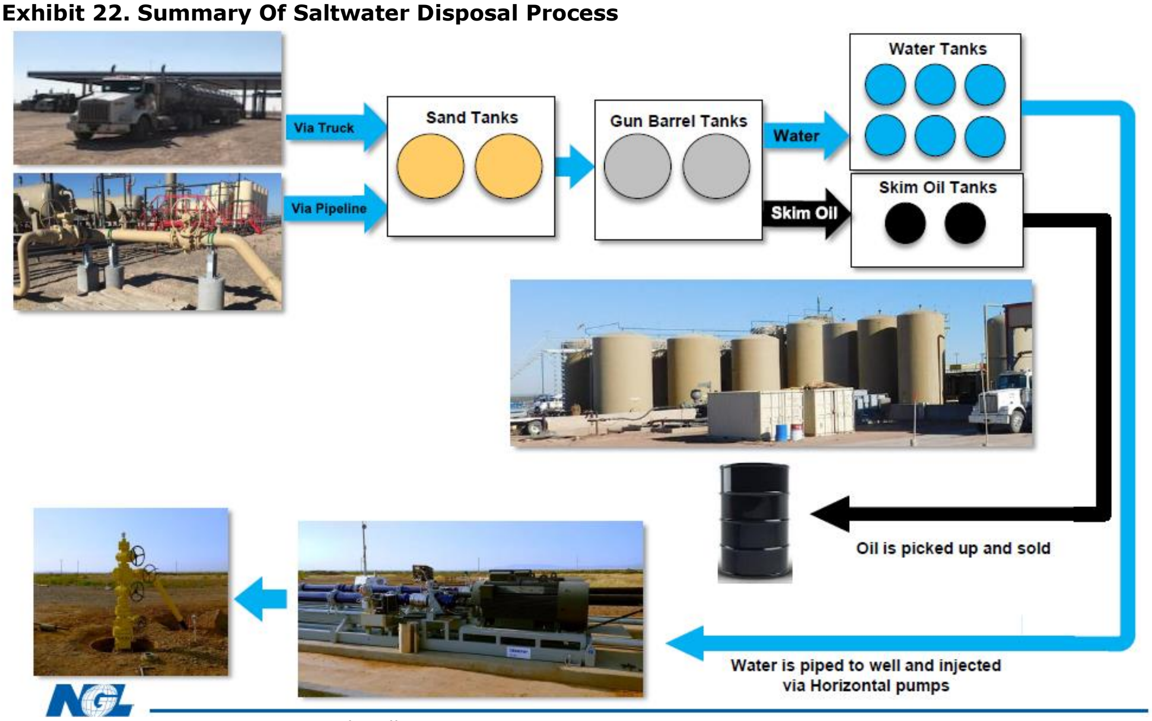
6) Hauling

Water hauling services includes frac water hauling, flowback water hauling and produced water hauling, which accounts for the largest segment of the water hauling market (e.g. 76% of total in 2018 based on Spears and Associates estimates). Hauling entails transporting primarily by truck fresh water to the well site as well as delivering flowback/produced water from a well site to a disposal site. Water hauling is a highly fragmented market. Spears and Associates estimates that trucking costs approximate $50-100 per hour in most regions, which translates to a cost of about $2-3 or Bbl.

7) Injection Disposal Services

A large percentage of the flowback, as well as pre-existing water in the formation, returns to the surface as produced brine/saltwater over the life of the well. The water "cut," or ratio-of-water-to-oil, is a measurement of the amount of water that is produced for every barrel of oil. Produced water typically contains saline (e.g. measured by total dissolved solids content or TDS), organic/inorganic compounds/metals and natural occurring radio-active material (NORM). Produced water is either reinjected as part of a secondary recovery project (about two-thirds of produced water is used for this) or stored until it is transported via trucks or pipelines (typically PVC lines installed underground) to a disposal site. Disposal options include injection into an underground disposal well at the site (most common method), discharge into surface water, water treatment or reuse in drilling/completion.

Exhibit 22. Summary Of Saltwater Disposal Process



Source: NGL Energy Partners, LP and Wells Fargo Securities, LLC

According to the EPA, most oil and gas injection wells are located in Texas, California, Oklahoma, and Kansas and are issued permits by the state. Disposal wells make up about 20% of the total number of Class II wells in the U.S., which approximates 180,000. They are required to comply with Underground Injection Control (UIC) regulations as well as Safe Drinking Water Act (SDWA) provisions.

After water hauling, injection disposal services represent the second largest segment of the U.S. water management market (e.g. $5.7B in 2018 according to Spears and Associates). The consulting firm estimates that producers handle more than 70% of total disposed volumes with the remaining balance serviced by third-party firms, who typically charge a fee per Bbl disposed of.

Please see Exhibit 23 for a brief description of the process to build a new water disposal facility (provided by NGL Energy Partners LP).

Exhibit 23. Steps To Build A New Salt Water Disposal Facility

Land Purchase and Permitting	Well Development	Surface Development	Operational
1. Determine Location for new facility or well based on customer needs and production 2. Consider needs of truck bay or if new facility is based solely on piped volumes 3. Purchase land when possible to eliminate royalty and land owner leverage (risk) 4. Obtain required permits 5. Notify all producers in the area of plans and contract as much volume as possible	1. Move in rig and drill to required depth (8-12 days in TX, 90 days in NM) 2. Conduct step-rate test to ensure well capacity (1-3 days) 3. Order appropriate injection pumps as determined by capacity	1. Order all tanks required (6-8 week lead time) • Sand • Gun-barrel • Crude Oil • Water Storage 2. Complete dirt work 3. Assemble tanks, pumps, and pipelines 4. Build containment walls 5. Initial electrical installation	1. Obtain station power from local utility 2. Ramp up injection pressure and continue to monitor 3. Maintain all compliance requirements and inspections 4. Continue to increase utilization with additional pipelines 5. Continue to market facility
~60-90 days + permit approval	~1-3 weeks	~2-3 months	**Total time to Completion: ~4-6 months + permit approval**
~$100,000-$500,000	**~$1.5-$2.0 million**	**~$3.0-$5.0 million**	**Total Investment: ~$4.6-7.5 million**

Source: NGL Energy Partners, LP and Wells Fargo Securities, LLC

Glossary

Flowback: Initial flow of water after bringing a well online; includes both completion fluid and formation water, but the composition of flowback typically resembles that of completion fluid. The duration of flowback changes depending on the formation. Flowback may last anywhere from 2 weeks to 6 months.

Produced water: Water which is produced from a crude oil or natural gas well. Typically, water coming from a production well transitions from flowback to produced water within the first few weeks when most of the completion fluid chemicals are no longer in high concentrations. Produced water volumes could be recovered in ratios of 0.75-10x relative to volumes of hydrocarbons produced by the well.

Salt water disposal (SWD) well: A salt water disposal well is a disposal site for water collected as a byproduct of oil and gas production. After produced oil or gas is treated, there is water leftover (referred to as "salt water"). Companies may choose to recycle the salt water by injecting it back into the well for secondary oil recovery, or dispose of it at a salt water well disposal site. Regulations for the disposal of this water vary from state to state, but the Environmental Protection Agency (EPA) monitors the disposal closely to ensure ground water is not contaminated.

Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA): EBITDA is a non-GAAP measure used to provide an approximation of a company's profitability. This measure excludes the potential distortion that accounting and financing rules may have on a company's earnings; therefore, EBITDA is a useful tool when comparing companies that incur large amounts of depreciation expense because it excludes these non-cash items which could understate the company's true performance,

EBITDA Multiple: An EBITDA multiple is the expected return an acquisition or organic growth project is estimated to generate. For example, a $100 million investment at an 8x EBITDA multiple, would be expected to generate approximately $12.5 million of EBITDA on an annual basis (or a 12.5% return).

Energy Industry Abbreviations
Bbls: Barrels
Bcf/d: One billion cubic feet per day
MBtu: One thousand Btus.
Mcf: One thousand cubic feet of natural gas.
MBbls: One thousand barrels.
MBbls/d: One thousand barrels per day.
MM: In millions.
MMBbls: One million barrels.
MMBbls/d: One million barrels per day.
MMBtu: One million Btus.
MMBtu/d: One million Btus per day.
MMcf: One million cubic feet of natural gas.
MMcf/d: One million cubic feet of natural gas per day.
Tcf: One trillion cubic feet of gas.

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