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FRAC SAND MARKET NEWSLETTER

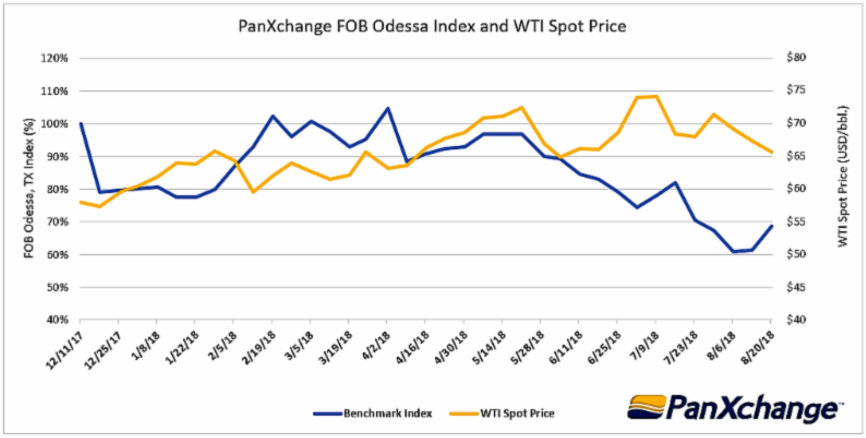
Monday, August 20th

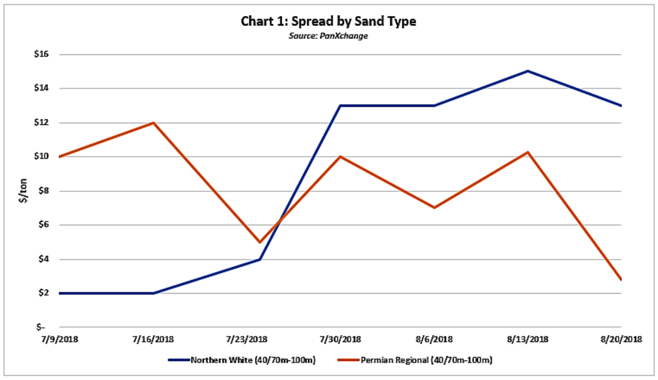
Market Update

PanXchange Benchmarks		
FOB Odessa, TX (NW, 100m)	$ 82.00	14%
FOB Odessa, TX (NW, 40/70m)	$ 95.00	10%
FOB Kermit, TX (Local 100m)	$ 50.00	2%
FOB Kermit, TX (Local 40/70m)	$ 52.80	-10%

NW Rebound, Permian Drop

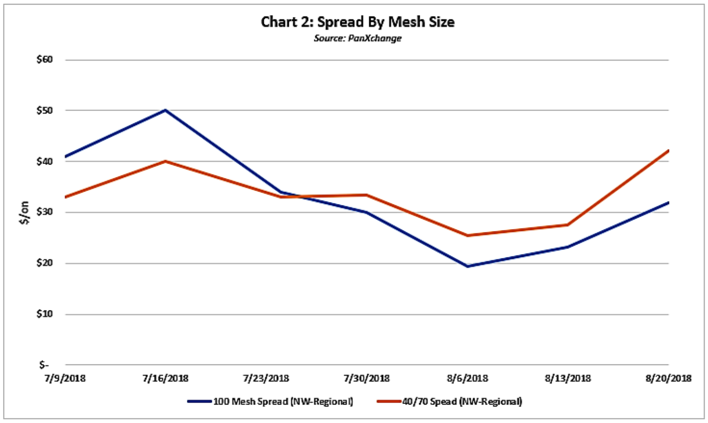
Spot local Permian sand pricing moved lower last week, while northern white saw a very solid rebound, showing signs of a slight recovery after a rough Q2 and Q3 to date. As seen in the spread charts, the product spreads have moved wildly, showing a very interesting relationship between both mesh sizes as well as sand types *(see the explanation of spread charts in the FAQ section below)*. We expect the sand type *(shown in chart 1)* to continue to move wildly as the market attempts to dictate whether local sand will prevail, or if northern white will retain a certain portion of market share. We believe that these spreads do an incredible job of explaining an objective, data-driven snapshot of what is going on on the ground level, in the Permian Basin.





The large move in northern white pricing may have some passive bystanders scratching their heads, as the story has seemed rather bearish for several consecutive months. The move comes from northern white producers anticipating the in-basin oversupply and allocating product elsewhere to other basins. While 100 mesh in-basin sand is currently easy to locate, last week northern white was difficult to find on the spot market and logistics providers noted an uptick in customers on the search for spot tonnage, a dramatic shift from just a few weeks ago.

On the heels of the Covia earnings call, we have heard several confirmations of contract price concessions. Historically, spot pricing has been above contract pricing, however, the opposite is true, and likely will remain true for at least the next few years. The truth is that there is no set rule of thumb for contract versus spot pricing in a mature commodity market, and we should see the conversation begin to shift to spot versus forward contracting instead. Part of the reasons for the wide bid/offer spreads on spot sand *(mentioned above)* is due to the fact that some sand companies are pricing spot sales relative to individual customer contracts, which has put them in a difficult position to compete with one another in a heavy spot market. The competitive spot market seems to be factoring in take-or-pay penalties, which actually may become an attractive option should spot pricing continue to fall and mines not adjust contract pricing. Of course, this is a sweeping generalization and may not apply to every contract for every mine, but an important market thought nonetheless.



Anecdotal conversations are showing that Permian sand producers have been offering product far below market pricing as a way to continue product flow without having to decrease production or shut down altogether. There has been confirmation of both events happening, but we believe this is not yet the norm. We will continue to monitor how this will effect spot pricing in the coming weeks.

Possible Uptick in Q4 Sand Demand?

We have been reporting flat completion growth throughout the summer, which was initially based solely on anecdotal conversations and softer frac crew pricing but has since been confirmed by falling sand pricing and further confirmed by EIA completion numbers as well as flat crude oil production from the Permian Basin. That is not to say that overall fracsand demand is falling, but rather incremental local sand production beyond contractual obligations is not currently needed by the market. Soley based on analysis, there is a scenario emerging where the steep decline curves of Permian Basin wells could catch up to flat completion activity, causing production to not just flat line, but actually fall. Considering the tight global crude oil market and record domestic refining demand, if production falls, pipeline capacity should become available in Q4, Mid-Cush basis differentials could improve and we may see a few operators take advantage by picking up a spot frac crew, capitalizing on inexpensive horsepower, sand, and rare pipeline availability. The question that arises is how does flat completion activity lead to shrinking production in Q4? The answer lies in the steep decline curves of shale wells. Simply stated, if you were to stack multiple decline curves, you would see the aggregated decline curve of the entire basin. As time passes, overall declines begin to increase and if completion activity does not outpace the rate of decline, theoretically, a drop in production should occur.

Sand suppliers are going to begin facing difficult decisions soon. If spot pricing continues to fall, the covenant of higher priced term contracts are at risk. We believe that current pricing is sparking internal debates as end users decide how they wish to proceed. Term contracts have essentially become a call option for end users with the premium being the take-or-pay penalty acting as the option premium. At a certain point, it will make sense to pay the penalty on term contracts, buy on the spot market, and recover a few dollars per ton. With the massive cost of losing customers and shutting a plant down, sand producers in the basin must make the decision how to handle the discrepancy in contracted pricing versus the spot market completion. Of course, most contracts were made with this exact situation in mind and there are several groups currently holding discussions on how the discrepancy in pricing will be handled.

FAQs

How Are Our Benchmarks Compiled?
We compile benchmarks utilizing standard commodity price reporting practices utilized by other energy markets like crude, natural gas, and natural gas liquids. Inputs are ranked and weighted based on the type of data point. PanXchange market transactions are weighted the heaviest, followed by bids and offers, official price submissions, and lastly anecdotal conversations. This methodology is an improvement on the standard commodity price reporting practices, by adding the online marketplace, creating more accurate and transparent benchmark pricing.

What is the FOB Odessa index?
The index was our first pricing indicator, first published in early December 2017. The index is a compilation of northern white 100 mesh and 40/70 normalized to FOB Odessa, Tx and shown as a percentage of the indexed date. Since we have recently added individual benchmarks for both 100 mesh and 40/70 northern white, the index is compiled between the two and may be used to provide a general consensus on northern white pricing in the Permian Basin.

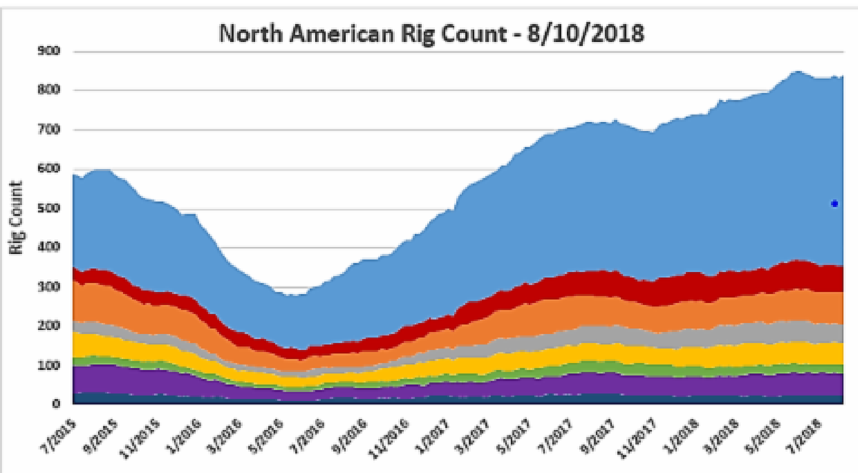
What are the new spread charts and why does it matter?
Chart 1: Spread By Sand Type: Shows the relationship between 100 mesh and 40/70 for northern white (blue line) and regional Permian (orange line). This chart provides an important indicator of in-basin sand adoption and utilization versus northern white. Prior to the inception of in-basin mining, northern white (blue line) was near parity,

showing that there was not a huge difference between 100 mesh and 40/70. As the market was flooded with inexpensive 100 mesh from in-basin mines, the spread widened significantly as 100 mesh weakened but 40/70 remained relatively strong.

Chart 2: Spread By Mesh Size: Shows the relationship between northern white and regional Permian sand by mesh type. 100 mesh (blue line) is calculated by subtracting regional Permian FOB Kermit from FOB Odessa northern white pricing. The 40/70 pricing relationship can be seen by the orange line. It is evident that 40/70 has remained the premium product in the Permian basin as 100 mesh continues to soften.

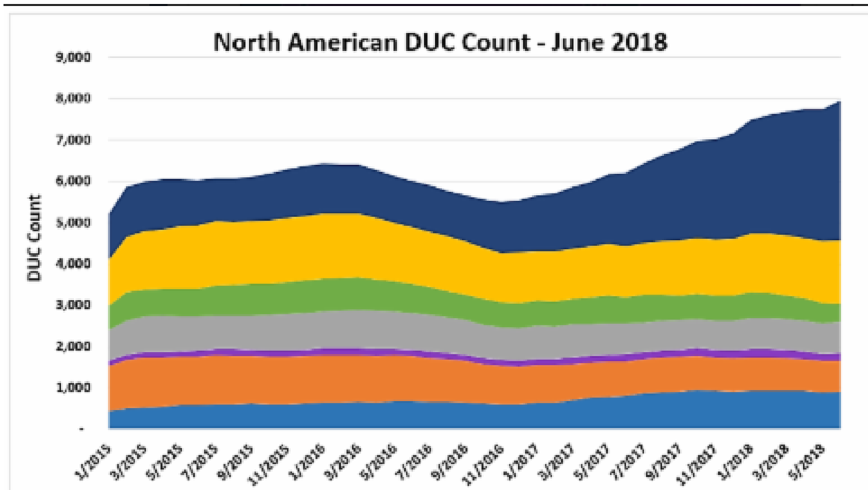
In the world of commodity market analysis, single data points are important, however, the relationship between two data points is the most important. The relationship changes between multiple data points tell the most important story: what is actually happening on the ground level. We will look to continue to add to our data offer through various spread trackers as we continue to expand our data services offerings.

Market Trends



Basin	8/3/2018	8/10/2018	Change
Permian	480	485	5
Cana Woodford	68	68	0
Eagle Ford	80	79	-1
Haynesville	48	49	1
Marcellus	53	52	-1
Utica	23	24	1
Williston	56	56	0
DJ-Niobrara	25	25	0
US Total:	1044	1057	13

*Source data from Baker Hughes North America Rig Count



Basin	5/2018	6/2018	Change
Anadarko	895	908	13
Appalachia	753	748	-5
Haynesville	180	182	2
Bakken	750	769	19
DJ	473	431	-42
Eagle Ford	1,495	1,537	42
Permian	3,204	3,368	164

*Source data from EIA Drilling Productivity Report