Hydraulic Fracturing: services & equipment

Richard Spears
Spears & Associates
Tulsa

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This Tulsa company and its affiliated data mining firm, Oilfield Logix, worked for 350 clients in 2017. With over 50 years of experience Spears & Associates provides business planning, analysis, activity forecasts and market research-based consulting services to the worldwide petroleum equipment and service industry.

THE SPEARS DIFFERENCE
John and Richard Spears lead the firm’s team of oilfield veterans and data analysts. Both brothers are former field engineers and operations managers for oilfield service companies. The brothers also hold board seats in privately held oilfield service companies active around the world, land and offshore. All four senior partners of the firm have decades of experience in drilling, completion and production products and services. Some of the firm’s 350 clients include Baker Hughes/GE, Halliburton, Saudi Aramco, ExxonMobil, Fidelity, Blackstone and H&P. The client breakdown is 57% OFS, 27% Financial, 11% Oil Co. and 5% Consultants.

REPORTS AND PUBLICATIONS
Spears publishes the following quarterly deep dive reports: Drilling & Production Outlook; Oilfield Market Report; Artificial Lift; Drill Bits; Directional Drilling; Cementing; Coiled Tubing; Completion Equipment; Hydraulic Fracturing; Proppant; Well Servicing; Water Management; Wireline.

BROADENING THEIR REACH
In addition to their paid services, Spears & Associates is also increasing their reach through free weekly podcasts. Weekly analysis, and an upcoming video series on YouTube.

<table>
<thead>
<tr>
<th>100k</th>
<th>5k-10k</th>
<th>2 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listens to weekly podcast The Drilldown</td>
<td>Readers of Spears &amp; Associates’ weekly Friday 300 word analytics report</td>
<td>Until the launch of their dedicated YouTube Channel</td>
</tr>
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</table>
Remember This Chart

Day 1 is the best day of a well’s life...each successive day is worse
Take-away #1

Because US wells decline rapidly, 16,000 wells must be drilled & frac’d each year to keep US oil output flat.
US new well drilling

New Wells Drilled Per Year

- **Horizontal**
- **Vertical**

<table>
<thead>
<tr>
<th>Year</th>
<th>Horizontal</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>24,000</td>
<td>21,000</td>
</tr>
<tr>
<td>2015</td>
<td>16,000</td>
<td>11,000</td>
</tr>
<tr>
<td>2016</td>
<td>9,000</td>
<td>5,000</td>
</tr>
<tr>
<td>2017</td>
<td>9,000</td>
<td>5,000</td>
</tr>
<tr>
<td>2018</td>
<td>9,000</td>
<td>5,000</td>
</tr>
</tbody>
</table>
Take-away #2

In 2017 and 2018 the US will drill enough horizontal wells to make oil production rise.
The 2018 environment

Drilling Rigs → New Wells → Resv Footage → Sand & Water

- 1000 Rigs
- 27,000 Wells
- 215 M Feet
- 115 M tons
Rail Shipments of Sand

Thousands of Tons

Q1 13  Q1 14  Q1 15  Q1 16  Q1 17

Spears & Associates
NoAm Oilfield Spending

<table>
<thead>
<tr>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2014</td>
<td>2015</td>
<td>2016</td>
<td>2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

MILLIONS
Domestic v. Intl Oilfield

NAM

Intnl

Millions

Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 2013 2014 2015 2016 2017
Take-away #3

Lack of international investment in new well drilling is causing foreign oil output to fall.
Take-away #4

Even if international oil companies decided today to ramp up drilling, first oil would be 5 years in the future.
From site to drilling to frac
Frac job ~1979

Frac job from 30 years ago...this is how China fracs today
Frac job 3 weeks ago

100-stage frac on 3 wells in the STACK
Infrastructure today
Big Trend: Long laterals

- <6000'
- 6000-8000
- Extended Reach

DrillingInfo
# Big Trend: Intensity

<table>
<thead>
<tr>
<th></th>
<th>1978</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to drill 1 well</td>
<td>60 days</td>
<td>15 days</td>
</tr>
<tr>
<td>Wells per pad</td>
<td>1</td>
<td>1 - 25</td>
</tr>
<tr>
<td>% horizontal</td>
<td>0%</td>
<td>75%</td>
</tr>
<tr>
<td>Days to frac 1 well</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Proppant per well</td>
<td>0.1 million lbs</td>
<td>14 million lbs</td>
</tr>
<tr>
<td>Cost in 2018 $</td>
<td>$3M</td>
<td>$6M</td>
</tr>
<tr>
<td>Frac % of total cost</td>
<td>10%</td>
<td>40%</td>
</tr>
</tbody>
</table>
Take-away #5

Frac jobs always grow in size and intensity.

This trend will continue.
Permian Frac Market

**Hydraulic Fracturing Market (Millions)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>$6,173</td>
</tr>
<tr>
<td>2015</td>
<td>$3,643</td>
</tr>
<tr>
<td>2016</td>
<td>$3,040</td>
</tr>
<tr>
<td>2017</td>
<td>$7,272</td>
</tr>
<tr>
<td>2018</td>
<td>$10,842</td>
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</table>

**2017 (Market Share)**

- HAL
- SLB
- Keane
- Liberty
- FTS
- BJ
- PTEN
- RPC/Cudd
- ProPetro
- CJES
- USWellSVs
- Calfrac
- SPN
- TUSK
- BAS
- QES
- ProSvs
- Others

Spear

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NoAm Frac HHP
Incremental Frac HHP

![Bar chart showing incremental frac HHP from 2006 to 2018.](image-url)
Frac Pricing is Flat

Hydraulic Fracturing Cost Index

Quarter to Quarter Price Change
Oilfield Markets (B)
NoAm New Well Metrics

- **New Wells Drilled**
- **Frac Stages Pumped**
- **Reservoir Footage Drilled (millions)**
- **Proppant Pumped (billions of lbs)**
Free to investors

Weekly Podcast

Weekly Analysis

New Video Series

Episode 48
How Did 2017 Turn Out for 5 Markets and 5 Companies?
We compare 2017 with 2016 to look at the change in revenue in five equipment and service markets and discuss how this impacted revenue growth for five "suckmother" oilfield service companies.

Stealth as She Goes
Our company measures oilfield equipment and service markets, with the flagship work being done in our quarterly Oilfield Market Report. The team just released its latest edition and here are the highlights:

First, the global oilfield is still growing. It is growing because US land is growing faster than international is falling, but any growth is good, right? The chart below plots the global oilfield equipment and service market's annual year to year change.