Flotek’s CnF Has Potential, But More Data, Lower Price Needed

Companies: BHI, CRR, ECL, FTK, HAL, SLB, TSE:CFW, WFT

April 11, 2014

Research Question:

Will Flotek’s CnF chemical become widely adopted by exploration and production companies to enhance the flow and recovery of hydrocarbons?

Summary of Findings

- Flotek Industries Inc.’s (FTK) Complex nano-Fluid Technology (CnF) product suite has the potential to gain substantial market share in the oil and gas exploration and production industry. Sources exhibited a high level of interest in any technology that could improve oil and gas recovery.

- Eighteen of 29 sources think CnF has the potential for widespread adoption if Flotek can prove the chemical’s hydrocarbon flow and recovery efficacy.

- Eleven of 23 sources with oil and gas activity in major U.S. formations have used CnF. Nine expect to continue using the product as it has improved their oil and gas recovery. Two others have found that CnF performed on par with other less costly products. One of these two was willing to try CnF again.

- Adoption and expanded use of CnF are expected to be driven by the large oil and gas companies, including Baker Hughes Inc. (BHI), Schlumberger Ltd. (SLB) and Halliburton Co. (HAL). Sources said if these companies believe in and get behind the product, they either will produce their own version and become a competitor or will contract with Flotek for their own brand of CnF. Schlumberger recently started buying CnF, and Halliburton already is a large CnF customer, according to comments made in Flotek’s 4Q14 earning call and two sources in this report.

- As it markets CnF to the various oil and gas plays, Flotek must include additional independent performance data to support its efficacy and ROI claims.

- Competition also is a factor. Sources expect well completion companies to claim that they have their own version of CnF or something just as good or better.

<table>
<thead>
<tr>
<th></th>
<th>Widespread Adoption of CnF</th>
<th>CnF Enhances Oil &amp; Gas Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>E&amp;P Companies</td>
<td>↑</td>
<td>↗</td>
</tr>
<tr>
<td>Well Completion Companies and Consultants</td>
<td>↑</td>
<td>↗</td>
</tr>
<tr>
<td>Industry Specialists</td>
<td>↓</td>
<td>↘</td>
</tr>
</tbody>
</table>

Silo Summaries

1) Exploration and Production Companies
Eleven of 14 sources from exploration and production (E&P) companies think CnF has the potential to gain widespread usage if additional third-party data supports Flotek’s claims. Seven of 14 have used CnF; five have had positive results and likely will continue using the product. Two sources said their results were no better than when other less costly products were used. Five of the seven non-CnF users were knowledgeable about the product. Interest in well improvement products is high, but no one magic product exists. Different chemical packages are required for different rock formations. The Bakken, Eagle Ford, Utica, Permian Basin, Woodford, Fayetteville, Barnett, Hayneville, Horn River Basin and Marcellus formations were all discussed as locations in which CnF use could enhance hydrocarbon flow and recovery. CnF’s high cost is an issue.

2) Well Completion Companies and Consultants
Four of nine sources have successfully used Flotek’s CnF. Of the five nonusers, three were familiar with the product. Six of the nine think widespread adoption of CnF is possible, one thinks it will be a niche product, and two did not comment. Five sources believe CnF improves hydrocarbon flow and recovery, but only one thinks it equals or exceeds Flotek’s claims for the chemical. Three others highly doubted Flotek’s assertions. One source did not comment except to say the market would be huge if third-party tests confirmed the claims. One source said a 15% recovery improvement makes CnF well worth using. Another said clients traditionally would ask to spend less for well services but now are requesting CnF and are willing to spend more. He added that competitors are scrambling to offer a similar product. CnF’s challenges include finding the right wells and shale plays, reaching smaller well services companies that usually are driven by low cost, and its high cost.

3) Industry Specialists
Four of six sources said widespread adoption across all shale plays is unlikely for Flotek’s CnF. Still, five reported significant interest in production enhancement solutions such as CnF. Flotek’s high productivity claims were questioned by all sources, indicating that additional data from the field is needed. In order for Flotek to expand the use of CnF, the company needs to provide competitive pricing and ensure adoption by the major service companies, including Halliburton, Schlumberger and Baker Hughes.
Flotek Industries Inc.’s CnF

Background

Flotek Industries’ Complex nano-Fluid, or CnF, is a chemical additive that helps streamline the recovery and flow of hydrocarbons and increase the profitability of wells. The compound is derived from organic sources and could have minimal environmental impact.

Blueshift Research’s review of industry publications and available research found that using CnF averages $200,000 per well—reportedly three to four times the cost of using conventional surfactants. Flotek claims CnF uses 20% to 40% less water and proppants, requires 20% to 40% less equipment at the well site, and reduces water and backflow waste. Flotek’s reported oil recovery rates are impressive; studies performed by Dr. Crafton showed 66% higher 30-day equivalent oil recovery, 76% higher 30-day recovery, 46% better fracture length and 133% improvement in the potential gross incremental value. Over a 20-year period this would equal a $2.4 million benefit.

Natural gas plants are a leading alternative to the coal-fired power plants that are being decommissioned in the United States, and have led to higher demand for hydraulic fracturing, or fracking. This coupled with recent news of shale wells not living up to estimated outputs leaves CnF well situated. Freeport McMoRan’s Exploration Unit already has seen a dramatic rise in productivity from using CnF in most of its wells in Colorado’s Niobrara Formation, and now uses it in Texas’ Eagle Ford Formation.

However, CnF cannot be deployed and utilized with maximum efficiency in all geographic areas. Also, Flotek faces considerable competition from other large industry players, such as Baker Hughes, Schlumberger, Halliburton, and Ecolab Inc.’s (ECL) Nalco and Champion Technologies. Flotek’s CnF line could fall by the wayside if a competitor were to develop a more widely usable, cost-effective compound. Already Carbo Ceramics Inc. (CRR) has witnessed widespread demand for its ceramic proppant, which significantly increases the efficiency of hydrocarbon extraction.

Blueshift’s March 11 Whisper found that CnF was improving the efficiency of hydrocarbon recovery through the fracking process for at least one early adopter. Sources said the chemical has the potential to reach a larger market as the demand for natural gas increases but that it faces competition from other national players and may be hampered by its geographical limitations.

Current Research

Blueshift Research assessed whether CnF will become widely adopted and can achieve Flotek’s efficacy and ROI claims. We employed our pattern mining approach to establish four independent silos, comprising 29 primary sources (including eight repeat sources) and three relevant secondary sources focused Flotek.

1) Exploration and production companies (14)  2) Well completion companies and consultants (9)  3) Industry specialists (6)  4) Secondary sources (3)

Next Steps

Blueshift Research will continue to monitor top well service companies’ adoption of CnF and their branding and promotion of the product. We also will check on third-party performance data and research and how they compare with Flotek’s lofty efficacy and ROI claims for CnF. Finally, we will research competitors’ alternatives to CnF and their performance results.
Flotek Industries Inc.’s CnF

Silos

1) Exploration and Production Companies
Eleven of 14 sources from exploration and production (E&P) companies think CnF has the potential to gain widespread usage if additional third-party data supports Flotek’s claims. Seven of 14 have used CnF; five have had positive results and likely will continue using the product. Two sources said their results were no better than when other less costly products were used. Five of the seven non-CnF users were knowledgeable about the product. Interest in well improvement products is high, but no one magic product exists. Different chemical packages are required for different rock formations. The Bakken, Eagle Ford, Utica, Permain Basin, Woodford, Fayetteville, Barnett, Hayneville, Horn River Basin and Marcellus formations were all discussed as locations in which CnF use could enhance hydrocarbon flow and recovery. CnF’s high cost is an issue.

KEY SILO FINDINGS
CnF’s Market Potential
- 11 of 14 think Flotek’s CnF has the potential for widespread usage.

CnF’s Efficacy and Cost-Effectiveness
- 7 of 14 have used CnF.
- 5 of the 7 were satisfied and will continue using CnF.
- 2 believe CnF’s performance was only equal to less costly, similar products.

Competitive Challenges and Headwinds
- 11 said additional third-party data is needed to support Flotek’s efficacy and ROI claims.
- 8 think the high price of CnF will challenge adoption.

Miscellaneous
- Interest in flow and recovery enhancement products is high.
- Large E&P and well service companies will drive adoption. Small companies will wait until products like CnF are requested or become the standard.
- 1 source said Flotek’s CnF is a best-in-class product.

1. Texas-based technical advisor for a large independent oil and gas company; repeat source
After using CnF in numerous wells, this source believes the chemical could become widely adopted. However, Flotek will have to reduce the cost and will need further research to confirm the chemical’s benefits. The evaluation process is very complicated because of differences in wells and areas, and six months to a year could pass before the benefits are realized. CnF had positive results, though not the ones Flotek has claimed. The source will continue to evaluate data with and without the additive.

CnF’s Market Potential
- “Their projection of 20% market share in two years may be possible. If they’re able to move the cost down with volume and we see some benefit, sure. The cost-benefit ratio is always important. If there’s definitely a benefit, you’ll see an increase in use. If it’s hard to see a quantitative benefit in a reasonable amount of time, then you won’t.”

CnF’s Efficacy and Cost-Effectiveness
- “The evaluation of these materials [like CnF] is an ongoing process. Just because the material works in one area doesn’t mean it will work in other areas. How the material functions depends if it’s used in oil-prone areas or gas-prone areas.”
- “Where we’ve utilized it in an area in the past, we’ve gone away from using it for a period of time to evaluate what the results might be without it, and now we’re looking at those results to see if we want to go back to it.”

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Texas-based Technical Advisor
Large Independent Oil & Gas Company
Flotek Industries Inc.’s CnF

- “We don’t have the answer as to whether CnF is doing what it claims it can do. There are a lot of different evaluations that need to take place to determine that.”
- “Right now we’re not using it, but we’re considering some of the implications where we could benefit.”
- “We’ve used [CNF] in different applications on and off for the past three years, in different areas. It’s been a little bit of a difficult evaluation, mostly because of the cost of the product.”
- “My personal opinion about the results we’ve been getting is that there are some positive ones. I’m not sure if the reservoir people and others all agree.”
- “It’s hard to name an ideal ROI. We’re trying to produce more oil and gas, so if it benefits that, regardless of the material, we will consider it.”
- “ROI can’t be quantified on something like this. There are many things to be done with these materials. Do we have the right volume optimized yet, the right amount?”

**Competitive Challenges and Headwinds**
- “Flotek’s CnF does not have any competitors that are on their level. Flotek purchased **Florida Chemical** as their primary manufacturer of the base product that goes into it. They have the manufacturing advantage.”
- “It’s not that CnF cannot be used in all the shale plays; it’s just that all the benefits may not be there. Primarily, the benefits seem to be in the oil-prone shale plays. In the gas-prone ones, it’s a little different.”

**Miscellaneous**
- N/A

### 2. Vice president overseeing operations for a small, private E&P company

This company is actively completing wells using CnF in the Niobrara Formation. The service provider has confirmed the use of CnF in more than 50% of the wells completed in the play. The source believes in CnF but was unsure what percentage of increased production could be attributed to the product. Controlled testing will be needed to verify the results.

**CnF’s Market Potential**
- “Obviously, the products that are working and providing good results will flourish in the current market. The liquid-rich plays like these here in the Niobrara will continue to provide growth opportunity.”

**CnF’s Efficacy and Cost-Effectiveness**
- “I believe this is one of the products in use in our completions. We use [CalFrac](https://www.CalFracServices.com) to complete our wells, and they make most of our completion suggestions right now and seem to be getting great results.”
- “We are very satisfied with our current production results. I am sure we will have to have additional testing to verify which of the products our completions team is using that is most to credit for the good results.”

**Competitive Challenges and Headwinds**
- “I am sure that there will be plenty of competition among the service providers as they all test competing products.”
- “It basically will come down to results that are verifiable, setting up the appropriate tests to verify the production cause and effect.”

**Miscellaneous**
- N/A

### 3. South Texas operator; repeat source

Flotek’s CnF is becoming more widely adopted by E&P companies because users are seeing positive results. This source has used the product for eight or nine months and noted that it is outperforming conventional surfactants. He has observed slightly faster and increased load water recovery, which in turn appears to be enhancing hydrocarbon production. CnF costs four times the price of a conventional surfactant, which is a major issue. Although CnF works well in low-permeability rock, primarily shale, it may not work as well in other rock formations.

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VP of Operations
Small, Private E&P Company
Flotek Industries Inc.’s CnF

CnF’s Market Potential
- “It’s hard to say if they really will have a market share of 20% in two years. It depends on how the rest of the industry is responding to it. It’s a big jump from 3% to 5%, to 20%. But I wouldn’t be surprised to see broader usage of the product than its use today, as soon as operators start using it. If they watch it closely, I think they’ll see improvements.”
- “It’s designed for low-permeability rock, primarily shale applications, so as long as we’re in shale we’ll use it. If we go into other properties that are not shale, we probably won’t use it. It depends on the type of rock we’re in.
- “We’re talking to other service companies about designing surfactant packages for the types of formation that we’re in. CnF isn’t the kind of product I would use in every case or in every well, for every formation, but in low permeability shale it’s a good place to start. As I go to a different rock, I’m going to start looking more carefully at the surfactant packages that I choose and try to tailor them to the rock.”
- “[CnF] is not a cure-all. It does not work in every case. We saw, depending on where we are in the field, that conventional surfactants can perform equally as well. ... But in most cases we saw that it was the preferred product.”

CnF’s Efficacy and Cost-Effectiveness
- “We’ve been using Flotek’s CnF for about eight or nine months. We’ve used it in a little less than 50 wells. It is outperforming conventional surfactants.”
- “The load water recovery is a little faster, and we get more volume back—not significantly more but a little more that is noticeable. These wells typically don’t return much of the load water. About 10% to 20% at most of the load water actually comes back, and we’re seeing more of that water is coming back when we use this product.”
- “The cost is a big issue. It’s about four times what a conventional surfactant costs. But of course the results we’re getting for now make up for it.”

Competitive Challenges and Headwinds
- “All the companies are competing in this area. There’s Schlumberger, Halliburton, Baker and a myriad of chemical supply companies that have these different products. All the service companies have at least a surfactant, water-surface tension reduction or a nonemulsifying product. The CnF nanofluid is a little more specialized, and it’s becoming more popular and known to the industry. And more chemical suppliers are providing them. It’s not exclusive to Flotek by any means. There are similar formulations, but they are not exactly the same.”

Miscellaneous
- “I have not heard about CnF 2.0.”

4. Petroleum engineer and advisor to an E&P company with a position in the Permian Basin

This veteran engineer predicted widespread adoption of Flotek’s CnF in certain shale plays within three years. CnF can improve recovery in both oil and shale plays, but is best suited to liquid-rich and tight formations seen in the Bakken, Eagle Ford, Utica and Permian Basin formations. The source has seen CnF successfully used in lab tests and in the field. He continues to recommend the Flotek chemical to his E&P company, which has done lab tests but has delayed field use because of cost. He described CnF as “best in class” and as a technology that consistently improves recovery and ROI, although he could not provide actual numbers.

CnF’s Market Potential
- “Within three years we will start to see wider adoption. But the pace depends on the field trials. You need more than testing and success in one or two wells. Flotek has to be able to define where the chemical works and how it works. As long as the chemical does what it needs to do and what it is said to, Flotek will achieve wider adoption in certain segments of the industry. Their long-term business outlook is positive.”
- “The questions are, who will use [CnF] and what markets can [Flotek] find? Right now the smaller companies are slow to adopt it. The overall market for Within three years we will start to see wider adoption. ... Flotek has to be able to define where the chemical works and how it works. As long as the chemical does what it needs to do and what it is said to, Flotek will achieve wider adoption in certain segments of the industry.

Petroleum Engineer & Advisor
E&P Company
Flotek Industries Inc.’s CnF

chemicals is good. Flotek is already one of the widely used product suppliers and providing a number of chemicals to the big guys like Halliburton, Schlumberger, Baker Hughes, Weatherford (International Ltd. /WFT). And they typically run their own chemicals with some made for them by Flotek but under different brands. As the chemicals become more publicly available, we will see wider usage.”

- “There are roughly five big vendors that do 40% to 50% of the frac jobs in the U.S. Many of them will use their own chemicals or develop a private label with Flotek, but they don’t sell it to the outside or identify it as a Flotek compound. Then there are another 40 to 50 smaller companies at the second- and third-tier level that do the rest of the fracking. Hardly any of them will use their own chemicals or have Flotek develop one specifically for them. That is where the market is, and that is Flotek’s outlet to the rest of the industry. They will not do their own chemical work but will buy from Flotek.”

- “As for widespread adoption, looking at the 40% of the market that is dominated by the smaller companies, consider this: In the U.S. we will drill 25,000 to 30,000 wells this year, and there are 25 to 30 fracture treatments per well. Even if you use it on a small percentage of preflush or postflush, it would pay for itself in short order. It’s just a matter of patience, finding the correct formulation for each situation. It did receive honorable mention for the 2013 Meritorious Awards for Engineering Innovation, so it is getting recognized.”

- “CnF can be used anywhere and in both conventional and unconventional wells. And of course most of the unconventional wells will ultimately become conventional wells. Fields that are best suited are the liquid-rich shales and the tight oil formations. The Bakken, Eagle Ford, Utica and Permian Basin are in that category.”

- “The primary target right now is anywhere there is oil. Oil is where the market is because of the price of gas. But it can be used in both oil and gas. The focus now is in improving recovery on the oil side.”

- “For gas, [CnF is best for] shale such as the Horn River Basin [Canada] and the Marcellus, and it could have been used in the Barnett. The Marcellus has a distinct advantage because it is closer to the market. Marcellus is within 200 miles of the biggest U.S. market for gas.”

- “As for liquid shale [oil], they can recover only about 5% of the wells in play, so everyone is interested in different technologies.”

- “I have been in the industry for decades, and typically there is a lot of euphoria over products in the development phase. Trying to find a market is what we call ‘the valley of death.’”

CnF's Efficacy and Cost-Effectiveness

- “I’ve watched the product as they developed it, and I have seen it used in field tests. I have seen the field test results. While I can’t quote numbers, it’s one of the best, if not the best in its class, out there. If they are able to manage the cost, it should be widely adopted.”

- “Flotek has done core tests for the company [I advise] at the Flotek lab with rocks from wells in the region. I have not convinced our company to use it yet because they frac in certain fields and have decided it’s still too expensive. … I’m still trying to get people to look at it [for field use] but have not yet been successful.”

- “It is difficult to assess return on investment. There is still a limited amount of data on how the chemical will perform in different wells and plays. The main thing I can say is, every time I know of that [CnF] has been used we have seen improved recovery and returns. I can’t quantify it, but when it is used we see better flow rates.”

- “I have not put the ROI in the form you mentioned [$2.4 million per well over 20 years]. What I do know is that when operators use it, it pays for itself and improves oil production within weeks.”

Competitive Challenges and Headwinds

- “It is one of the higher-priced approaches to hydrocarbon recovery, but it is certainly not the highest-priced chemical.”

- “Competition is limited because a number of the big chemical suppliers have been gobbled up by the major service vendors. They have been gobbled up by the Big 5 to get the patents. With other big chemical suppliers, you just tell them what you want and they will make it for you. But very few have the ability to develop a product, make it and then ready it for sale. That is an advantage for Flotek. It is rare to see a company like Flotek that has not been acquired. I don’t think they want to be acquired. They are still in the building phase, and they have other new products in development that would replace xylene. They do have organics like lemon oil, which stems from closing the deal with Florida Chemical.”
Flotek Industries Inc.’s CnF

- “Reverse engineering means you see a product work and then develop your own chemical. Machines and mechanized products can be reverse, but it’s not as easy or simple with chemicals.”

Miscellaneous
- N/A

5. Petroleum engineer within completions for a small oil and gas company in the Powder River Basin

This source has used Flotek’s CnF on the past 10 wells. He first heard of the product through a presentation made by an SPE Distinguished Lecturer. He then decided to include CnF as part of his completions “recipe” on the Powder River wells. Completions were proving successful even before he tweaked his recipe. His last 10 wells have had even better production, but he is not yet prepared to credit that to any one factor because he changed several things at once. Since he is still in a leasehold phase of drilling one well per pad to hold acreage, he is not yet ready to run two wells in the same geological area for direct comparisons with and without the single product.

CnF’s Market Potential
- “Once there are controlled use data available from our production or another unbiased third party to verify the kind of gains in production being touted, the market potential can get huge. That kind of growth in use will be tempered until the empirical data is available.”
- “Another factor that may influence the market potential is the time required to analyze this product against direct competitors.”

CnF’s Efficacy and Cost-Effectiveness
- “I have used the product for the past 10 wells and will continue to do so. I won’t be able to run some comparative analysis on production with and without the product until we enter the multi-well buildout phase. At that point I can get very granular in how I quantify the cost-effectiveness of the specific CnF product.”
- “We are happy enough with our results to continue to utilize the product, and believe our results will prove out the efficacy of the product.”

Competitive Challenges and Headwinds
- “There are lots of choices and products that need to be compared. Every service provider will have their own library of products they use and will be tried before they make a switch to the Flotek product. Competition will be fierce.”
- “Getting a larger producer in the manufacturing phase and utilizing multi-well pads so that similar geology is in the test group to run a controlled test on the product are essential. Right now when a particular well gets great results, every player—from the pressure pumping company to the frac fluids providers to the completions engineer himself—is trying to take credit for the great result.”

Miscellaneous
- N/A

6. Lead technical advisor working in the Bakken region; repeat source

CnF could become widely adopted if the price drops. This company does not use CnF, but the source was familiar with the product. Flotek’s claims of significant improvements do not seem to take into account recent changes in fracturing technology, which involve doing multiple but smaller fracs that have improved productivity already by 25% to 30%. A similar product package already can be created with a variety of chemicals, which is what many companies do to keep prices lower. Also, not all packages work in every shale basin, so ingredient ratios often have to be tailored.

CnF’s Market Potential
- “Flotek’s CnF could become widely adopted if they would drop the price. Price is always a driver, especially if you’re getting results.”

CnF’s Efficacy and Cost-Effectiveness
Flotek Industries Inc.’s CnF

- “If CnF’s price is too high, I wouldn’t consider using it. I would use a combination of other chemicals that would post similar results.”
- “You can have significant gains [as Flotek claims], but some of that is shrouded in the fact that we’ve been doing our perforating in a totally different way in the last three years. In conjunction with the new way of doing multiple but smaller fracs, there is also a change of technology. Some of those benefits do not just accrue to CnF but to the fact that we’ve changed the way we perforate. You expose more rock area to depletion than what you did with the old technique. To claim that so much improvement is due to the CnF product is a stretch. We probably pick up a good 25% to 30% improvement in productivity for the equivalent length of lateral with the new fracturing technology.”
- “Shale is tight to start out with. We’re developing a marginal reservoir, where the permeability characteristics are very low. If you can visualize a sponge where it just oozes out of the sponge, this is our type of rock here. You have to expose a lot larger area in order to get the volume.”
- “It’s very common to use wetting agents. The citrus [in CnF] is primarily for sludge control. Basically, the citric acid is the active ingredient in it. It acts like a chelant. And a chelant is something that will lock up an ion to prevent it from forming a compound. The citric acid latches it up in its matrix so it is not chemically reactive. ... Iron is your main troublemaker. The citric acid wraps around the iron ion and then allows it to transport back out, with the produced fluids preventing it from forming a sludge.
- “The purpose of the citric acid is to prevent damaging. We use it all the time when we run hydrochloric acid. It’s nonemulsifying iron control. Basically, the citric acid prevents the sludge formation from the reaction of the byproducts of the acid reaction.”

**Competitive Challenges and Headwinds**
- “Competitors have something very similar [to CnF], but you’d have to mix several chemicals in order to get the job done and get the same effect. Flotek has figured out what they think is the right ratio for their package. But it may or may not be the right ratio for different shale basins. It’s never a one-size-fits-all.”
- “We’ll sometimes pick and choose what goes into our packages and tailor the chemicals to the shale we’re working on.”
- “No two shale basins are the same. They’re all completely different in the way they stimulate, and in everything else.”
- “[CnF] could easily be reverse-engineered.”

**Miscellaneous**
- N/A

7. Well completion manager for a large independent oil and gas company with operations in most U.S. plays

After a trial and internal analysis of data, CnF was not found to deliver Flotek’s promised results. Flotek’s claims were helped by a simplistic analysis of data; it tended to show favorable studies when trying to sell its products and makes normalizations to come to its conclusion. Internal analyses are more rigorous with variables and additional data. Still, this source has not ruled out the use of CnF under different circumstances, and is continuing discussions with Flotek.

**CnF’s Market Potential**
- “We still have a few lingering questions about Flotek’s CnF and haven’t 100% excluded pumping it. At this point we are not planning to use it, but it’s not a deal no. We’re continuing to look at data. We use some of Flotek’s other products in other areas.”
- “We found that [Flotek] tends to show very favorable studies to make their claims. For their analyses, the data they use is very basic and simplistic, and that can lead to conclusions that are misleading or not completely accurate.”

**CnF’s Efficacy and Cost-Effectiveness**
- “Flotek presented us with a lot of impressive data projections and simulations about their CnF additive, but we were skeptical. They said their additive would make big changes in production. So we did a trial. They analyzed our results after pumping CnF, and then we did an internal analysis, but our analysis did not show the same findings. They found
their product improved the wells, and we found the results weren’t because of their product but because of other factors that they didn’t consider in their analysis.”

- “We cannot see a difference in production results when pumping CnF into our wells.”
- “Flotek’s analysis of our basic data found that poor performing wells improved to the quality of regular wells. Our internal review and analysis, with variations and additional data, did not find that. We concluded that the wells were equal and there were other factors involved for why the wells performed as they did.”

**Competitive Challenges and Headwinds**

- “Their claims are always very impressive, but they’re based on simple data. They make normalizations to come to their conclusions. When you take other data into account, you don’t get the same results.”

**Miscellaneous**

- N/A

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**8. Manager of a global E&P fracturing company with a presence in Texas, OK and PA; repeat source**

This company has tried Flotek’s CnF chemical, which worked well but no better than a comparable in-house product. The source doubted Flotek’s projections for improved recovery, ROI and market share growth, but conceded the product is still in an early testing phase. With comparable products on the market, CnF likely will not see widespread adoption. The product is best suited for shale gas plays in Texas and shale oil plays in the Bakken.

**CnF’s Efficacy and Cost-Effectiveness**

- “I believe we have used Flotek’s CnF on a number of wells, and we also have our own competitive products that are not made by Flotek.”
- “Our engineers have said lab tests show [CnF] performs well, but so did our product. They considered it a tie.”
- “I don’t believe [Flotek’s] claims for increased production and ROI are warranted. I don’t think they will get 20% market share in two years because there are already other products out there.”
- “The [Flotek] product works well, but it has not yet proven itself to be a game changer. It is still in the early adoption and testing phases, making it hard to predict adoption rates.”
- “I personally don’t think Flotek’s CnF will be widely adopted. Companies that are more interested in technology may adopt it more readily because they have the ability, but I don’t see it being used in every frac or in every shale play.”
- “I don’t believe we have seen materials results on our side of things yet. I know from our engineers that we have shared lab tests with customers, but I am not aware of any published data. We usually wait for the results to get into the public domain before talking about it.”

**CnF’s Market Potential**

- “It is not something our customers are asking for at this time.”
- “Our engineers have told me the guys at CESI [Flotek] are actively disseminating information collected from public databases [like] FracFocus and Railroad Commission showing the use and benefit of their CnFs.”
- “As far as [Flotek] CESI’s ability to grow their market share, our engineers said to look at past performance and what they did with GasPerm 1000 [which Flotek developed for Halliburton]. I don’t know the market share, but they did a great job of selling the performance [of GasPerm] to customers so that customers requested the product.”
- “There are some other companies out there using the product, but most want to wait and see what results Flotek gets in different plays and over time. Right now they are selling it themselves, rather than having the product sell itself.”
- “If and when the large companies start to hear from their customers who work their well services, things could start to turn around and you could see people saying they need [CnF]. But that’s also when the Flotek name disappears...”

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**Manager**

Global E&P Fracturing Company

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I don't believe [Flotek's] claims for increased production and ROI are warranted. I don't think they will get 20% market share in two years because there are already other products out there. ... If and when the large companies start to hear from their customers who work their well services, things could start to turn around and you could see people saying they need [CnF]. But that's also when the Flotek name disappears...
Flotek Industries Inc.’s CnF

and the large companies rebrand the product as their own. We actually sell the product now, but it has our name on it.”

- “Their product works best in shale gas plays. I would imagine it’s suited to Woodford, Fayetteville, Barnett and Hayneville. It would work best in dry gas where water is inhibited by the flow of gas. It may also do well for liquid in the Bakken and Marcellus, which is gas but gas that is close to many markets.”
- “It also might be well suited for use in old wells. There is still a lot of follow-up work to be done on older wells that were not fully completed and perhaps they could go in with the product and economically recomplete these wells.”

Competitive Challenges and Headwinds

- “I’m sure there are competitive products out there. Enersciences LLC’s Chem Rock Technologies has one that I am aware of. I’m sure there are others.”
- “The biggest problem companies face with a new product is getting people to believe it does what you say it does. You have to be able to demonstrate its efficacy across the board in dry gas areas and show success where it has been used. Overcoming that hurdle is the first step in moving adoption forward. And then if you also claim that it improves recovery and ROI in oil shale, you have to overcome the problem of getting people to believe that.”

Miscellaneous

- N/A

9. Vice president of completions for a small oil and gas company working in the Utica and Marcellus shale plays

This source has not used Flotek’s CnF, but has used similar products. Proving efficacy and cost-effectiveness in the field is very hard and is the reason CnF may be relegated to a niche product. When completing wells, cost is a major concern; adding any additional expense like CnF is a tough sell. Engineers understand how a product like CnF is supposed to work and the improvement it is supposed to provide, but proving that CnF has made the difference is difficult. If a larger company with the resources to try CnF on a large number of wells has success, the product could take off.

CnF’s Market Potential

- “I think the cost and lack of strong field data will render CnF to niche product status. That said, if a large company gets behind it with lots of wells that experience improved performance, word of mouth will cause increased usage.”
- “Smaller companies like mine will lag behind in the adoption of new products like CnF.”
- “Shall plays with marginal economics are not going to be primary adopters of a product that is going to add to the overall cost of the wells.”
- “Flotek is a good company; I know some of the team there, and they are good folks.”

CnF’s Efficacy and Cost-Effectiveness

- “I have not used CnF, but we know what it is supposed to do, and it is very hard to prove in the field. Even with testing on a large number of wells, it is hard to prove that any satisfactory results are the result of the CnF or any other similar product.”
- “It is very hard to cost-justify an added expense like CnF to management. I could choose expensive resin-coated proppants or other materials, but then the question is always is it worth the added expense.”

Competitive Challenges and Headwinds

- “Everybody has some kind of a surfactant product to roll out to the completion companies—maybe Nalco, their main competitor.”
- “Cost and provable improved results are the biggest deterrent to adoption.”

Miscellaneous

- “One nice thing about using a product like CnF is it make the well head smell really great.”
10. Completions engineer for a major oil and gas production company in the Bakken Formation

This source was not familiar with Flotek or CnF, but was very interested once he learned of the product. He said he plans to inquire about his pressure pumping service provider’s knowledge of CnF. He has used various other recommended products on previous completions.

CnF’s Market Potential
- “With the increase in production and production budgets—not only here in Bakken but in all the liquid-rich plays—the potential for this type of product is huge.”
- “Everyone has been watching for the promises of nanotechnology to become confirmed by actual numbers on the ground.”
- “The cost of completions is already high, so a product really has to prove itself to be of great value.”

CnF’s Efficacy and Cost-Effectiveness
- “Even though I am not currently aware of this specific product, I am aware of the surfactants and their value in the oil plays. We have used several competing products I am sure.”
- “If the results can be proven, this product will grow in demand rapidly. At today’s price, increased production and improved ROI are everything.”

Competitive Challenges and Headwinds
- “Every one of the providers in this vertical has their own proprietary blends. The competition will be fierce for market share.”
- “Structuring a way to identify a single product that is responsible for good completion results will not be a simple task.”

Miscellaneous
- N/A

If the results can be proven, this product will grow in demand rapidly. At today’s price, increased production and improved ROI are everything.

Completions Engineer
Major Oil & Gas Production Company

11. Senior operations engineer; repeat source

This source likely will not ever use CnF because he disagrees with trying to recover load in an oil well. After water is pumped into an oil well, it is absorbed by the rock, swaps places with the oil and the oil is recovered. The water is needed. CnF’s process is more relevant to gas wells. Generally, results such as those claimed by Flotek are rarely as “clear-cut” because every well is different and reacts differently to surfactants. Also, desired ROI is hard to calculate. Sometimes surfactants can be harmful to the production. He plans to run tests on surfactants but has not yet decided which ones.

CnF’s Market Potential
- “Engineers are pretty skeptical by nature and somewhat distrustful. You’ve got to prove it to me. You’ve got to show me.”

CnF’s Efficacy and Cost-Effectiveness
- “Results are rarely as clear-cut as [Flotek’s claims]. Because every well is different when adding a surfactant. It’s hard to know exactly which knob you’re turning that gives you the results.”
- “We use some surfactants, and there is some work to be done to study that further. But I disagree on [Flotek’s] philosophical approach on wanting to recover load.”
- “It’s hard to quantify the ROI we expect when we will use a surfactant. If it works, it’s well worth the cost. But if it doesn’t work or is actually harmful to what you’re trying to do, that’s money that’s very poorly spent.”

Competitive Challenges and Headwinds
- “It’s not just the shale plays that are different, but every well is different. You’re going to get different results from every well.”
- “There are many companies in this field. Everybody is looking for that secret sauce. It’s really hard to determine and if you do have it, somebody will always come along and try to make you do something different. Everybody wants a magic elixir.”
12. Area manager for a top-10 Permian Basin oil and gas E&P company

This source was not familiar with CnF, but has used similar products. If Flotek’s claims can be proved by third-party research, the source would authorize the use of CnF.

**CnF’s Market Potential**
- “Market potential will be huge for those products that prove to be most effective in increasing production.”
- “My company certainly won’t be alone in the expanding use of this or other products that prove to be effective ways to sustain better production from our wells.”

**CnF’s Efficacy and Cost-Effectiveness**
- “Like every other producer out here, we are always searching for the best way to maximize our production. If these kind of results mentioned in the promotions are achievable, then the costs of the product would be justifiable. Data to support those kinds of results would be essential to the authorization to increase the cost of completions.

**Competitive Challenges and Headwinds**
- “Of course, winning the information battle is a great challenge—getting the results, then proving the results, and then getting the information out in the midst of all the competing products. It may take some time to make major inroads and capture large market share.”

Miscellaneous
- N/A

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13. Sales manager for completions at a top-tier oil and gas service company

This source has not used Flotek’s CnF, but has used similar products. CnF and other nanofluids have a way to go before they are a proven technology and before their costs can be justified. The source would be interested in seeing third-party researchers’ data on the efficacy of the newer nanofluids.

**CnF’s Market Potential**
- “Since there has been continuing expansion of horizontal drilling and fracking completions throughout all the oily plays, the potential for this and other products like it is huge if results continue to drive demand.”
- “The Big 3 companies ... will use proprietary or third-party products like Flotek as needed to satisfy the client. Certainly if ... clients request this product and their results justify the use of the product, the use of this particular product will grow accordingly.”
- “I don’t think the hope to capture 20% market share in two years is realistic.”

**CnF’s Efficacy and Cost-Effectiveness**
- “I have not used CnF, but I am very familiar with similar products that we have in our library of available tools for completion. The costs of nanofluids will make the necessity of rock-solid data paramount before they capture a large market share. However, if the kinds of results that are proposed by Flotek do prove out, there is tremendous opportunity.”

Miscellaneous
- N/A
Flotek do prove out, there is tremendous opportunity.

**Competitive Challenges and Headwinds**
- "Each of the pressure pumping service providers will have competing products that will vie for that favored status with our own clients. The competition to prove results and capture market share will be fierce.

**Miscellaneous**
- N/A

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**14. Completions engineer for a midtier oil and gas company producer in Eagle Ford**

This source was not familiar with Flotek or CnF, but has used surfactants and other fracking chemicals. He has mostly used Baker Hughes for completions in the play and believes Baker uses its own version of surfactants. A new product with proven and improved results would be of interest.

**CnF’s Efficacy and Cost-Effectiveness**
- “I am personally not aware of this product, but have been familiar with surfactants in general. Obviously, this product and its claims have piqued my curiosity. Provable results will be of big interest.”
- “We don’t need to throw expensive options out there unless they have proven results in similar wells. However, there are plenty of people searching for products that increase production. The potential could be huge.”

**CnF’s Market Potential**
- “Word spreads quickly when something is working in a given play. If this product gets anywhere close to the results they are claiming, you will see the news spread like wildfire.”
- “As a few big players catch on and believe in a product, it can catch on fire and ramp up rapidly.”

**Competitive Challenges and Headwinds**
- “Most likely this product will be a tough competitor for all the proprietary blends owned by the service companies themselves.”
- “Finding a way to prove production results will be the greatest challenge.”

**Miscellaneous**
- N/A

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**2) Well Completion Companies and Consultants**

Four of nine sources have successfully used Flotek’s CnF. Of the five nonusers, three were familiar with the product. Six of the nine think widespread adoption of CnF is possible, one thinks it will be a niche product, and two did not comment. Five sources believe CnF improves hydrocarbon flow and recovery, but only one thinks it equals or exceeds Flotek’s claims for the chemical. Three others highly doubted Flotek’s assertions. One source did not comment except to say the market would be huge if third-party tests confirmed the claims. One source said a 15% recovery improvement makes CnF well worth using. Another said clients traditionally would ask to spend less for well services but now are requesting CnF and are willing to spend more. He added that competitors are scrambling to offer a similar product. CnF’s challenges include finding the right wells and shale plays, reaching smaller well services companies that usually are driven by low cost, and its high cost. Shale plays where sources have had or expect positive results with CnF include the Bakken, Powder River, Eagle Ford, Niobrara, D-J Basin and Utica formations. One source does not expect widespread adoption in the Barnett and Niobrara plays. Some interesting one-off comments included the expectation for CnF to work best in low-pressure gas wells, the belief that demand is consuming all of the available citrus oil available from Florida Chemical, and Flotek’s additional supply purchases from outside the United States. One source who was not knowledgeable about CnF said he could be using it and not know it because companies often do not disclose the contents of their downhole packages.
Flotek Industries Inc.’s CnF

KEY SILO FINDINGS
CnF’s Efficacy and Cost-Effectiveness
- 4 of 9 have successfully used Flotek’s CnF in the Bakken to the Powder River Basin, Eagle Ford, Niobrara, D-J Basin and Utica.
- 5 sources think CnF improves hydrocarbon flow and recovery, but only 1 thinks it equals or exceeds Flotek’s claims.
- 3 are suspicious of the company’s claims for improved well efficiency and ROI.

CnF’s Market Potential
- 6 of 9 think widespread adoption of CnF will take place, 1 thinks it will be a niche product, and 2 did not comment.

Competitive Challenges and Headwinds
- 3 commented on CnF’s high cost as a challenge to adoption.
- Reaching smaller well service companies and operators focused only on cost will be challenging.

Miscellaneous
- Flotek is said to have demand equal to the total available raw material produced by Florida Chemical. The company is sourcing supply outside of the U.S. to meet demand.

1. Fracture treatment engineer/consultant in the North Central shale basins; repeat source

This source has considerable experience with Flotek and CnF technologies, having used it in hundreds of wells in North Dakota and Wyoming. CnF products are being used in at least 70% of the wells in the region, and are being offered by dominant companies like Halliburton, Schlumberger and Baker Hughes as their own products but manufactured by Flotek. CnF has gained market share, has the potential for additional adoption and works well when correctly mixed and applied. The source has not seen the kind of success claimed by Flotek but said returns still are worthwhile. The technology is better suited for gas wells, especially low-pressure gas wells. The Barnett and Niobrara plays are not likely to see widespread adoption of CnF. Its use in other shale plays will depend on how well results hold and how well Flotek markets the chemical.

CnF’s Market Potential
- “I do see Flotek gaining market share in our area because more and more companies are using this type of chemical, especially the contact angle modifiers.”
- “They will do better when the gas market picks up again. That’s when they will see growth because that is where the Flotek CnF shines. You can turn around a well and clean it up better for shale gas.”
- “The big guys are easier to convince because they can afford to pay and they are not using a product solely on a cost basis. With everyone else, I see hurdles. They may be able to convince them to try it and sell the stuff to them, but if it is not properly used and they get bad results, no one will buy it again.”
- “The biggest violators of the application problem are with the smaller companies. They will promote that they have the ability to use nanofluids and buy the stuff to have in the warehouse. They often pump the product down the hole, and it doesn’t work because they cut corners by running too little for it to function properly. Flotek has to figure out a way to penetrate this other segment of the market and then sell the product to and convince the second-, third- and fourth-string companies to use it, and use it properly.”
- “I have used the nanofluid technology for years in shallow gas reservoirs. Some of the nanofluids are being marketed today as contact angle modifiers.”
- “Flotek is basically ‘boutiquing’ CnF for the big guys. Functionally, the boutique product is not a heck of a lot different from the Flotek brand. But there are little changes, and that means Halliburton or Schlumberger can show their customers the MSDS, demonstrating that it is not exactly the same. The big guys don’t want to say, ‘We carry Flotek products’; they want to show they have something like it.”

Flotek is basically ‘boutiquing’ CnF for the big guys. Functionally, the boutique product is not a heck of a lot different from the Flotek brand. But there are little changes, and that means Halliburton or Schlumberger can show their customers the MSDS, demonstrating that it is not exactly the same. The big guys don’t want to say, ‘We carry Flotek products’; they want to show they have something like it.

Fracture Treatment Engineer & Consultant, North Central Shale Basins
“Some of the bigger guys do market [CnF] directly to the smaller oil companies, but when I say they sell it, I mean they try to justify passing it off as their own. But Flotek dominates most of the sales and does not seem to mind whether it’s marketed as a Flotek brand, because when the big guys sell it for them, they have that much more out there.”

“I would say up in our area in the Bakken, we have less shale gas and more shale oil, so the product makes less of a difference in these types of reservoirs. We are blessed up here with high pore pressure and not a lot of water blockage issues. In Wyoming and Colorado you could potentially see better performance differences due to more prevalent gas production.”

“The area I work is the Bakken in North Dakota down to the Powder River Basin in Wyoming. [CnF] is already pretty widely adopted. It is used in about 70% to 80% of the wells. But those plays are dominated by the big companies.”

“I suspect it will not be as widely used or adopted in some of the lower-dollar plays like the Barnett or the Niobrara in Colorado. It’s not that there is no application for it in those areas; they are just lower cost, and there is more competition. It would do better in a smaller market with less competition.”

“The technology is getting out there. If you were in an area where there weren’t any of the big guys, then there would be some direct market potential. It can be very effective to have the big service companies on board and use them as a reference base.”

CnF’s Efficacy and Cost-Effectiveness

“I am very familiar with the Flotek CESI CnF products. I have used them a number of times, usually as a resale product through a fracturing company. They actually make the product for direct sale, and they make variations of the product for Halliburton, Schlumberger and Baker Hughes that are not that different from one another, except for the solvent used. They might use lemon oil or orange oil or pine oil.”

“I don’t think I have seen actual numbers that match what you have described, but either way I have seen better frac fluid recovery. I am always cautious if I see better numbers for one product or another on results for oil or gas recovery, because from an engineer’s point of view, what the company claims the product does is exactly what it should do. I have not seen numbers in the 66% or higher range, but the efficacy of a CnF always depends on the well. ... But even if it gives you a 15% better result, that kind of improvement is worth it.”

“I would say I have used it on a hundred wells in our area. It can be a very powerful technology. But the contact angle modifiers have been in use for decades. There is a lot of potential for benefit and a minimal downside.”

“Determining the ROI as you describe is the hard part. Most unconventional wells haven’t produced for 20 years, so you are projecting a hypothetical baseline, using a forecast that fits to the typical production history curve. When it comes to forecasting ROI in that case, your forecast can only be proven conclusively by history. At this point if what it should do and what it appears to do holds, it should be more widely adopted.”

“Wide adoption depends on whether the numbers bear out. The difficulty is in selling. They have no trouble selling it to the big guys, and many of them already have the technology on board. The problem is with all of the little mom-and-pop fracturing vendors. They don’t necessarily make the bulk of their revenue on the chemicals they sell, but rather they make their money on equipment utilization.”

“The CnF technology potentially works better in gas wells because the surface tension difference between gas and water is much less than oil and water. The angle modifiers have more potential for gas. That’s a no-brainer. If you get into the low-pressure gas wells, that’s where you will see these surfactants really making a big difference.”

Competitive Challenges and Headwinds

“I am not aware of any major competitors to Flotek. Some of the majors do have their own CnF, but most are using a third party to manufacture and warehouse it. I suppose if there is any main competition, it would be coming from the big guys, but a lot of the product is the same and just boutique it for them by Flotek. Sometimes there might have more micelle capability or one may use for more asphaltic crudes, or more paraffinic crudes, or with a different nonemulsifier. Most of the majors are getting away from making their own chemicals, but none of the little guys likely make their own.”

“There are almost always features and benefits with new technologies. The headwind for Flotek will be to identify what feature is actually a benefit in a particular application. The identification can be difficult, but you have to be able to sell the benefits of the feature. If a client falls for buying a gallon of it when they should have used three gallons and then it doesn’t work because it was misapplied, people get a bad taste in their mouth. You have to be able to balance the characteristics and target them properly. ... However, it is not that early on with this technology. The application is a fairly mature technology.”

Miscellaneous
Flotek Industries Inc.’s CnF

- “I am not familiar with CnF 2.0. But that phrasing is in vogue these days in the sales world. There are a lot of young people out there, and they are familiar with the term ‘2.0’ for software. The term appeals to them. I would say they have marketed and repackaged the product, but it may not have features it did not have before.”

2. Principal consultant for a fracture consulting firm, repeat source

Flotek’s CnF chemical is heading to be widely adopted because clients using it are seeing results that confirm and even improve on Flotek’s claims of efficacy. Flotek’s marketing also is driving adoption. The high price of CnF is the main stumbling block, but is due to its inherent composition. CnF works better than competing products because of the citrus oil, which makes surfactants do a better job. Different concentrations and loadings can be adapted to be used in different formations.

CnF’s Market Potential
- “Clients hesitate because of the price. They see it, and they turn their head against it.”
- “One of the advantages is it’s a natural product and probably biodegradable.”
- “If Flotek’s marketing keeps going as it is, their projections [of 20% market share] in two years are realistic. Their requirement currently for the generic chemical base is higher than the citrus output of Florida.”
- “They also buy from other sources outside the United States, maybe Costa Rica and Mexico. That base material is used in a lot of cleaning materials.”
- “[Flotek is] the only one who has this package. None of the other surfactant providers use this technology. Plus, they have the patents on it.”
- “They have a very intense marketing campaign to sell it, and they work at it very hard.”

CnF’s Efficacy and Cost-Effectiveness
- “We recommend CnF. It will always improve the performance of a well, and some of our research shows it’s even better than the numbers [Flotek] claims.”
- “I haven’t seen a single data point that contradicts Flotek’s claims about CnF’s effectiveness.”
- “The main issue is it’s expensive compared to the competition. ... But the cost of the product is not because it works so well but because it is inherently expensive.”
- “The generic name of one of the key components is limonene. Flotek contracts with citrus growers, particularly for limes but also lemons and grapefruit, and gets the oil out of the peel. That oil makes the surfactant more active between the water and oil when you frac a well. It makes the surfactant properties work better, more active.”

Competitive Challenges and Headwinds
- “The competition to Flotek is mass-market, maybe not like McDonald’s but not as efficient and targeted as CnF.”
- “It’s not exactly correct that it can only be used in certain shale plays. They probably have different concentrations and loadings of it that will work better in certain types of oils, i.e., formations. That would be the only restriction.”
- “Buyers have more impact than engineers on well operations nowadays because of the proliferation of wells. There’s been quite a bit of discussion about not running surfactants at all to cut costs out of total well costs. But that doesn’t apply to everything. You can make better wells with this material.”
- “According to a study, when you couple CnF with ceramic proppants, it has a better synergistic effect, producing two and half times what surfactants or ceramic proppants would alone.”

Miscellaneous
- “Flotek is a very innovative company. They’ll do well.”

3. Petroleum engineer with completions experience in Woodford, Fayetteville, Haynesville and Marcellus

This source has not used CnF but has seen it promoted at industry meetings. She dismissed Flotek’s claims for gross incremental value of $2.4 million per well over 20 years, calling long-term measurements unrealistic and unreliable. She
Flotek Industries Inc.’s CnF

would give weight only to claims based on instantaneous measures and extrapolations calculated no further than 30 days out. If the product works as described and intended, Flotek could increase its share in certain regions from 3%, to 15% to 20%, but doing so could take longer than two years.

CnF’s Market Potential
- “Due to the fact that the market is shifting towards oily shales, I can see the market share increasing to 15% to 20% if the product works as it says, but two years might be an unrealistic rate.”
- “The Bakken and Eagle Ford are probably more suited towards this product. I don’t have any knowledge of how many operators are currently using this product.”
- “If a product is successful and performs consistently well, it could catch on.”

CnF’s Efficacy and Cost-Effectiveness
- “The company I work for hasn’t used any Flotek products.”
- “Regarding intersurface tension and increased production, some of the measurement claims you describe are reasonable when you are looking at a 30-day average. As for microseismic activity, you can calculate and infer results and link it to a frac, but you cannot actually measure them. When I hear such claims, I call bull on them. People say this kind of thing in the industry all the time, but they are not quoting actual measurement results.”
- “This [ROI that Flotek claims] seems excessive and would be determined greatly on the average EUR of the wells as well as different companies’ fracture treatment designs. There is a basis for looking at increased production based on a 30-day average and extrapolation, but until you actually have 20 years of data you cannot really forecast the potential for gross incremental value per well. It is not realistic to make such claims.”
- “When someone offers a 20-year forecast for the value of a well, the validity of the results depends on the gas and oil prices used to calculate. It depends on whether they ran numbers based on current prices or [projected] commodity prices. The claims are a stretch. I know why they made those claims, but I would not put too much weight on the 20-year value. Something can be inferred from the instantaneous numbers.”

Competitive Challenges and Headwinds
- “If the cost is more upfront than a standard surfactant, then that will prohibit trials and growth.”

Miscellaneous
- “I’ve seen a brochure about CnF 2.0 at an SPE conference, but have not personally used it.”

4. Manager of sales and marketing for a midsize oil and gas service company in the Niobrara and D-J basins

This source has used CnF on nearly 1,000 wells. The source’s client base appears convinced of measureable results attributable to the product’s use. Almost 50% of Niobrara clients request CnF. The company plans to do its own independent study of the chemical.

CnF’s Market Potential
- “To continue to capture market share is difficult because different companies among our competitors like to develop their own proprietary products and promote them. If the results hold up in other plays and the product is requested by name in other plays the way it is here, then the market share potential is huge.”
- “We believe this product has great potential in all liquid-rich plays. That remains to be seen and is exactly why we are beginning controlled studies to capture the data.”
- “Liquid-rich environments need surfactants, and this part of the oil and gas market is obviously the focus at today’s market prices. If the data continues to support adoption of this product, we believe the use of it can spread to other plays and increase widely.”
- “The CnF product MA844W is getting lots of use for our clients, and Flotek continues to get the word out about the products.”

Due to the fact that the market is shifting towards oily shales, I can see the market share increasing to 15% to 20% if the product works as it says, but two years might be an unrealistic rate.

Petroleum Engineer w/ Completions Experience

We used it on about 1,000 wells now. Nearly 50% of our Niobrara clients use it, and most request it by name.

Manager of Sales & Marketing Midsize Oil & Gas Service Company
Flotek Industries Inc.’s CnF

CnF’s Efficacy and Cost-Effectiveness
- “We used it on about 1,000 wells now. Nearly 50% of our Niobrara clients use it, and most request it by name.”
- “It is growing quickly in the use within this area because they kind of started here and grew their base here with aggressive marketing. It remains to be seen if the local results here are similar in other plays since the geology and science of each play is so different.”

Competitive Challenges and Headwinds
- “ChemEOR is the biggest competitor touting their nanofluids currently. I believe it will be interesting to see how well they compete against this product.”
- “The highest amount of competition will likely come from the Big 3 pressure pumping service providers as they develop their own proprietary competition for the product to keep more profits at home.”

Miscellaneous
- “Flotek is really tightlipped about the CnF technology, so we don’t know how easily it can be similarly duplicated by the competition. All of that will go into the eventual capture of market share. It is very competitive in this vertical.”

5. Field operations manager for a North Dakota well completion company; repeat source
This source was familiar with Flotek but had not heard of CnF or nanofluid chemicals. He could not comment on CnF’s current or future adoption and potential. Enhanced recovery tools and technologies are increasingly part of the marketing push in the Bakken and Three Forks shale plays, although he had no specific information about brands or companies promoting it. CnF technology already could be widely deployed by the key players, but well completion service companies such as his would have no knowledge about their fracking components.

CnF’s Market Potential
- “The kind of ROI you are describing would be a game changer, and it would be front and center here if the results were that good. Not a lot of product is proprietary up here. If someone had a product that delivered exponentially higher results, that product would quickly become the flavor or the month. Everyone would use it. But I’m just speaking about how it is in the Bakken and Three Forks plays.”

CnF’s Efficacy and Cost-Effectiveness
- “I have not heard the term CnF, but I have heard of Flotek.”
- “I don’t know what CnF can do or what it would do. I have run it by our guys and engineers who run the consultancy side as well, and they have 35 guys who frac wells up here. None of them have heard of it. Sounds like snake oil.”
- “Nothing I have seen or come across would match the numbers you are describing [for load recovery]. Do I think you can get that high a return? Not really. It doesn’t sound realistic. And results vary by well.”
- “It would be interesting to know the primary companies and operators that are using it or testing it. We work for all of the big guys up here. But when we work for them, we may not be privy to all of the components of the frac, or privy to the chemicals or fluids that the companies we work for use. Generally, that kind of information is proprietary, and they don’t say what they are using. They just have us use it.”
- “We do well completions for all of the big players up here, so it is possible we are using CnF or even the Flotek chemicals specifically and not even know it. They wouldn’t tell us because even if they are using Flotek, they would want us and everyone else to think they had some specific, in-house product. It could be made by Flotek. We wouldn’t know.”

Competitive Challenges and Headwinds
- “There are a lot of people promoting enhanced recovery up here right now. But I can’t name you a company or brand. It’s just something that is available.”

Miscellaneous
- N/A

6. District engineer of completions for a midsize oil and gas service company
This source has used CnF in both the Niobrara and Bakken formations. He mentioned data from independent studies showing great production results for the chemical, but he has not yet received specific results from his clients. He said operators continue to request CnF by name.
Flotek Industries Inc.’s CnF

CnF’s Efficacy and Cost-Effectiveness
- “So far we have used this product for about seven clients at their request. They continue to seem happy with the results and ask for the product on their frac jobs. While this is a good sign, I have not yet been provided with specific results from the jobs we pumped.”
- “If our own results are even close to those in the published report, we believe this product will increase in use rapidly with clients in the region. Data will be the key.”

CnF’s Market Potential
- “It is quite amazing that I have clients asking me to use this product since it costs four times as much as other surfactants in use in the region. The market potential is great if we can duplicate the results shown in the previous study.”
- “Usually clients are calling and asking how they can spend less on the frac job. In this case, clients are asking to spend more based on perceived value. We are anxious to verify the results that will justify their enthusiasm.”
- “The results here when proven should open a corresponding market in all of the oily shale plays.”

Competitive Challenges and Headwinds
- “All of the pressure pumping companies are scrambling to offer competing products. Data from real results will be key to market share.”
- “Hopefully volume sales might begin to mitigate the price differential between CnF and other surfactants. High price alone sets the bar for new adopters pretty high.”

Miscellaneous
- “We recently had another operator in Billings, MT, requesting the product for some of their wells. Hopefully, we will have data from another area soon.”

7. Lead engineer for a company that provides well completion services and tools

This source said CnF likely will end up as a niche product for use in certain wells that pose design challenges. He does not expect his company to use CNF, but said it could be used in conjunction with ceramic completion products to improve the efficacy of proppants in difficult formations.

CnF’s Market Potential
- “It would be best in horizontal oil formations and multistage fracs. It could be for gas, but oil shale would be the low hanging fruit. I imagine it would be useful in the Bakken or in Eagle Ford, maybe Utica.”
- “I’ve seen them marketing the product at conferences but have not been directly contacted.”
- “I have no in-depth experience with Flotek or other products in that chemical segment. I imagine its market potential is as a niche product.”

CnF’s Efficacy and Cost-Effectiveness
- “We have not used the Flotek product, but I am somewhat aware of what it is. We are not an operator but provide [completion] services and materials like ceramic proppant, design simulation and consulting. We do completions and provide materials and fracture design using software.”
- “I’m not sure we would use [CnF].”
- “It sounds like it could be adopted in certain cases or in wells that pose challenges.”
- “We sell high-grade proppants and technologies that materially enhance flow, so in theory Flotek’s CnF would be used together with our products. But we would not buy from them.”
- “I am not aware of anyone using the chemical or asking for it. We sell different materials that are parallel to the chemical offerings.”

Competitive Challenges and Headwinds
- “I imagine the most challenging headwinds would be just finding the right client for the product and providing the chemical for the right problem.”
8. Sales and marketing executive for completions with a small fracking services company

This source has not used Flotek’s CnF, but has used similar products. Part of his company’s successful marketing strategy is to reduce the cost of completions through savings on services and chemicals used in the fracking process. His company would use an expensive chemical like CnF only if data was rock-solid and supported by third-party research.

CnF’s Market Potential
- “If the results are verifiable, then the market potential is huge—not just in Bakken but in all of the oily plays.”
- “Once the results are verifiable, the word will get around among producers and a product that works can expand its market share quickly.”

CnF’s Efficacy and Cost-Effectiveness
- “I have not used CnF and would likely not do so unless the product was specifically requested by our client.”
- “We would be glad to be able to offer solid evidence of the kind of results mentioned in the materials from Flotek. That evidence would have to be from a third party with unbiased research.”

Competitive Challenges and Headwinds
- “Every service company will have some competing product that they think will get just as good of results. The difference will need to be so overwhelming that operators request the product by name.”

Miscellaneous
- N/A

9. Well site supervisor for a completions unit of an oil and gas company fracking in Wyoming; repeat source

The company has not used anything but diesel oil in its horizontal fracturing, and the source had not heard of Flotek or CnF. Some big operators in the region might be using a product compounded by Flotek but presenting it to customers as proprietary, in-house frac fluid. He doubted the validity of Flotek’s oil recovery and ROI claims, saying that any new product with game-changing potential either would be in testing mode, in the process of being adopted or already used by everyone.

CnF’s Market Potential
- N/A

CnF’s Efficacy and Cost-Effectiveness
- “I’ve asked around the area and asked our people, but no one knows about CnF and no one seems to be using it. I’m not familiar with Flotek, and none of my people have heard about it.”
- “The stuff we are using at our company is diesel oil.”
- “The efficacy and cost-effectiveness really depend on which well you drill, how well you understand how to apply the fluid and your other materials. You can drill one well and get great results and then use the exact same materials in a well next to it and get nothing. It’s all about quality control and application, and then the rest is up to the well.”
- “People make all sorts of claims about new products. I have not heard of anything that even comes close to the results you are describing. Everyone would be using the product if it were that much of a game changer.”
- “I don’t put much stock in claims about new products, especially when they sound fantastic. And results projected over 20 years don’t mean much in unconventional wells. Most if not all won’t produce for 20 years.”

Competitive Challenges and Headwinds
Flotek Industries Inc.’s CnF

- N/A
- Miscellaneous
  - N/A

3) Industry Specialists
Four of six sources said widespread adoption across all shale plays is unlikely for Flotek’s CnF. Still, five reported significant interest in production enhancement solutions such as CnF. Flotek’s high productivity claims were questioned by all sources, indicating that additional data from the field is needed. In order for Flotek to expand the use of CnF, the company needs to provide competitive pricing and ensure adoption by the major service companies, including Halliburton, Schlumberger and Baker Hughes.

KEY SILO FINDINGS
CnF’s Efficacy and Cost-Effectiveness
- 4 do not think widespread adoption of CnF across all shale plays is likely. 2 did not comment.

CnF’s Market Potential
- 5 reported high demand for production enhancement solutions.
- 1 thinks CnF can achieve 20% market share and may be at that level in some shale formations.
- No one solution will work in all shale formations.

Competitive Challenges and Headwinds
- 3 said CnF needs to be cost-competitive.
- 1 source identified Halliburton, Schlumberger, and Baker Hughes as key potential customers but also key competitors.
- Additional field data is needed to verify Flotek’s CnF efficacy and ROI.

Miscellaneous
- Sources reported considerable industry interest in increasing hydrocarbon recovery rates because typically only one-third of the gas or oil is captured.

1. Consultant specializing in stimulation completions
Flotek’s claims for CnF need to be examined very carefully because time benefits generally can be measured only in months, not years. So far, this source’s research has not found any chemical that can significant affect “ultra-ultra-tight-rock” formations because of their low permeability.

CnF’s Market Potential
- “I would encourage anybody to look at a large subset of data before saying this is something really special.”
- “If they have this data subset, they should be screaming from the top of every mountain. But there’s a lot there a person should look at.”
- “When you have great rocks, it could work. In more porous rocks, it could have a longer-term effect. But even then six months is an extremely long-term effect.”

CnF’s Efficacy and Cost-Effectiveness
- “I’ve talked to several people in whom I have a high level of confidence from the chemistry standpoint. [Flotek’s] claims are very exciting. I would have to look at a large subset of data before I would be able to say, yes, that sounds good or, no, that doesn’t sound good. Today I would probably not say that I can agree or accept all the claims.”
- “Maybe somebody is going to come upon that one group of chemicals, but we’ve not seen it quite yet.”
Flotek Industries Inc.’s CnF

- “Generally the surfactants and the nonemulsifiers have a relatively quick effect.”
- “Typically, in any kind of oil and gas reservoir, one chemical, or even a family of chemicals, cannot produce a production response that would be impacted over a period of 20 years. It might be impacted for a period of a few months. But as the oil and gas continue to be produced out of that formation, that chemical is not going to have a residual to bring that back out over 20 years.”
- “There’s a lot of data that somebody should look at like the wells this product was used on, how it was used on these wells, what do the offsets do. A lot of times, if the wells were in production for a number of years, they may have some damage to the wells that reduces the productivity of that well. If you go in and do a little cleanup and then you happen to use some of that chemical, you might see results. But is the effect because of the chemical, or is it because you’re cleaning up damage that was there?”

Competitive Challenges and Headwinds
- N/A

Miscellaneous
- “Three decades ago we were looking for that magic chemical or family of chemicals that could release all the oil and gas, but we never found it. Then as the really great rocks had been produced, we got into rocks of lesser quality. Then we were looking for other things like damage mechanisms. And now the rocks we’re looking at are ultra-ultra-tight rocks. What we initially looked for in these rocks was, is there a chemical that can do some of this stuff and the short answer is, we never found it. Instead, we turned to trying to understand the stimulation effectiveness.”

2. Petroleum engineering professor

Competition is intense for products such as Flotek’s CnF and between service companies using these products. Oil companies are hesitant to take risks by using only one service company and one product. They usually will contract with two or three service providers to work in similar formations, and then scale back contracts with the one delivering the least. Most clients are aware that no one product can be a “silver bullet.” Engineers are more likely to believe a product’s published claims of successes if the maker also publishes its limitations.

CnF’s Market Potential
- “Each individual reservoir condition is slightly different, so it’s very hard to convince the oil companies that any one product is the silver bullet.”
- “Unless your sites are almost completely identical, there really is no proof that one particular package will work for most of the fields. I think most of them do not believe that would be the case.”
- “The only thing the end user, the client, can do to eliminate the risks [of ambitious claims] is to use two or three preferred service companies. So, for example, in one field they will run 10 different locations and sign a contract with one company to do half of them, and sign an agreement with another company for the other 50% of that formation. Under those conditions, the formations are similar. So if service company A can deliver and under similar conditions company B cannot deliver, they will scale back contracts with company B. It’s extremely competitive.”

CnF’s Efficacy and Cost-Effectiveness
- “I would look at the whole package and not just focus on one promise such as increasing recovery by 30% to 40%. That is only one parameter. You need a thorough study of what’s in the package, how the package is being used, under what conditions, the limitations of the use in different reservoir conditions, and the limitations of the package. That’s what you need to watch for. [Flotek and other companies providing chemical packages] need to alert the end user of the pros and cons and make it clear that their product is not a silver bullet for all the sites. That’s more believable by the engineers.”
- “The more testing you have run, the more believable your claim is—not just to say you’ve improved one particular number or to emphasize one

Service companies like Halliburton and Schlumberger are the preferred clients of companies like Flotek. They are also the preferred vendors of the major oil companies. This is based on their technical expertise. There may be, let’s say, three service companies competing for a project. If they don’t deliver, they’ll be dumped for the following projects. So the service companies are very eager to find a product that works better.

Petroleum Engineering Professor
particular claim. You need to publish promising tests but also other tests where you found limitations or pitfalls. Like with pharmaceutical ads, you need a disclaimer.”

**Competitive Challenges and Headwinds**
- “I’m not an expert in hydraulic fracturing and don’t have the names of the companies, but there are five to 10 companies out there competing with their packages.”
- “Service companies like Halliburton and Schlumberger are the preferred clients of companies like Flotek. They are also the preferred vendors of the major oil companies. This is based on their technical expertise. There may be, let’s say, three service companies competing for a project. If they don’t deliver, they’ll be dumped for the following projects. So the service companies are very eager to find a product that works better. They want to make sure they can deliver whatever their client wants.”

**Miscellaneous**
- “Flotek will try to sell their package to service companies, which provide services for major oil companies or independent oil producers. These oil companies can do their own laboratory studies to verify the claims of the products. We have found for some of the packages provided by whatever company they’re using, some of the claims are not true. But there is no FDA or EPA that sets guidelines and regulates claims.”
- “Most of the oil companies rely on their service company to provide the technical input about which packages they will try.”

**3. Professor of chemical engineering**

The big issue facing hydraulic fracturing is to do it more economically, and many different products and applications exist for this. This source was not familiar with research regarding CnF used in hydraulic fracturing, only in enhanced oil recovery, but believes that as long as the application is done correctly, it may work well. Research has shown that the new products can make a big improvement over conventional products. However, their price remains very high. Hydraulic fracturing is a dynamic area of growth and has contributed to improving the economy.

**CnF’s Market Potential**
- “There’s a lot of research looking at new products. Compared to conventional technology, it makes a big improvement. But if you apply it wrong, you may get much improvement at all. In any case it’s fairly expensive, so the benefit has to be greater than the expense.”
- “Hydraulic fracturing is a very big business right now, and many people are trying to develop innovations in it. Using surfactants and foam would be one of the areas where they may be doing that.”
- “Both enhanced oil recovery and hydraulic fracturing are very hot items right now. Hydraulic fracturing is what’s caused a big surge in oil production in the United States, and so it’s changed the economy of the United States and eventually of the world. The rest of the world is now getting started in enhanced oil recovery.”

**CnF’s Efficacy and Cost-Effectiveness**
- “The big issue facing hydraulic fracturing is to do it more economically. They can now do it successfully so it’s revolutionized being able to produce oil from unconventional shale reservoirs that used to be too tight. They made it possible, but if they could do it better and with less cost, then they’ll increase the profits. It’s still very expensive drilling the oil and doing the hydraulic fracturing.”
- “For each application [different areas and rock formations] you need to have the appropriate product. One size doesn’t fit all.”
- “[Flotek is] probably using the terpene from citrus peelings. I’m somewhat familiar with that for enhanced oil recovery but not so much as a fracturing fluid. They may be talking about using it with other materials, and then they get additional oil recovery compared to no chemicals at all.”
- “If you apply them right, these products may work well. If you apply them wrong you may not get any benefit.”

**Competitive Challenges and Headwinds**
- “There are a number of companies working on this, but in terpenes there’s only limited activity.”
- “There is also use of ceramic proppants for hydraulic fracturing. But that’s a different technology. You can combine different technologies and by doing that, you get better than conventional technology. But you may have to pay an extra price for that.”
4. Professor in chemical engineering

Lab tests cannot always be reproduced in the oil field. In tests, putting complex fluids in contact with each other and in a complex system such as an oil well can add to the complexities. The cost of surfactants has long been a main issue, as is the effect on the environment. Flotek’s lofty claims give rise to skepticism.

**CnF’s Market Potential**

“I am usually skeptical of such extravagant claims. As a scientist I do not believe such claims unless I can see and read about the evidence for the claim, and assess it to be scientific and believable.”

**CnF’s Efficacy and Cost-Effectiveness**

“Research on using surfactants for enhanced oil recovery goes back to 1970s. ... Little was known about phase diagrams of surfactant, oil and water, and the cost of using surfactants. When the price of oil crashed in the mid-1980s, the research virtually stopped. But now it has come back, given the current price of oil and the projections.”

“Not every surfactant works and not every surfactant, while good at the lab scale, can be tested in an oil field. But the idea has returned, much better understanding of the phenomenon exists, and even field trials have been carried out.”

**Competitive Challenges and Headwinds**

“There are challenges. Surfactants are complex fluids and when you put them in contact with another complex fluid, such as crude oil, in a complex system—a porous medium such as an oil reservoir—then the complexities increase even further, particularly under the actual reservoir conditions.”

“I have not noticed a dramatic increase in the rate of publication of scientific papers dealing with the complexities of the problem, but one reason might be that compared to the late 1970s and early to mid-1980s there is better understanding of the problem.”

“I am not sure whether there are companies that specifically compete for selling surfactants. There is no miracle surfactant yet, at least to the extent that I am aware. Of course, enhanced oil recovery is still important, and indeed techniques have been developed that have increased the recovery dramatically.”

**Miscellaneous**

“The burning issue is still the cost of using surfactants, as well as the possible effect that they might have on the environment.”

5. University professor of petroleum engineering investigating nanotechnology’s effect on oil and gas fracking

This source is being paid by Flotek to study CnF and how it behaves at the molecular level. The researchers have developed simulated models based on information provided by Flotek, but the company has not provided actual specifics of the chemical or the authentic formulation. The source’s research results, due out later this year, will not be used to support Flotek’s claims about ROI, recovery rates or other measures used to promote the product’s efficacy. Rather, they will be used to demonstrate how simulated chemical structures behave.

**CnF’s Market Potential**

“Based on our work, we cannot differentiate what type of shale or what shale plays will react best with the actual chemical.”

**CnF’s Efficacy and Cost-Effectiveness**
“We are not looking at the actual chemical, and I don’t have the complete formulation. But we are looking at CnF based on information Flotek gave us about how the fluid behaves at the molecular level. Based on a simplified model, we make a simulation of the molecules and look at the behavior.”

“Our role as researchers is to build a model to validate and show how the molecule manipulation occurs.”

“Molecular simulations such as these are not used for the purpose of establishing efficacy for long-term recovery in the field. But I can tell you that the models we have established represent very exciting chemicals, and they are behaving in ways that we have not seen before.”

“Our research will never be able to predict how much oil will be recovered. We are looking at the surface chemistry and working on simulations of the matrix in the rock formations.”

“I cannot say whether Flotek’s claims for recovery or ROI have merit because I don’t know the basis of their claims, and our research is not intended to support their claims. But to make such claims, they should have experiments or numerical data results that tie their arguments to the results. I would take the technical reports to someone who understands the science, someone who is independent. I am not an independent researcher because my work is paid for by Flotek.”

Competitive Challenges and Headwinds
- N/A

Miscellaneous
- N/A

6. Associate director of a university research center devoted to the study of oil and gas production

This source has not used CnF chemicals but was familiar with Flotek. He doubted Flotek’s claims for oil recovery and ROI, especially the projected $2.4 million per well over 20 years. Market share gains of 20% in two years seemed reasonable, if not already achieved in certain shale plays like the Bakken. To gain widespread adoption, CnF must be unique, cost-competitive and capable of delivering on Flotek’s claims.

CnF’s Market Potential
- “If it’s true that 70% of the wells in the Bakken are using the CnF chemical, it is reasonable to project 20% market share in two years. It sounds like much of the penetrations has already occurred in the Bakken, but the products are under other brand names.”
- “The answer in theory is yes, Flotek’s product could be widely adopted if the claims they have made are true and unique. But we also know everything is cost-sensitive. If someone has a similar ‘gee whiz’ product that is 50% cheaper and has equally compelling results, adoption would be challenged.”
- “To achieve widespread adoption, my thought is that Flotek needs to be 1) cost-competitive and 2) to see someone with an underperforming program and then convince them they will save money and improve results.”

CnF’s Efficacy and Cost-Effectiveness
- “I know about Flotek, but I am not familiar with CnF. I do work in reservoir applications, but I have not used CnF. My guess is that clients of our have had experience with it.”
- “I am very skeptical of the results you describe for oil recovery and gross incremental value. I don’t know how they can support such a claim with know the baseline information. To me, it is just silly guesswork.”
- “Spending $200,000 per well is not a crazy number, but I would not put much stock in values of $2.4 million per well over 20 years. If some of the other figures such as the 76% higher 30-day oil recovery are in fact true, wouldn’t you have all you money back in 30 days?”

Competitive Challenges and Headwinds
- “Flotek’s competition at some level comes from its customers like Baker Hughes, Halliburton and Schlumberger.”
- “At the end of the day a lot of buyers may be out there but they may not buy directly from Flotek. There are probably a limited number of potential customers who would buy from them.”
“There are no shortages of clients in the space, but the large customers and competitors might argue they do it just as well or better. The producers are less likely to make their own or buy from Flotek. They are more likely to buy the product as part of a package from Baker Hughes, Schlumberger and Halliburton. That means companies may be less likely to chase Flotek for the product.”

Secondary Sources
The following three secondary sources centered on Flotek acquiring intellectual property from Arc Fluid Technologies’ general manager, Anthony Rea; acquiring SiteLark; and expanding its EOR portfolio.

April 7 Oil & Gas Financial Journal article
Flotek is acquiring intellectual property from Arc Fluid General Manager Anthony Rea. They have agreed to a two-year consulting contract to help new find new companies that will benefit from its CnF technologies.

- “Flotek Industries Inc. has agreement to acquire certain intellectual property from Anthony Rea, via ARC Fluid Technologies LLC related to drilling fluid systems used by unconventional drilling programs and other challenges.”
- “In addition, Flotek and Rea have agreed to a two-year consulting agreement whereby Rea will assist Flotek in reaching players in the drilling fluids market as well as exploration and production companies that will benefit from the use of Flotek’s Complex nano-Fluid™ technologies in the drilling process.”

Feb. 11 Houston Business Journal article
Flotek is acquiring SiteLark to expand how much it can help clients through evaluating and predicting shale productivity.

- “Flotek Industries Inc. has entered into a letter of intent to acquire SiteLark LLC, its second acquisition of a North Texas company in the past year.”
- “Flotek, a Houston-based developer and distributor of oilfield technologies, including specialty chemicals and downhole drilling and production equipment, said in a press release Tuesday that it will make an initial payment of $600,000 in cash and stock for SiteLark, which is based in Plano and provides reservoir engineering and modeling services for a variety of hydrocarbon applications.”
- “He said that SiteLark’s proprietary software will provide Flotek with new opportunities to assist clients with complex problems, including a proprietary system for evaluating and predicting shale productivity.”
- “In July Flotek bought Eclipse IOR Services LLC in North Texas for $6.5 million in cash and stock.”

Jan. 16 Energy Voice article
Flotek is expanding its EOR portfolio by purchasing oil recovery firm Eclipse IOR Services.

- “Houston-based oilfield technologies’ developer Flotek Industries has completed the purchase of oil recovery firm Eclipse IOR Services (EOGA) as it looks to expand its enhanced oil recovery (EOR) portfolio.”
- “The deal, firstly announced in July last year, was finalised on January 1 at $5.25million plus 94,354 Flotek stock shares.”
- “The company will benefit from EOGA’s current and planned EOR projects across the US, Canada, South America and the Middle East including the use of gel polymer and CO2 foam techniques.”
- “EOGA’s expertise in Enhanced Oil Recovery processes and the use of polymers to improve performance of EOR projects is an important addition to Flotek’s growing inventory of EOR services,’ said John Chisholm, Flotek’s chairman, president and chief executive.”

Additional research by Carolyn Marshall, Eva Cahen and David Wright
Flotek Industries Inc.’s CnF

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