

**Case study:** Barnett shale play, North America

# LiteProp 108 proppant increased production and revenue in Barnett Shale operation

During late summer 2010, Baker Hughes pumped the first 14/40 mesh of **LiteProp™ ultralightweight proppants** for a major operator in the Barnett shale play. An examination of the 45 months of production data from this well and a nearby offset provides a good, long-term evaluation of the LiteProp 108 proppant performance vs. that of a conventional proppant.

The two wells involved in the field trial were a 12-stage well using conventional proppant (Well A) and a 7-stage LiteProp 108 proppant well (Well B). Both wells were located in Wise County, Texas northeast Barnett shale play. To minimize any variations in the stimulation treatment, the two wells were fractured simultaneously.

Wells A and B were isolated from other wells, thus eliminating the possibility of communication from nearby offsets. These isolated wells provided an excellent opportunity to validate the effectiveness of the LiteProp 108 partial monolayer technology using production studies.

When looking at the actual production data for each of the wells, it initially appeared as if the LiteProp 108 well had yielded little, if any, production increases. This is because the two laterals were of unequal length and possessed a different number of stages. To provide a more accurate representation of each well's production, the data was normalized to a 3,750 ft (1143 m) lateral length. The production charts also denote November 2 as the date when the chokes for both wells were fully open.

With fully open chokes and the data normalized to the same lateral length, the results showed that the well completed with LiteProp 108 yields higher daily gas rates (~176 Mcf/d greater on average from November 2 to present) and a cum gas differential of ~231,137 Mcf.

Increased revenue is based on the additional cum gas (231,137 Mcf) and cum oil (999 bbl) production mentioned above. More importantly, the additional revenue amounts to USD 900,030.99—significantly increasing the operator's return on investment.

## Challenges

- Achieve significantly better production using LiteProp 108 proppant vs. conventional proppant
- Boost recovery in a shorter lateral well with fewer stages than offset

## Results

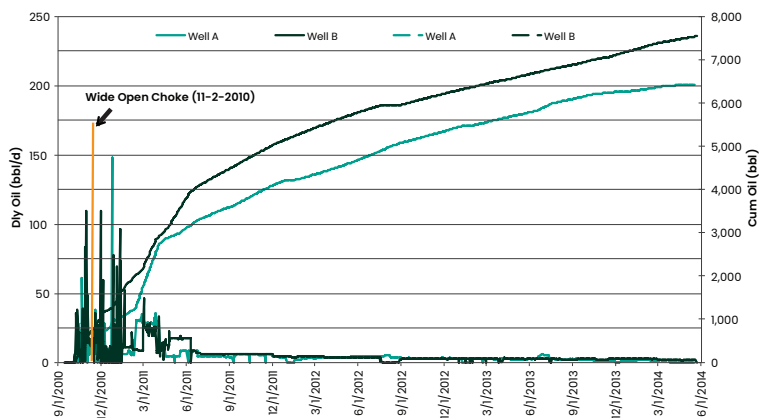
- Achieved higher normalized production with LiteProp 108 proppant
- Increased revenue/profit for operator
- Decreased substantially sand and water volumes required during frac operations

## Properties

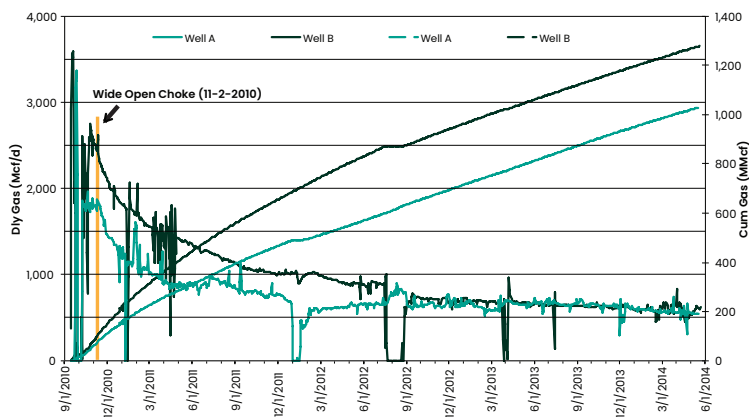
	Well A	Well B
Proppant	Conventional 12 Stages	LiteProp 108 7 Stages
100 Mesh	517,500	851,170
40/70 White	1,695,000	-
20/40 White	232,500	-
LiteProp 108 14/40	-	144,500
RC Sand 20/40	-	281,290
Proppant /Stage	203,750	182,423
Proppant Total	2,445,000	1,276,960

Shows a comparison of the breakdown of proppant types and volumes for each well.

Normalized Daily and Cum Oil Production  
(3,750 ft Lateral Length)



Normalized Daily and Cum Gas Production  
(3,750 ft Lateral Length)



The normalized daily and cum production (oil and gas) of each well are shown on the charts above, respectively. The Gross Producing Interval (GPI) for Well A was 4,323 ft (1329 m) and 3,153 ft (961 m) for Well B.

## Properties

	Well A (Conventional Proppant)	Well B (LiteProp 108 Design)	Production Increase	Additional Costs
Normalized Cum Gas Production	969,584 Mcf	1,200,721 Mcf	+231,137 Mcf (24.5% increase)	\$804,356.76
Normalized Cum Oil Production	5,994 bbl	6,993 bbl	+999 bbl (16.7% increase)	\$95,674.23
Total	-	-	-	\$900,030.99

The cum oil production is also higher for the well that was completed with LiteProp 108 by 999 bbl

Note: The normalized daily production rates are averaged from 11-2-2010 to 5-25-2014. The resulting economics are based on an average price of oil and gas from 2 November 2010 to 25 May 2014 of USD 95.77 per bbl and USD 3.48 per Mcf respectively (eia.gov).

