



# PROPEL SSP™ PROPPANT TRANSPORT TECHNOLOGY

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## PERFORMANCE HIGHLIGHTS

Reduce cost per BOE by increasing  
stimulated reservoir volume

## ABOUT PROPEL SSP PROPPANT TRANSPORT TECHNOLOGY

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Propel SSP proppant transport technology resists settling in a low-viscosity fluid. This hydrogel coating, wrapped around a grain of sand, swells in water effectively reducing a proppant's specific gravity. The hydrogel coating uniformly distributes proppant throughout the full length of a created hydraulic fracture. Ultimately, this better transport reduces cost per BOE by increasing the stimulated reservoir volume.

The technology requires less pumping time because of the higher capacity to carry proppant compared with slickwater, and an operator can eliminate fluid sweeps, in addition to using less fluid additives because less fluid volume is needed.



## GO FARTHER

Since the commercialization of Propel SSP proppant transport technology in 2014, we have worked with operators and service companies on a variety of frac designs. Collectively, the latest field trials document how this remarkable technology is increasing hydrocarbon production and reducing the cost per BOE in shale formations across the United States.



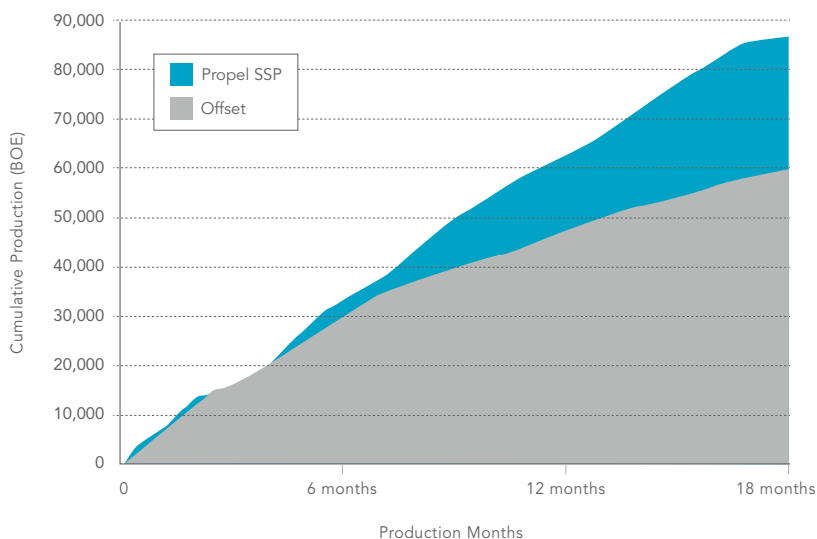
# PROPEL SSP TECHNOLOGY VS. SLICKWATER

## MISSISSIPPIAN LIME, LIQUIDS-RICH PLAY

### Increased recovery

In a simple, direct comparison between 20/40 Northern White sand in a conventional slickwater design and 20/40 Northern White sand coated with Propel SSP technology, production increased 45% after 18 months.

18-MONTH CUMULATIVE PRODUCTION GAIN WITH PROPEL SSP TECHNOLOGY VS. SLICKWATER



	Offset	Propel SSP Technology	% Change	Change
12-month Cumulative BOE	47,684	63,027	+ 32%	15,343
18-month Cumulative BOE	59,863	86,792	+ 45%	26,929
Well Cost (\$MM)	\$3.1*	\$3.35	8%	\$0.25
Well Cost/BOE (\$/BOE) @ 18 months	\$51.8	\$38.6	- 25%	

\* Based on publicly available data for basin

### PROPEL SSP TECHNOLOGY WELL



100%

Propel SSP technology on 20/40 Northern White sand

### OFFSET WELL



100%

20/40 Northern White sand in slickwater



# PROPEL SSP TECHNOLOGY TAIL-IN VS. SLICKWATER SIMPLIFIED DESIGN

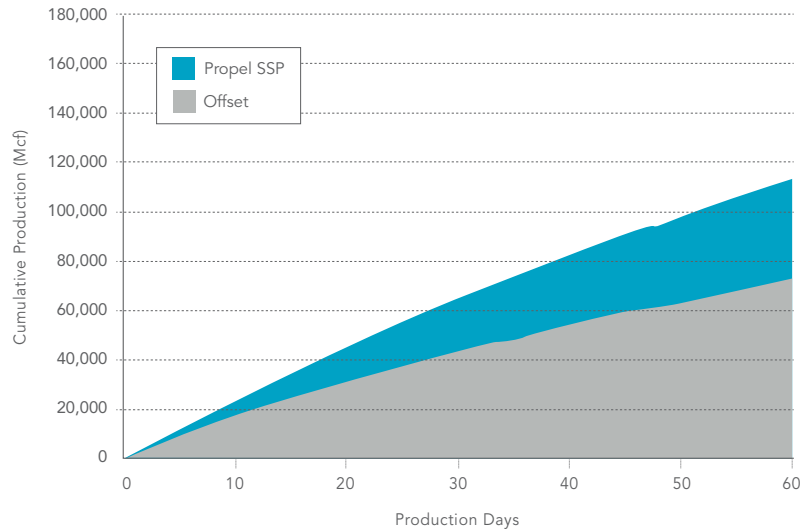
## ESCONDIDO FORMATION, RICH GAS PLAY

Higher IP, improved hydraulic fracturing efficiency

An optimized design with higher proppant loading using Propel SSP technology as a 46% tail-in boosted 60-day initial production by more than 55% while decreasing water demand, chemical additives, and pumping time. The smaller-mesh, lower-conductivity frac sand coated with Propel SSP outperformed the larger-mesh, higher-conductivity frac sand, based on the production results, by maximizing the fracture surface area.

- Improved hydraulic fracturing efficiency**
- Decreased pumping time: 25%**
- Less chemical additives: 15%**
- Decreased water consumption: 10%**

60-DAY CUMULATIVE PRODUCTION GAIN WITH 46% PROPEL SSP TECHNOLOGY TAIL-IN



Cumulative Production (Mcf)	Offset	Propel SSP Technology	% Change	Change
60-day	85,207	132,678	+ 55%	47,471

### PROPEL SSP TECHNOLOGY WELL



### OFFSET WELL





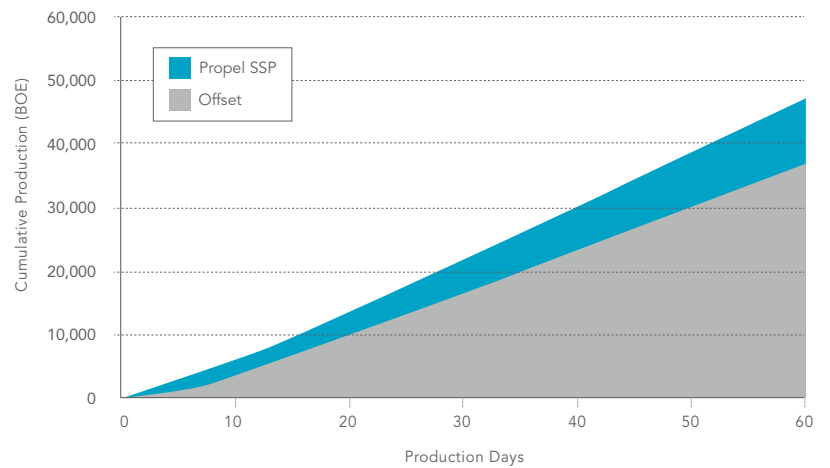
## PROPEL SSP TECHNOLOGY TAIL-IN VS. HYBRID SYSTEM

### MARCELLUS FORMATION, LIQUIDS-RICH GAS PLAY

#### Increased contact area and conductivity

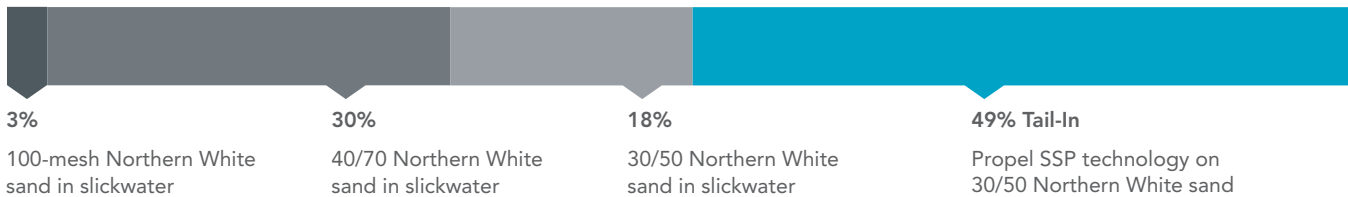
In more complex frac designs that use viscosifiers for transporting large concentrations of coarser proppant sizes, there is always the threat of formation and proppant pack damage. As this case study documents, replacing conventional viscosifying gel with a Propel SSP tail-in can improve initial production. Propel SSP mobilizes more oil and gas recovery with the additional reservoir contact area.

60-DAY CUMULATIVE PRODUCTION GAIN WITH 49% PROPEL SSP TECHNOLOGY TAIL-IN

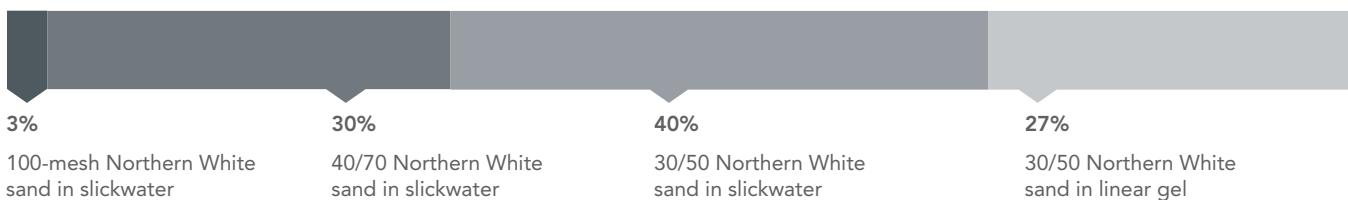


Cumulative Production (BOE)	Offset	Propel SSP Technology	% Change	Change
60-day	36,933	46,466	+ 26%	9,533

#### PROPEL SSP TECHNOLOGY WELL



#### OFFSET WELL





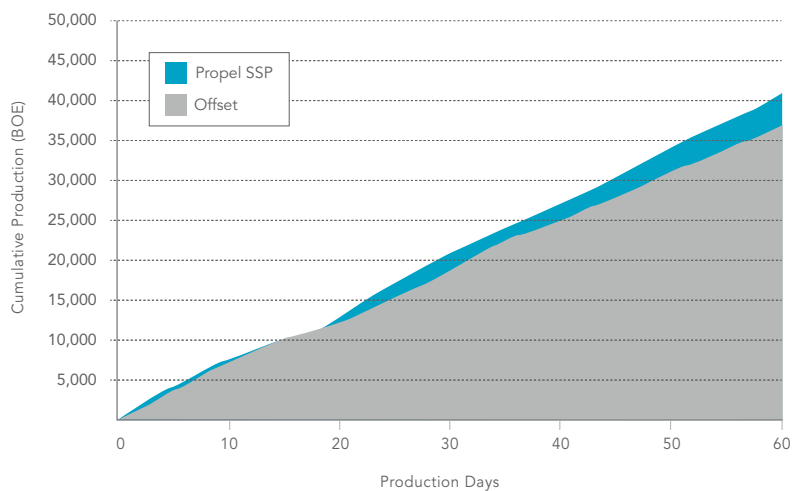
## PROPEL SSP TECHNOLOGY TAIL-IN VS. HYBRID SYSTEM

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#### Increased contact area and conductivity

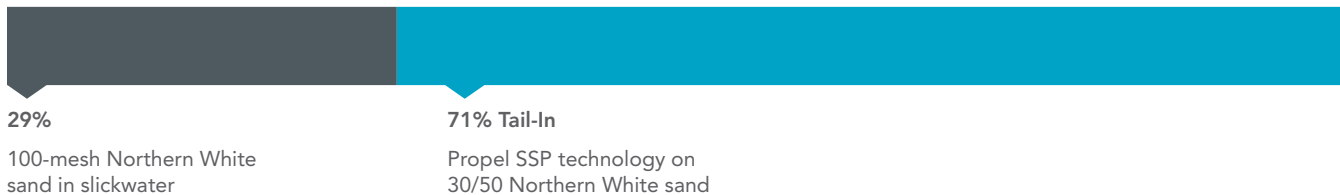
Just as with the previous hybrid design in the Marcellus formation, this case study documents the improved recovery possible when effectively transporting and uniformly distributing proppant in all dimensions throughout the fracture with a relatively low-viscosity fluid. The offset design included 24% crosslinked gel, which can be even tougher to manage post-breaking. The operator replaced formation-plugging viscosifiers with a Propel SSP technology tail-in. As this field trial reveals, the 71% Propel SSP technology tail-in eliminated the crosslinked and linear gels for a 12% production increase in the first 60 days.

60-DAY CUMULATIVE PRODUCTION GAIN WITH 71% PROPEL SSP TECHNOLOGY TAIL-IN

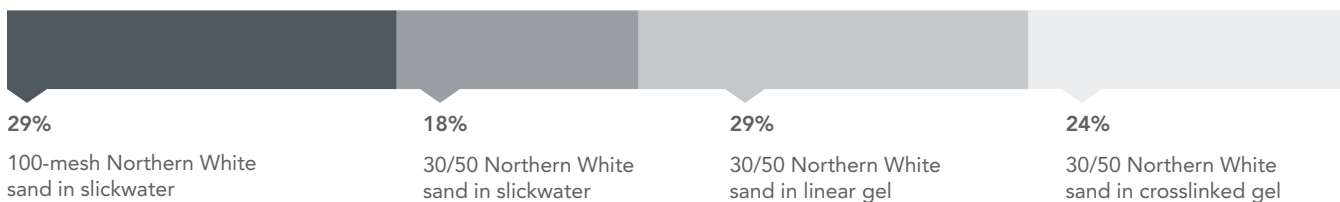


Cumulative Production (BOE)	Offset	Propel SSP Technology	% Change	Change
60-day	36,757	41,053	+ 12%	4,296

#### PROPEL SSP TECHNOLOGY WELL



#### OFFSET WELL



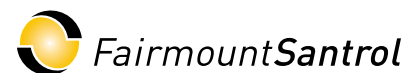
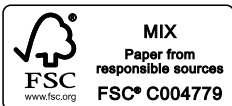
## FIELD TRIALS CONTINUING

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We are continuing extensive field trials of Propel SSP proppant transport technology in many different conditions. We are pleased with the short- and long-term production gains that E&P companies are achieving. We will keep you up to date on the latest production data.

Fairmount Santrol (NYSE: FMSA) is one of the largest providers of high-performance sand and sand-based products used by oil and gas exploration and production companies to enhance the productivity of their wells. Similarly, we provide high-quality products, strong technical leadership and applications knowledge to end users in the foundry, building products, water filtration, glass, and sports and recreation markets. Our company's global logistics capabilities include a wide-ranging network of distribution terminals and more than 8,500 railcars that allow the company to effectively serve customers wherever they operate. As one of the nation's longest continuously operating mining organizations, Fairmount Santrol has developed a strong commitment to sustainable development, environmental stewardship, and operational safety. Correspondingly, our motto and action orientation is: "Do Good. Do Well."

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