Evaluating Consistent Hole Charges vs SDP Charges in Unconventional PNP

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AUTHORS: Cam Le, Kyle Biega, Shell

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Agenda

- Summary of Field Trial
- Data Analysis on Stages Tested
- Conclusions from Field Trial
- Overview of Frac Pads Analyzed
- Data Analysis on Frac Pads
- Summary of Results and Conclusion
- Questions and Comments

Summary of Trial

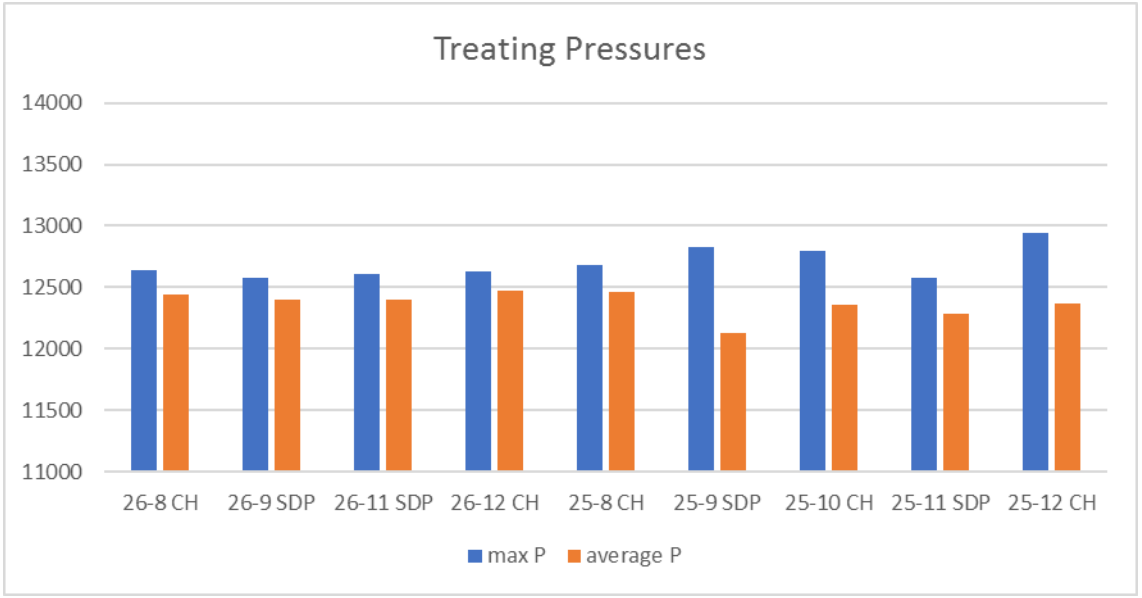
- Purpose: Recent well construction and frac design changes have resulted in higher-than-normal treating pressures and therefore lower-than-desired treating rates during frac. This trial was conducted to determine if a different perforation charge type can help lower treating pressures and therefore increase achievable pump rates.

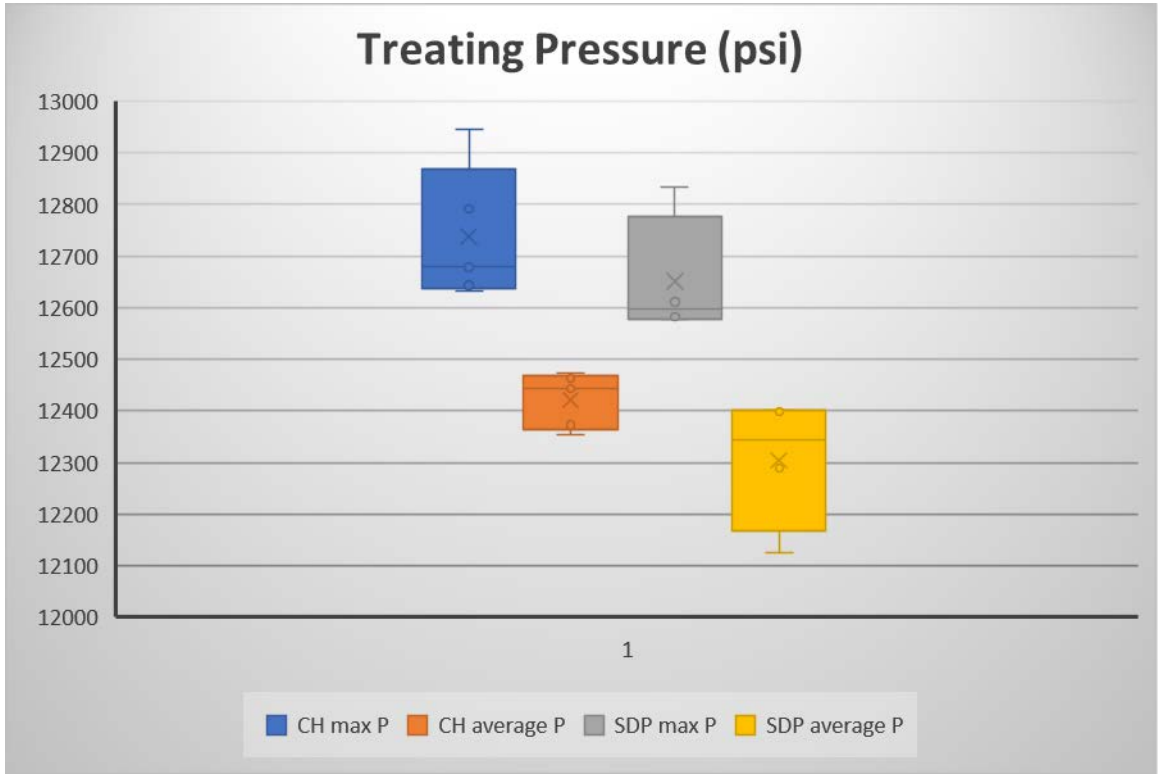
- Justification: The consistent hole charges do not cost any more than our standard PNP charges (non-consistent hole). Additionally, the charges are designed to create the same 0.37” hole diameter, which is aligned with the CTE’s recommendation based on limited entry. The benefit is that due to the charge design, it creates a more consistent hole size, regardless of eccentricity. The variation in hole diameter on the EH charge is <5%, while the variation in hole size for the conventional charge is 19%. If higher rates are achievable, pump times per stage and overall pad cycle time will decrease

- Trial Methodology: Stages 8 to12 on the My TB 6076-25H & 26H were alternated from the EHD charge to the non-EHD charge. Treatment design was kept as consistent as possible (same FR, acid, treating pressures, etc) to get a true determination if either of the charges resulted in higher achievable rates

Data per stage: Pressure

Well -stage	CH max P	CH average P	SDP max P	SDP average P	Well -stage
26-8	12643	12443	12582	12402	26-9
25-8	12678	12463	12832	12126	25-9
25-10	12791	12354	12611	12398	26-11
26-12	12633	12473	12577	12288	25-11
25-12	12945	12372			
Average	12738	12421	12650	12303	



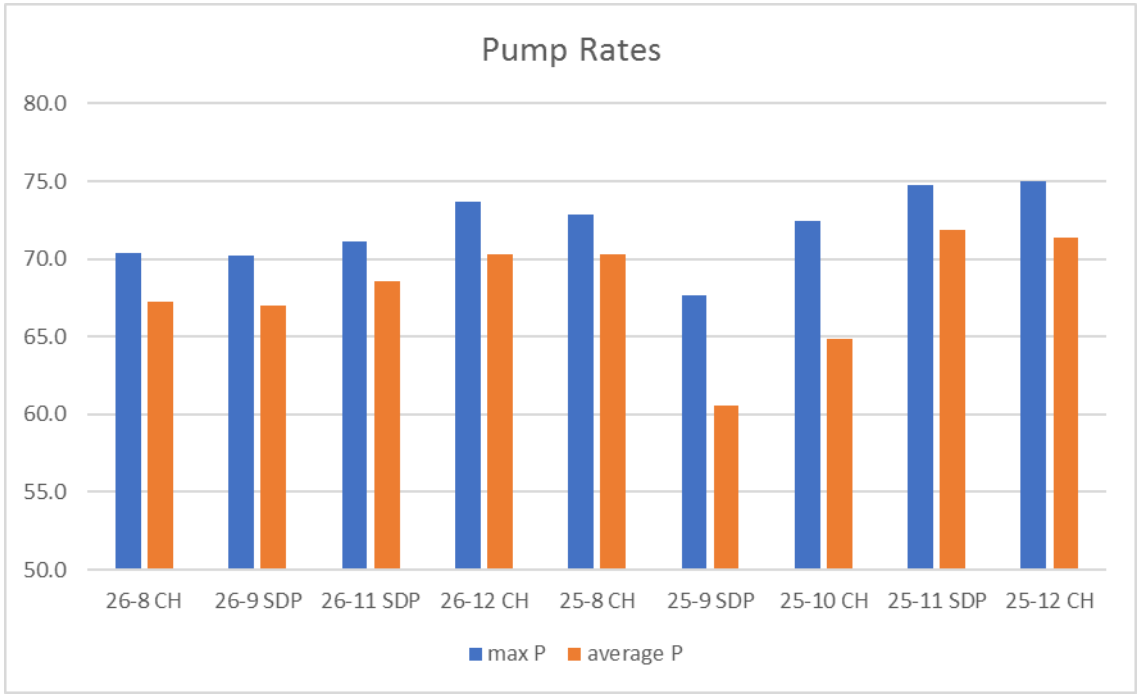


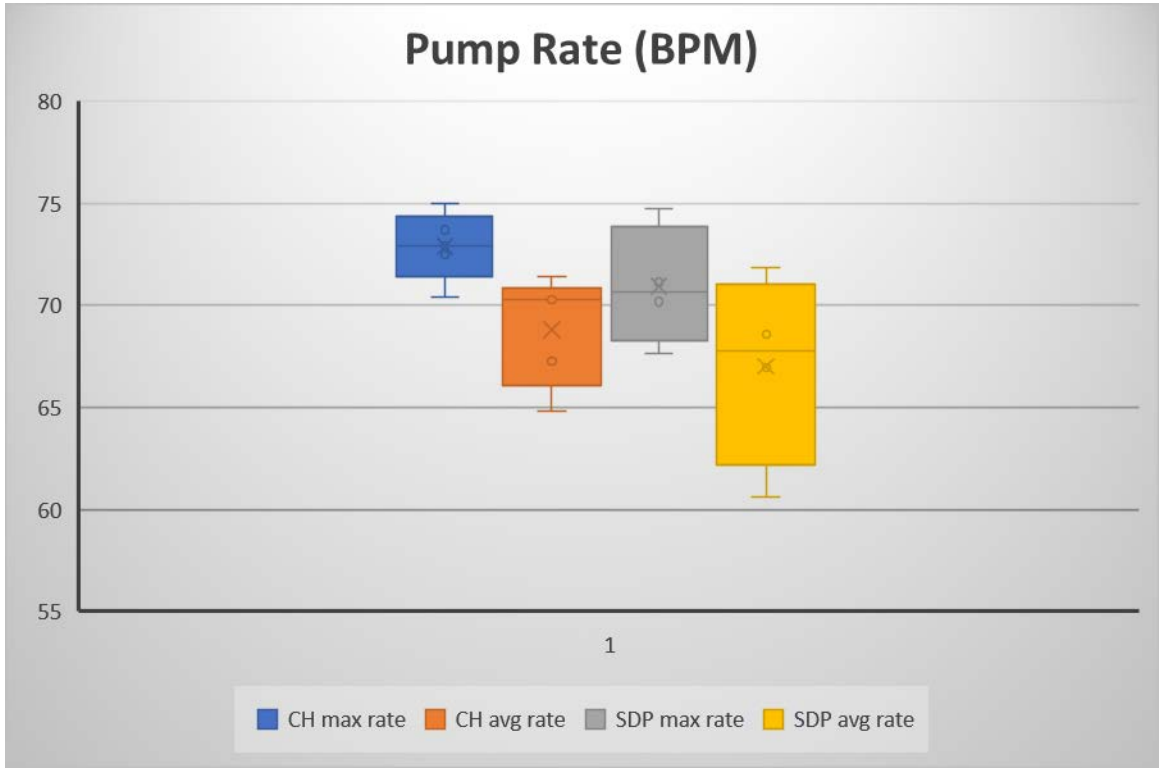
Treating pressure are very similar for both charges

Average pressure are more consistent with the CH charges

Data per stage: Rate

Well -stage	CH max rate	CH avg rate	SDP max rate	SDP avg rate	Well -stage
26-8	70.4	67.2	70.2	67.0	26-9
25-8	72.9	70.3	67.7	60.6	25-9
25-10	72.5	64.8	71.1	68.6	26-11
26-12	73.7	70.3	74.7	71.9	25-11
25-12	75.0	71.4			
Average	72.9	68.8	70.9	67.0	



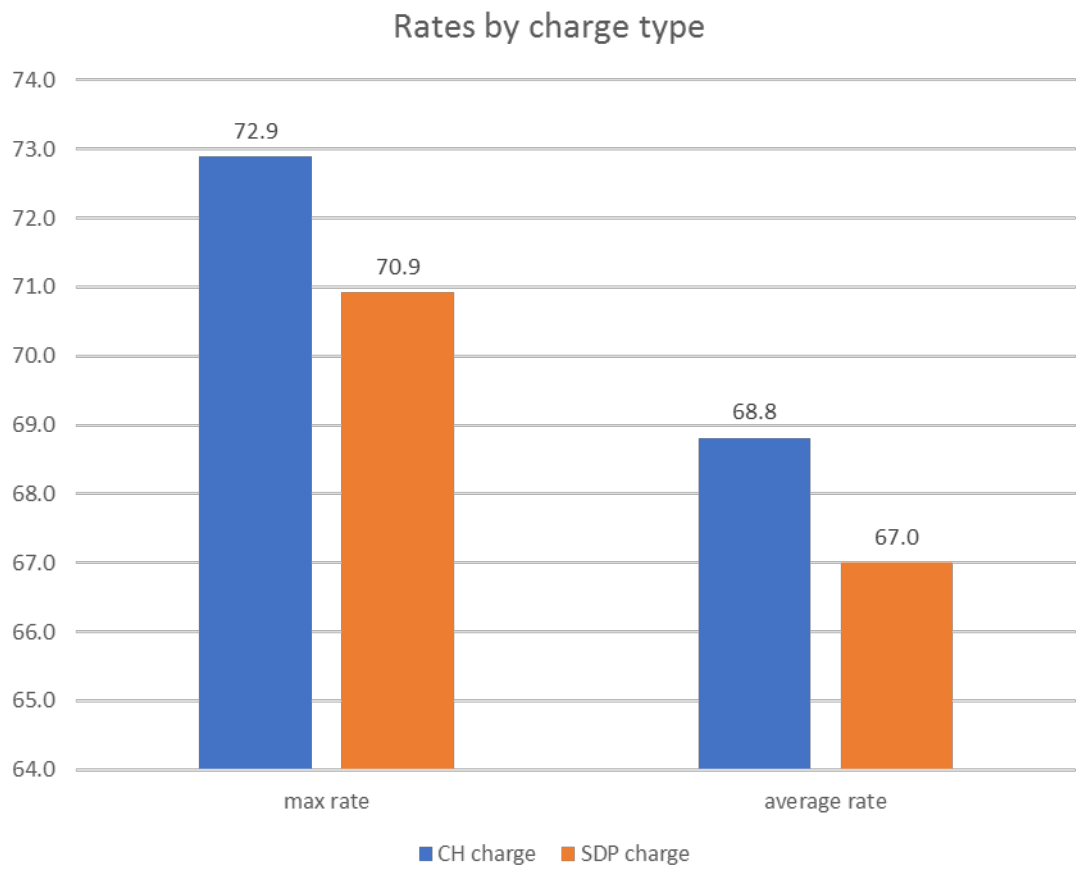


Max Rate and Average Pump Rates are higher for CH charges

Max Rate and Average Pump Rates are more consistent with the CH charges

Data per stage

Conclusion Stage Field Trial



1. For the stages analyzed, on average, the CH charge resulted in 1.8 bpm increase compared to SDP charge

2. Since there is no increase in cost for this charge, it is recommended to continue to use the CH charges for future wells

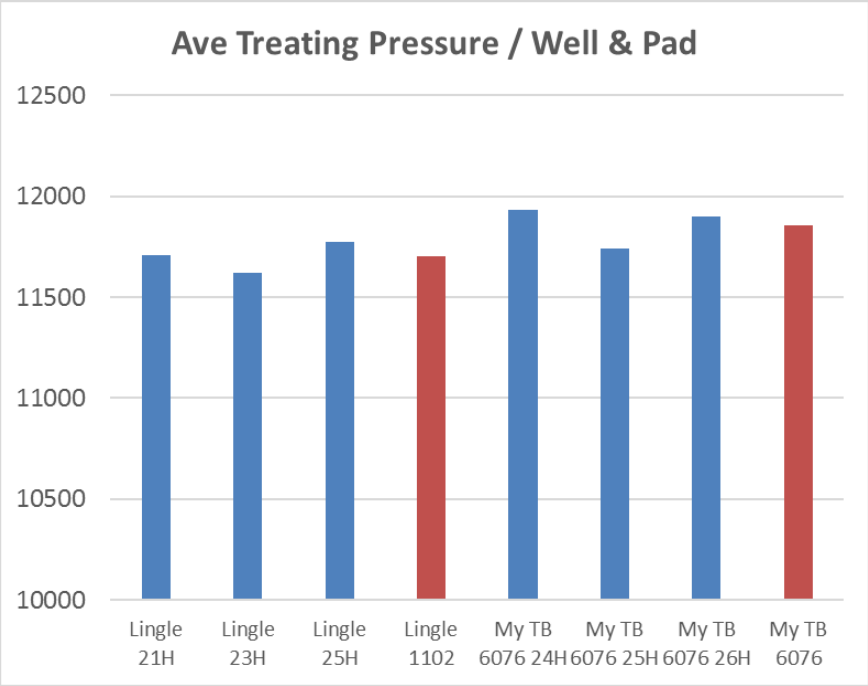
Overview of Frac Pads Analyzed

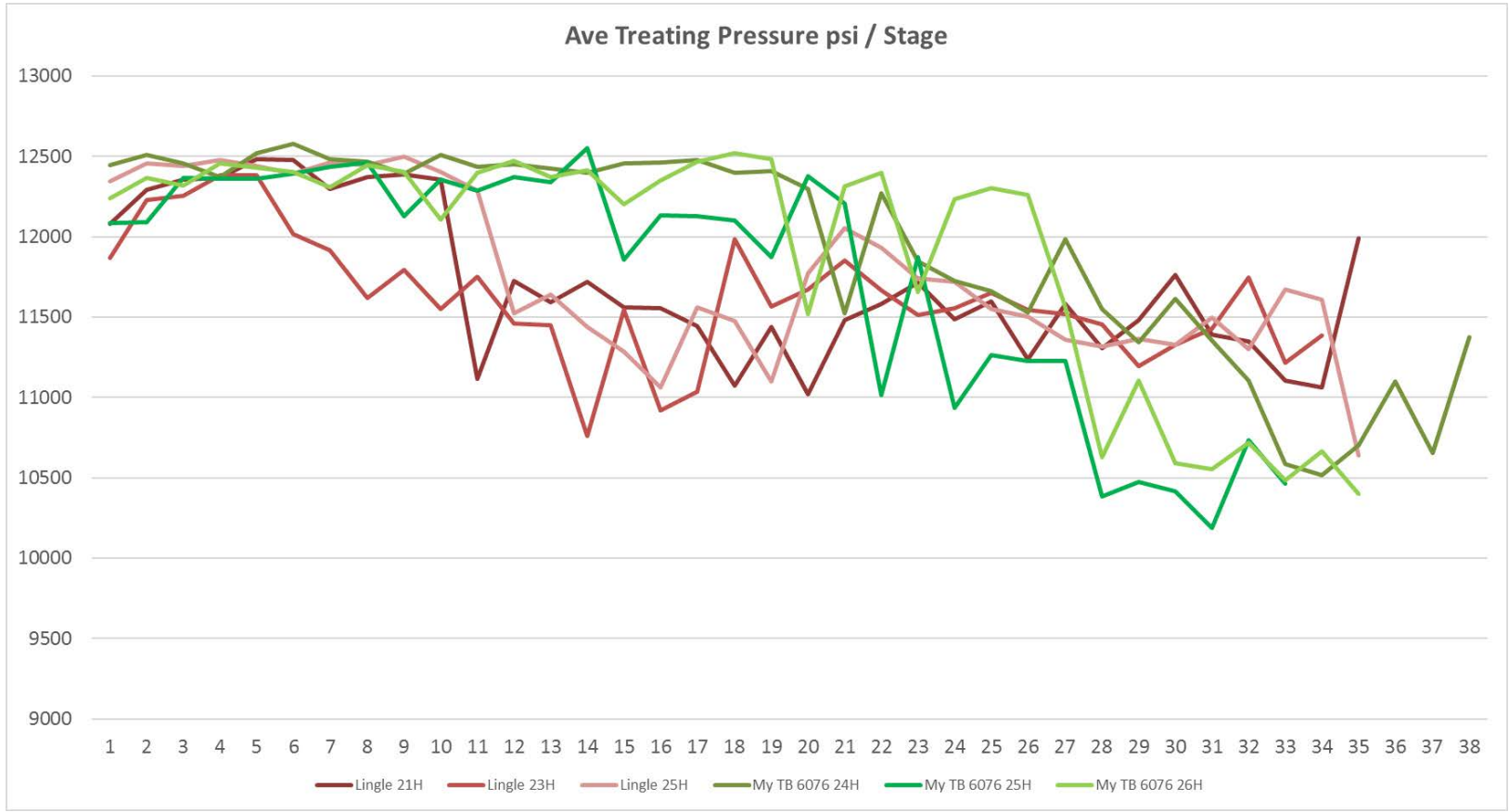
- Lingle 1102 and My TB 6076
- Water quality: 32,800 vs 46,500 ppm Chlorides
- Same Total Prop Design
- Utica, similar BHT,BHP, # of stages, clusters
- Frac with gas fleet
- Only a small knob was changed, Charges
  - Both have an average hole size of 0.37”

Full Pad Data Analysis: Treating Pressure

Reconfirms that treating pressures are similar due to max rate completion design

1% delta in average treating pressures



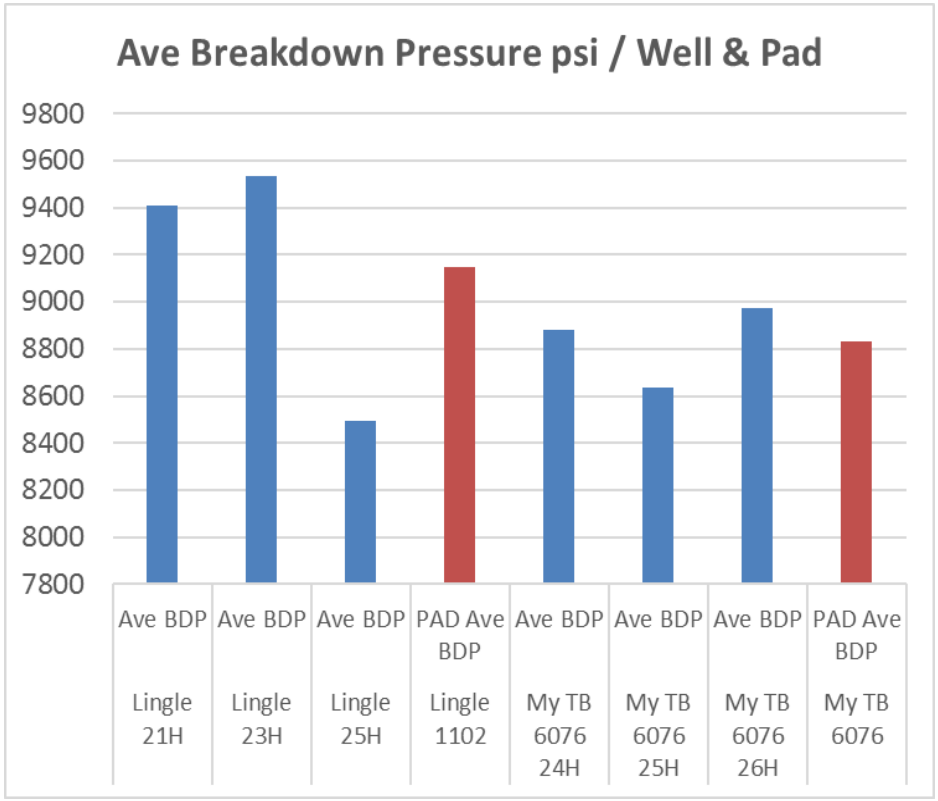


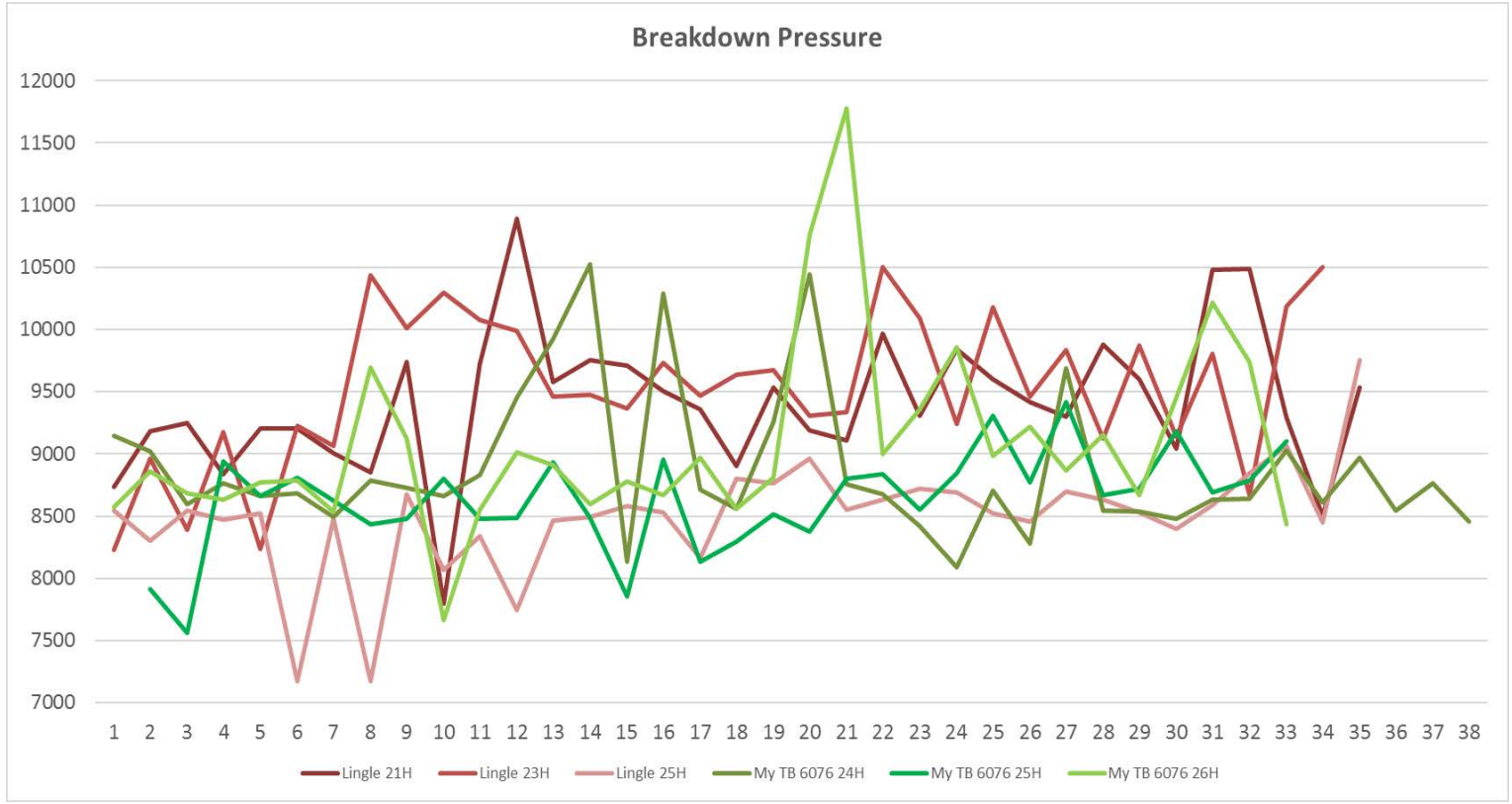
Lingle 21H	Lingle 23H	Lingle 25H	Lingle 1102	My TB 6076 24H	My TB 6076 25H	My TB 6076 26H	My TB 6076	
Ave Treat P	Ave Treat P	Ave Treat P	PAD Ave Treat P	Ave Treat P	Ave Treat P	Ave Treat P	PAD Ave Treat P	D Ave Treat P
11709.55	11623.75	11773.64	11702.31	11930.79	11741.45	11901.09	11857.77	155.46

Full Pad Data Analysis: Breakdown Pressure

Observed reduce breakdown pressures

On average 3.44% reduction



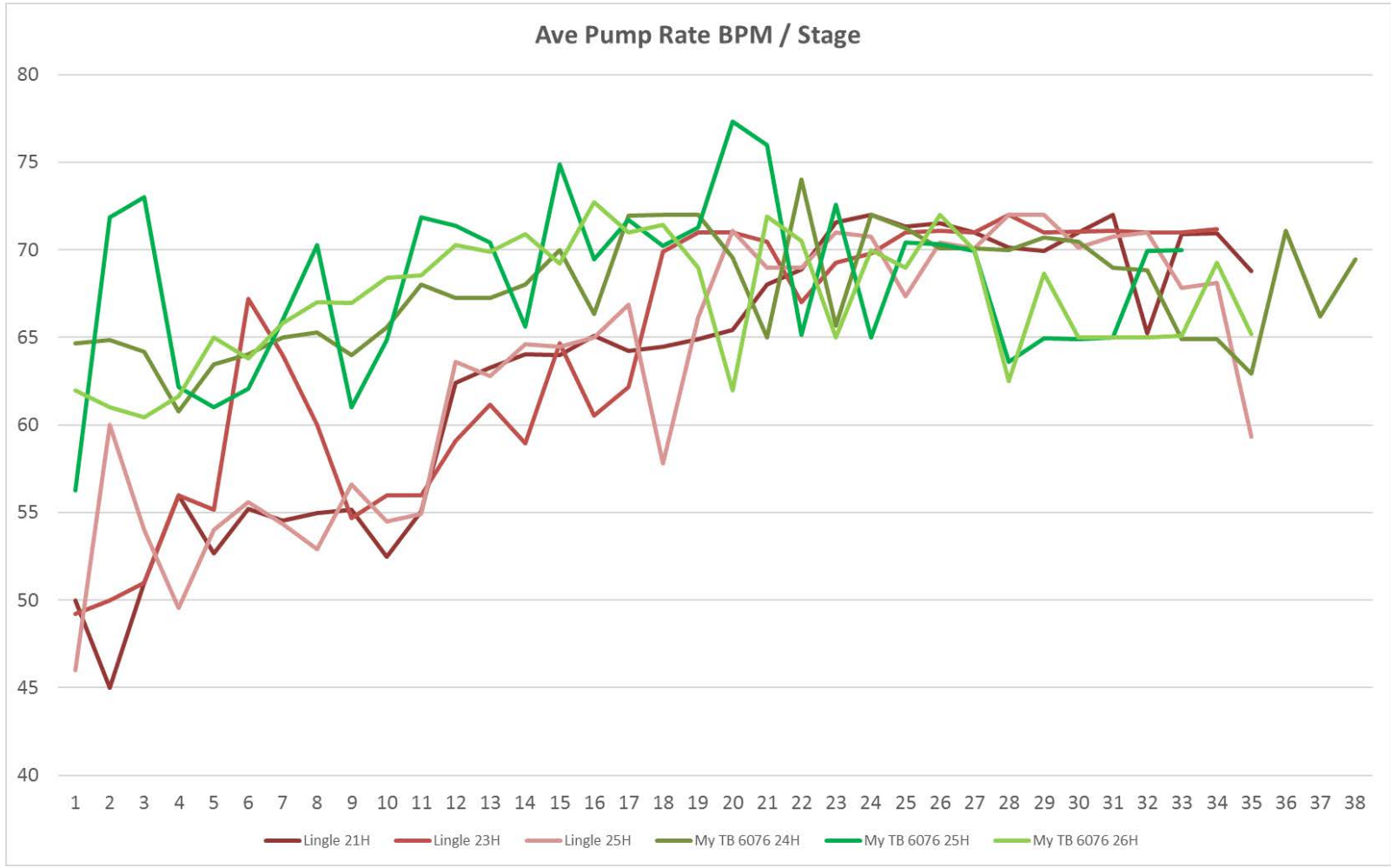


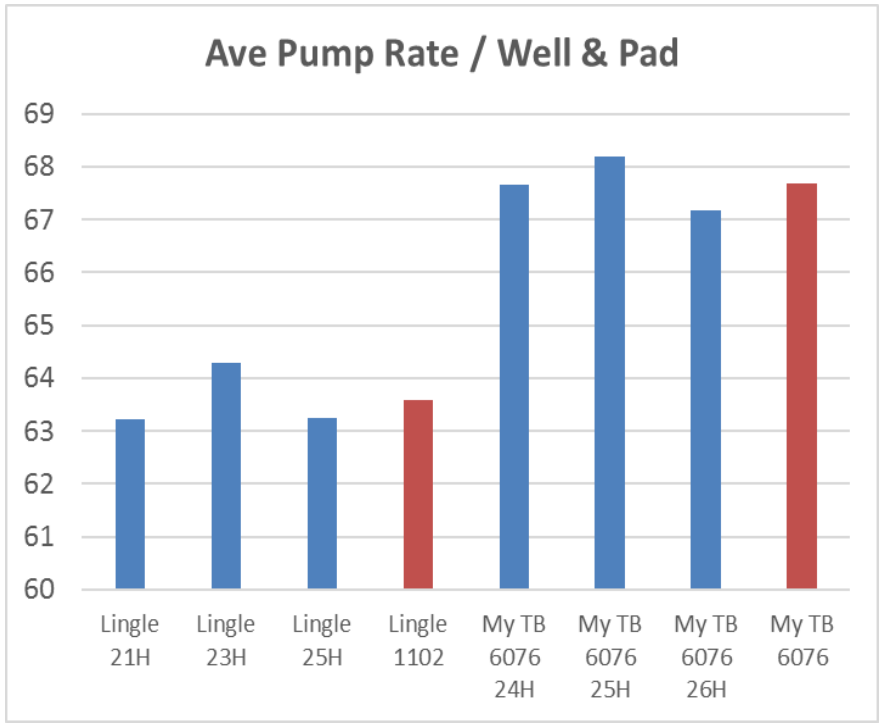
Lingle 21H	Lingle 23H	Lingle 25H	Lingle 1102	My TB 6076 24H	My TB 6076 25H	My TB 6076 26H	My TB 6076	
Ave BDP	Ave BDP	Ave BDP	PAD Ave BDP	Ave BDP	Ave BDP	Ave BDP	PAD Ave BDP	D Ave BDP
9408.11	9533.53	8494.66	9145.43	8880.45	8638.03	8974.88	8831.12	314.31

Full Pad Data Analysis: Pump Rate

Observed increase average pump rate

On average 6.42% increase





Lingle 21H	Lingle 23H	Lingle 25H	Lingle 1102	My TB 6076 24H	My TB 6076 25H	My TB 6076 26H	My TB 6076	
Ave Rate	Ave Rate	Ave Rate	PAD Ave BDP	Ave Rate	Ave Rate	Ave Rate	PAD Ave Rate	D Ave Rate
63.23	64.29	63.25	63.59	67.65	68.19	67.18	67.68	4.08

Full Pad Data Analysis: Other Observations

		# of stages	Ave Fluid Frac/stage bbls	Total Fluid Frac bbls	% Prop Placed
SDP	Lingle 1102	104	10083	1048614	96.75
CH	My TB 6076	106	8981	952016	98.75
	Delta	2	1102	96598	2
			10.93%	9.21%	

Summary of Results and Conclusion

- From Field Trail data on selected stages
  - Treating Pressures are similar due to completion designed to max rate
  - “On average, the CH charge resulted in 1.8 bpm increase compared to SDP charge”

- From post job Frac Pad data analysis
  - Reconfirms Treating Pressures similarity
  - 3.44% reduction in Breakdown Pressures
  - 6.42% gain in Ave Pump Rates
  - 10.93% reduction in fluids per stage
  - 2 % gain in proppant place

- Conclusion CH has displace current charge for the whole asset
  - My TB 6076 deliver expected production vs Lingle 1102 was under
  - Moved away from max rate design due to increased maintenance
  - Using benefits to reduce pump maintenance
    - Set new record on pumped fracs per day
    - Decrease days to deliver pad

QUESTIONS? THANK YOU

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