

Cross-Unit, Longer Laterals, and More Sand Create Better Well Economics in North Louisiana

Joe Anderson with Nadel and Gussman

Our Company

Nadel and Gussman was formed in 1940 with an initial partnership between Isadore Nadel and his son-in-law, Herb Gussman. We are a fourth generation family-owned, independent oil and gas production and exploration company headquartered in Tulsa, Oklahoma.

Isadore Nadel came to Oklahoma in 1919 to open a grocery store and join his extended family. He began investing in shallow oil in the 1920s and 1930s. In 1935, Herb Gussman, Nadel's son-in-law, joined the company. Gussman would later go on to lead one of the largest oil producing companies in both Osage, Oklahoma and Kansas and make significant contributions to the modern oil industry and community in Tulsa, Oklahoma. Stephen Heyman and Jim Adelson joined the leadership team in 1965 and 1986, respectively, and still guide Nadel and Gussman today. Under their leadership, Nadel and Gussman grew aggressively into other basins in the United States.

Today, we are primarily focused on operated and non-operated opportunities that require horizontal drilling and completion technology in both conventional and unconventional plays. We have projects across the United States, including Oklahoma, Kansas, North Dakota, Texas, and Louisiana.



Isadore Nadel



Herb Gussman

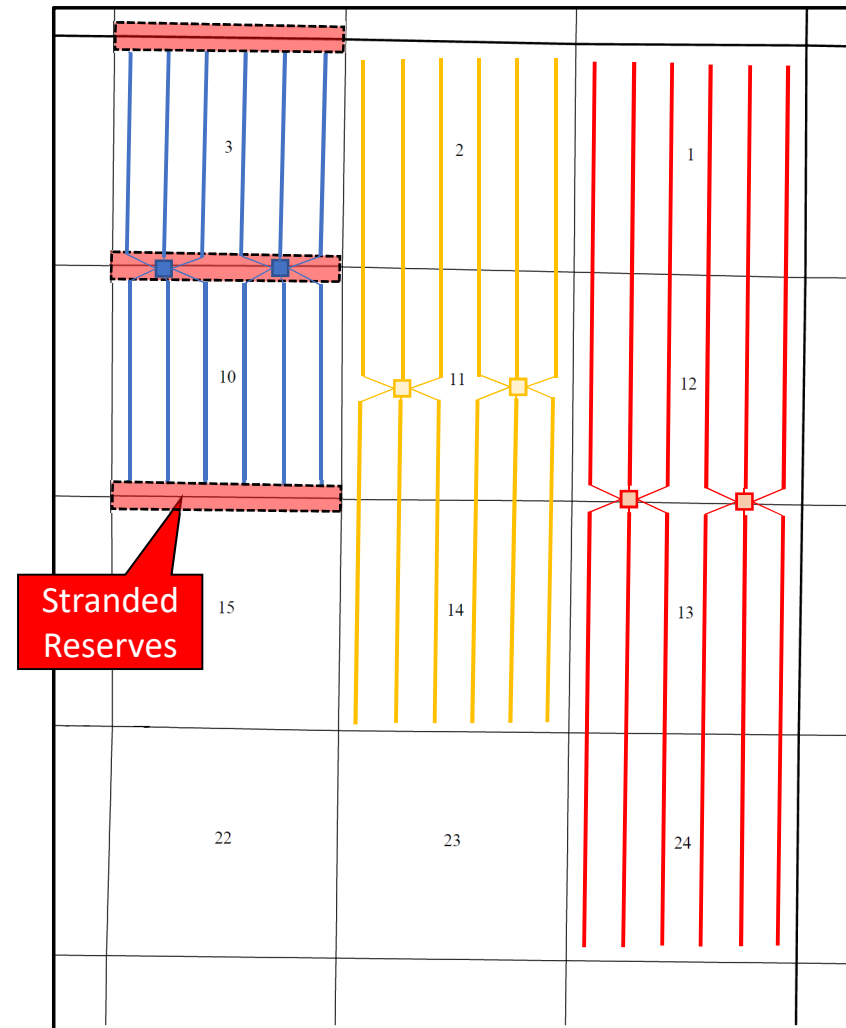
Louisiana Operations

2018 Gas Production Ranking by Operator Onshore Louisiana

Rank	Organization Name	MCFD	MCF Total	Producing Wells
1	INDIGO MINERALS LLC	933,291	340,651,101	1023
2	CHESAPEAKE OPERATING, L.L.C.	910,092	332,183,601	853
3	VINE OIL & GAS LP	835,748	305,048,183	362
4	COVEY PARK GAS LLC	572,994	209,142,727	258
5	RANGE LOUISIANA OPERATING, LLC	536,732	195,907,280	460
6	GEP HAYNESVILLE, LLC	442,371	161,465,415	373
7	COMSTOCK OIL & GAS--LA, LLC	424,956	155,109,044	344
8	QEP ENERGY COMPANY	341,630	124,695,071	474
9	EXCO OPERATING COMPANY, LP	318,753	116,344,979	519
10	AETHON ENERGY OPERATING LLC	296,154	108,096,104	1088
11	BHP BILLITON PETRO (TXLA OPERATING) CO.	261,365	95,398,067	440
12	NADEL AND GUSSMAN RUSTON, LLC	129,487	47,262,659	167
13	HILCORP ENERGY COMPANY	117,042	42,720,264	518
14	TANOS EXPLORATION II, LLC	113,419	41,397,853	702
15	BHP BILLITON PETRO (WSF OPERATING), INC.	89,032	32,496,831	33
16	PETROQUEST ENERGY, L.L.C.	68,297	24,928,367	16
17	BHP BILLITON PETRO (KCS RESOURCES), LLC	68,022	24,827,875	74
18	GOODRICH PETROLEUM COMPANY	67,358	24,585,652	36
19	TEXAS PETROLEUM INVESTMENT COMPANY	59,099	21,571,300	710
20	XTO ENERGY INC.	56,318	20,556,182	820

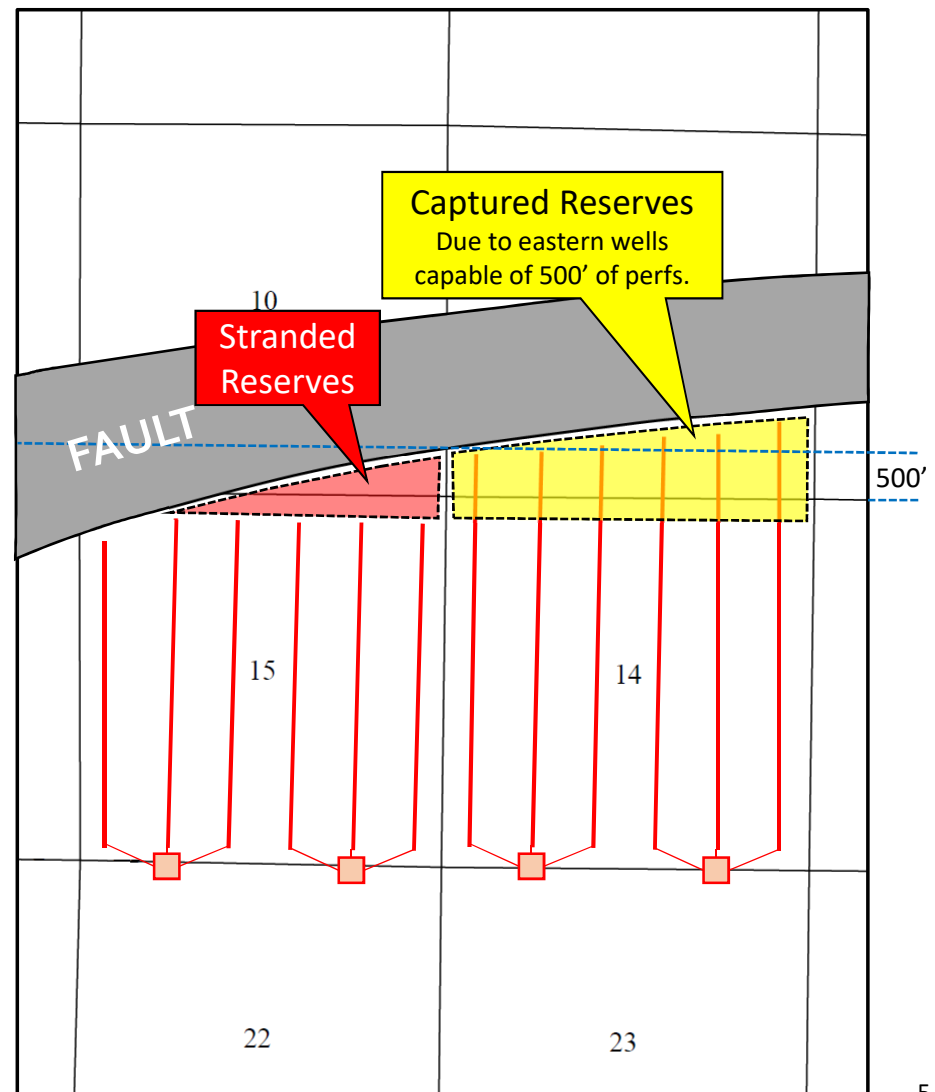
Why Cross Units?

- Longer, more economic laterals.
- Fewer surface locations.
- Stimulation and production of normally stranded reserves in the 660' of unit line offset cushion—330' for each unit.



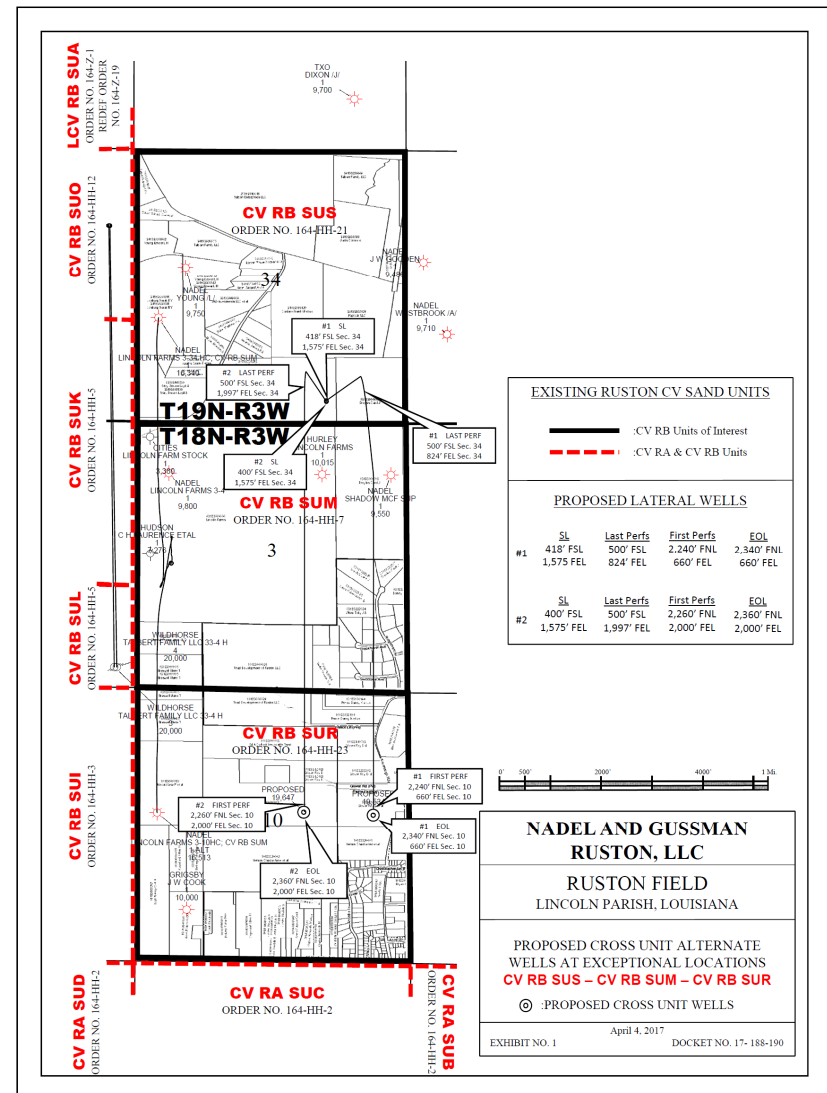
Why Cross Units?

- Longer, more economic laterals.
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- Stimulation and production of normally stranded reserves in the 660' of unit line offset cushion—330' for each unit.
- Capture of stranded of reserves in thin fault blocks.
- No casing point election
- Optimum spacing



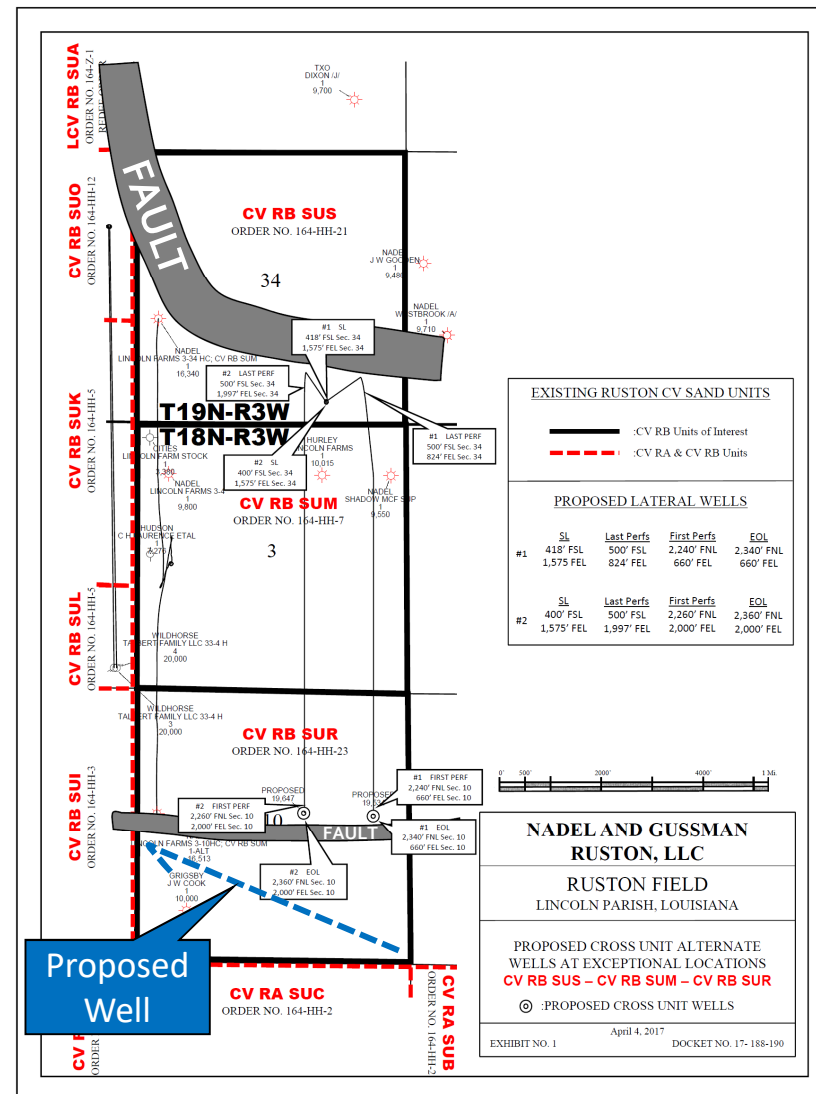
Cross Unit Proposal Criteria

- Agreement of over 50% of each unit.
- Reservoir Classification
 - Shales and Tight gas sands
- Pre-App Conference
- Hearing Application
 - Must have 500' minimum perforated wellbore in initial unit well.
- Hearing
- Order
- Working Interest proportionally determined by the number of feet of perforations in each unit.
- Working Interest being in the heel or toe is critical.



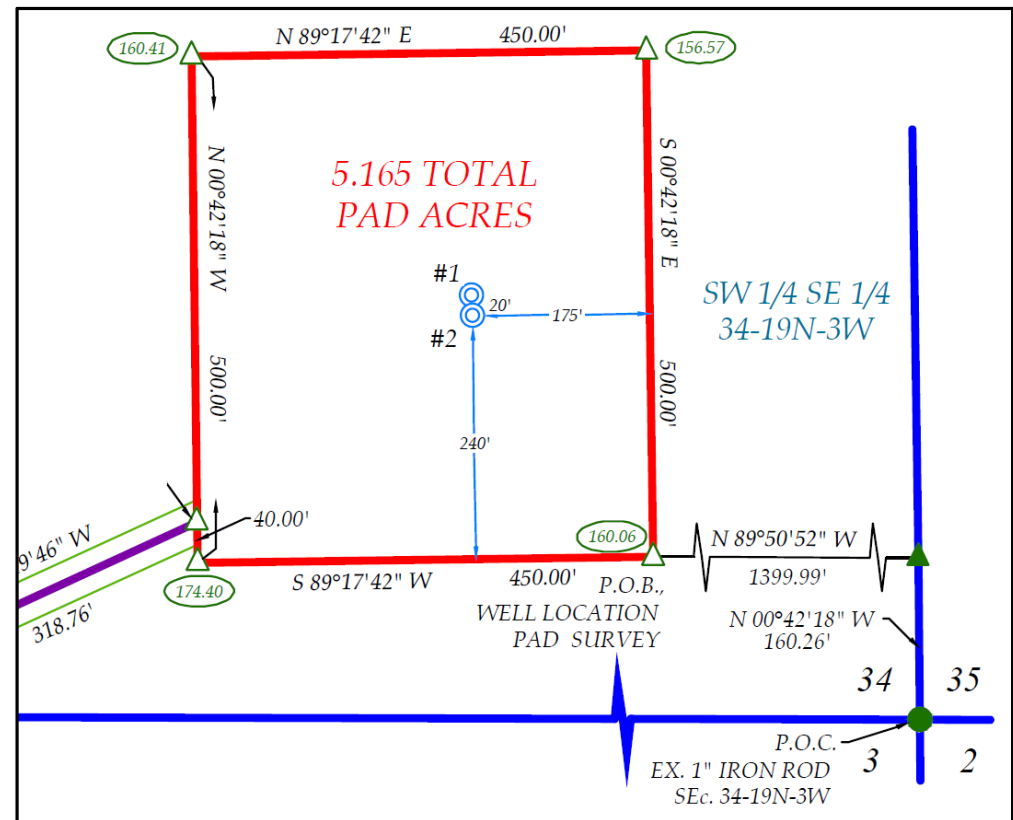
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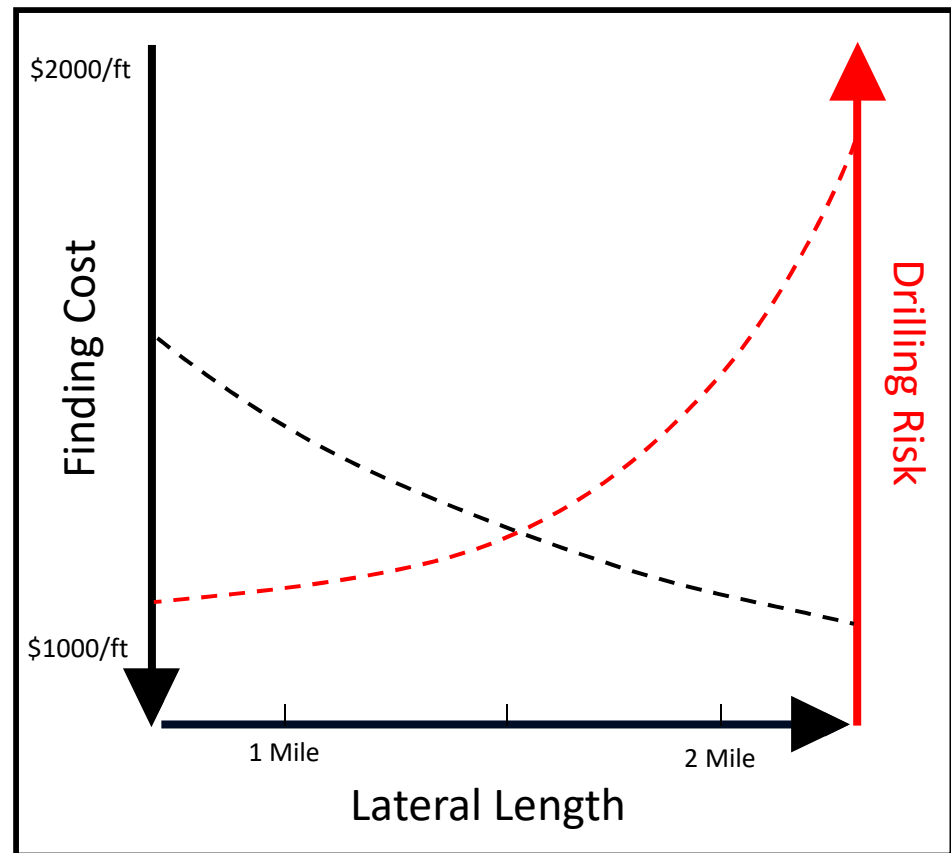
Surface Use

- 5-6 acres
- Location size driven by frac jobs and ability to frac 24/7
- Wells hooked up to production before frac job commences. Gas emissions and ability to sell gas with no flaring
- +/- 350 truckloads of sand per mile of lateral
- Water availability +/- 400,000 Bbls per mile of lateral
- Example: 20 acre pond drops +/- 2.5 feet per mile of lateral



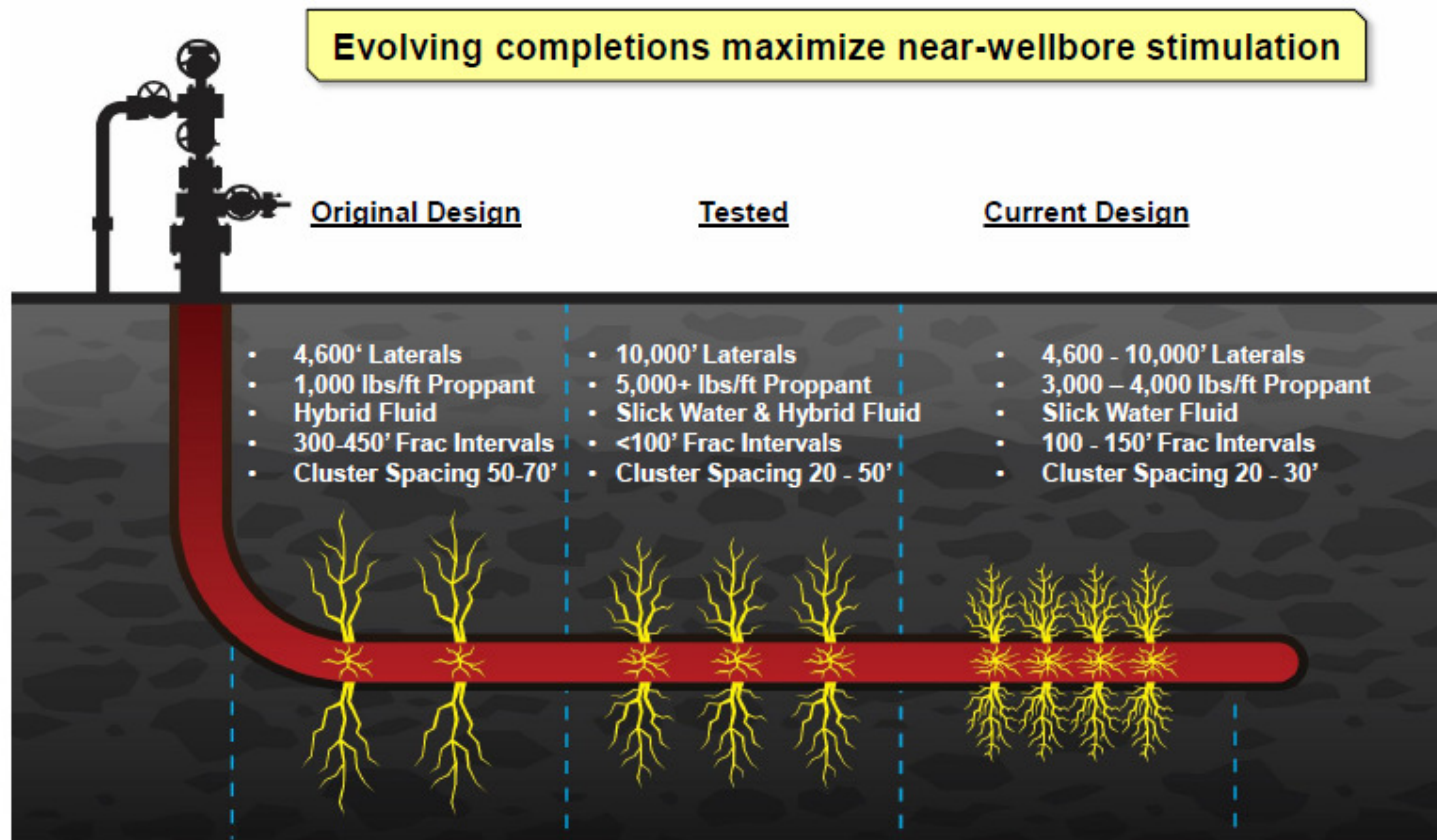
Drilling

- Issues with Longer Laterals
 - Temperature +/- 300°F
 - Increasing stand pipe pressure and torque
 - Harder to slide to stay in zone
 - More operational risk the further you go.



Completion Strategy

Haynesville Completion Evolution

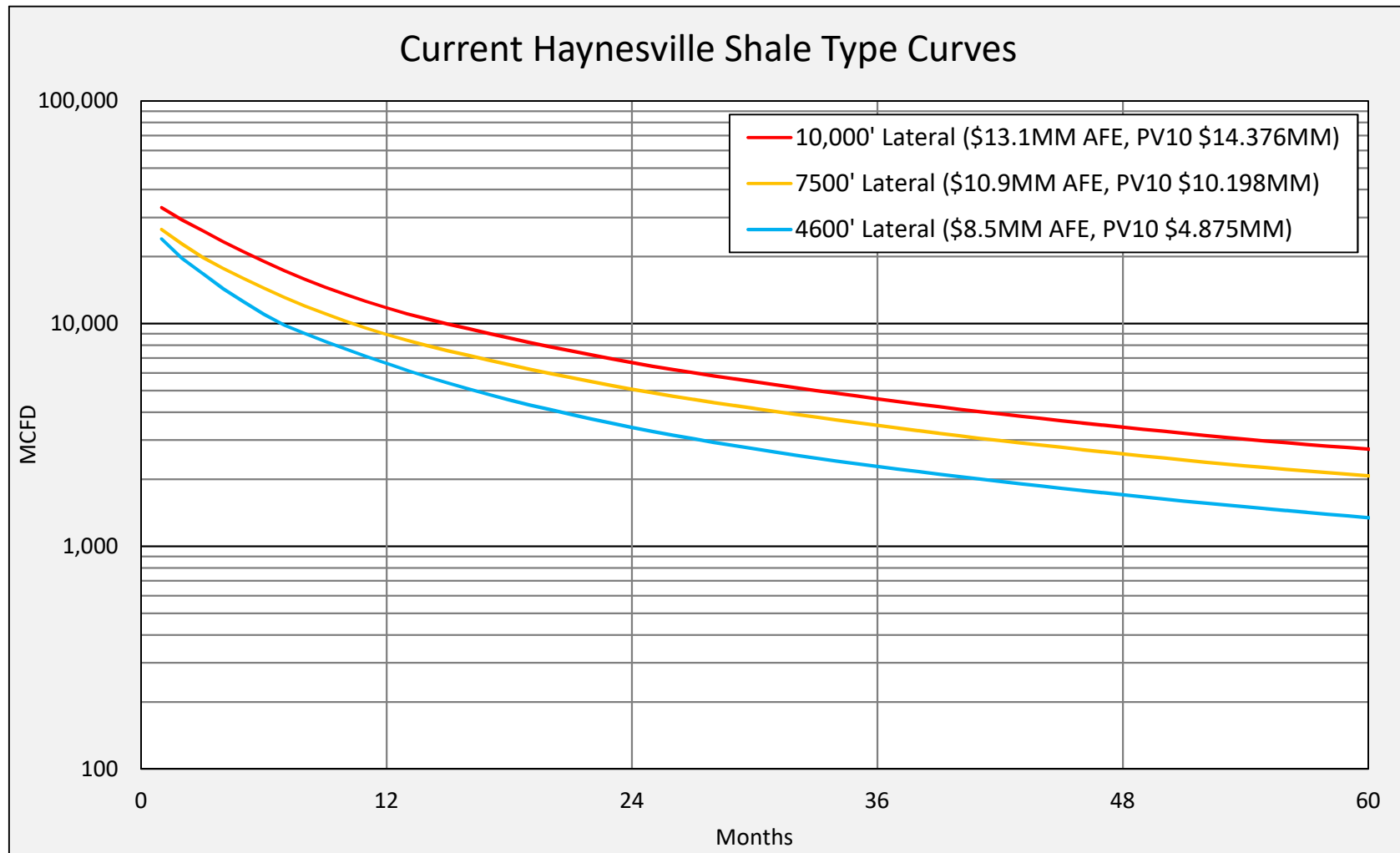


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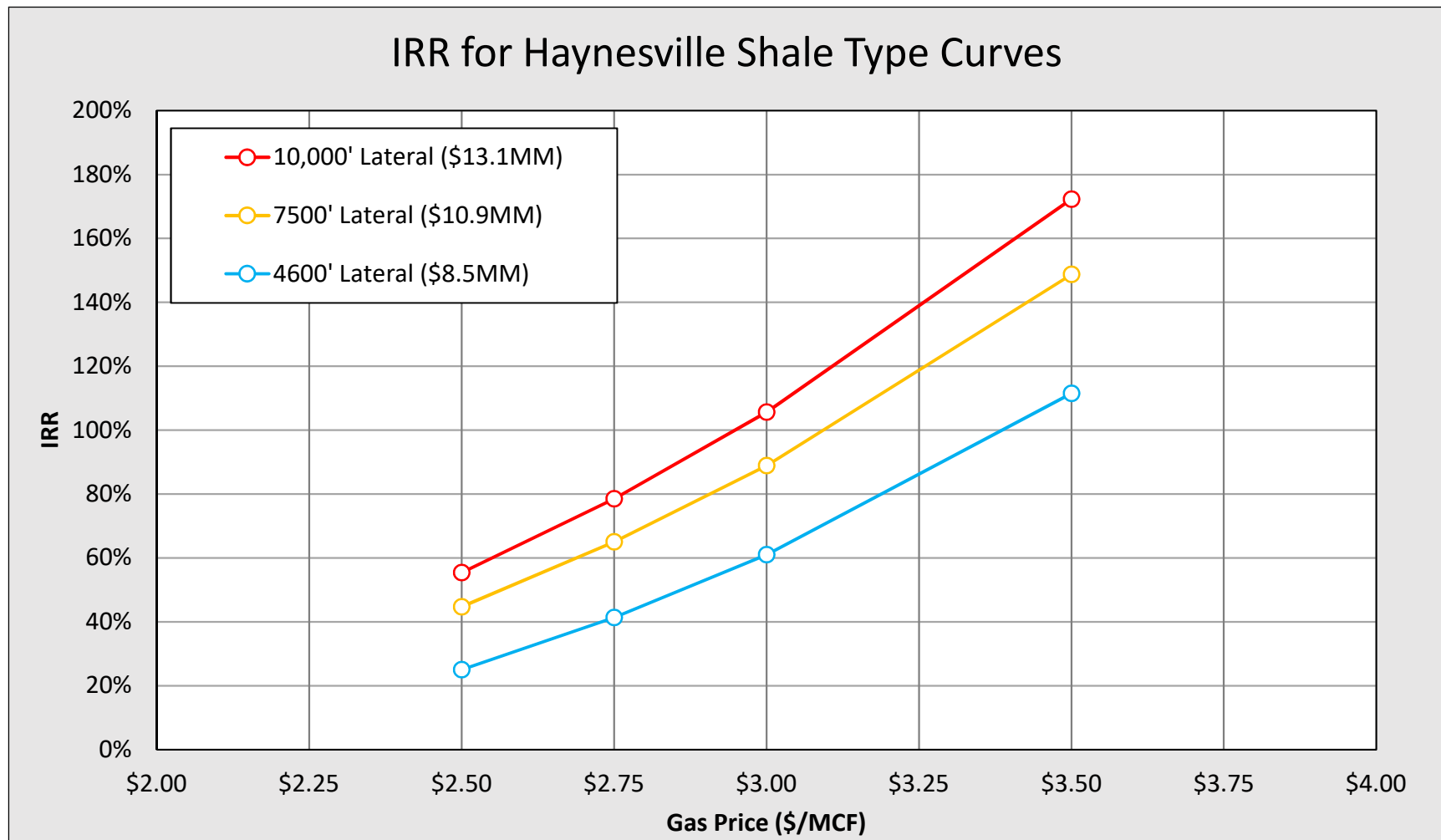


Management Presentation

Production and Economics



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Lateral Length	AFE \$MM	PV10 \$MM	PV10 per Section \$MM	CAPEX per Section \$MM
4600	8.5	4.875	14.6	51.0
7500	10.9	10.198	30.6	43.6
10000	13.1	14.376	43.1	39.3

- Developing a section with 7500' laterals rather than 4600' laterals reduces CAPEX per section by **14.5%** and produces a **116% increase in PV10**.
- Developing a section with 10,000' laterals rather than 4600' laterals reduces CAPEX per section by **22.9%** and produces a **204% increase in PV10**.