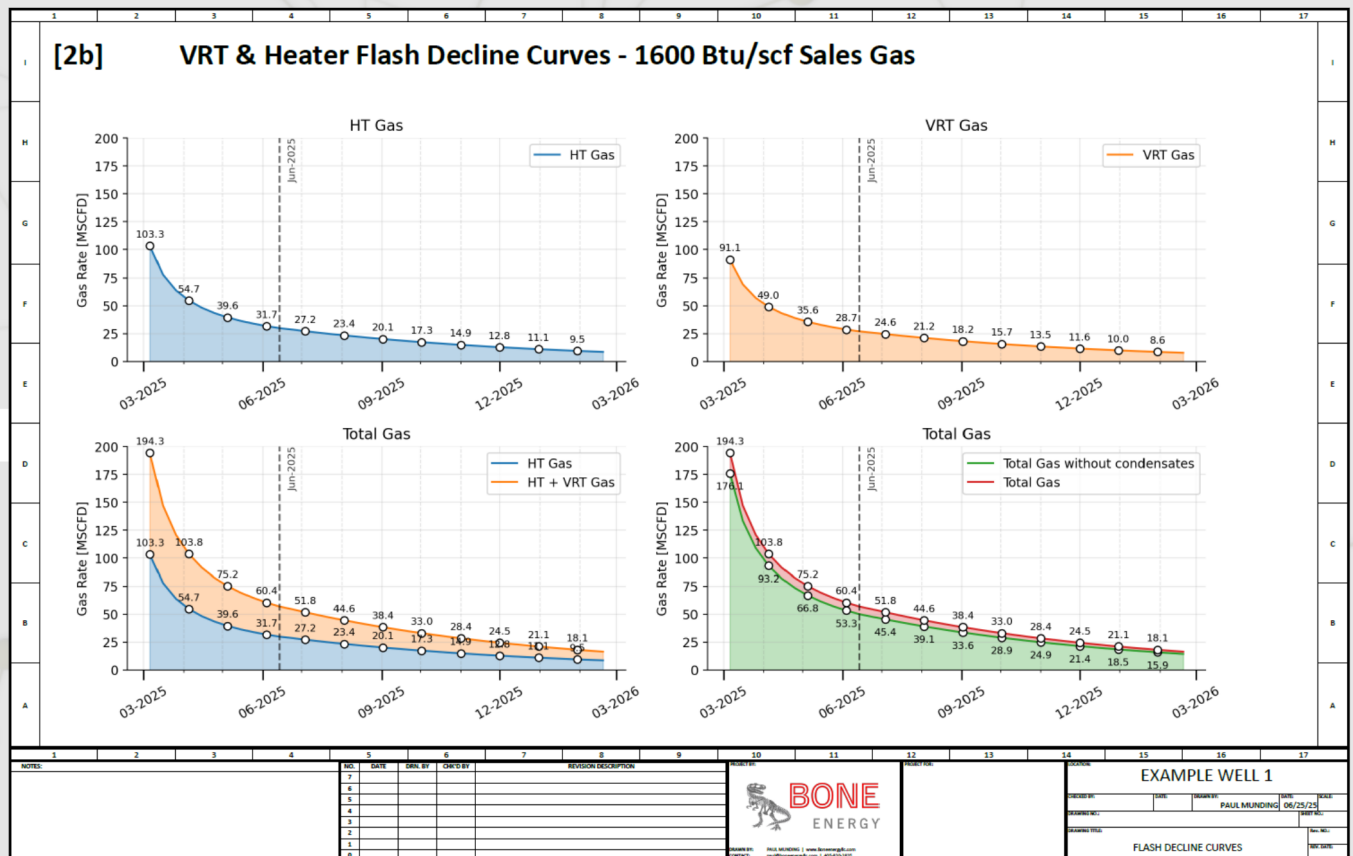
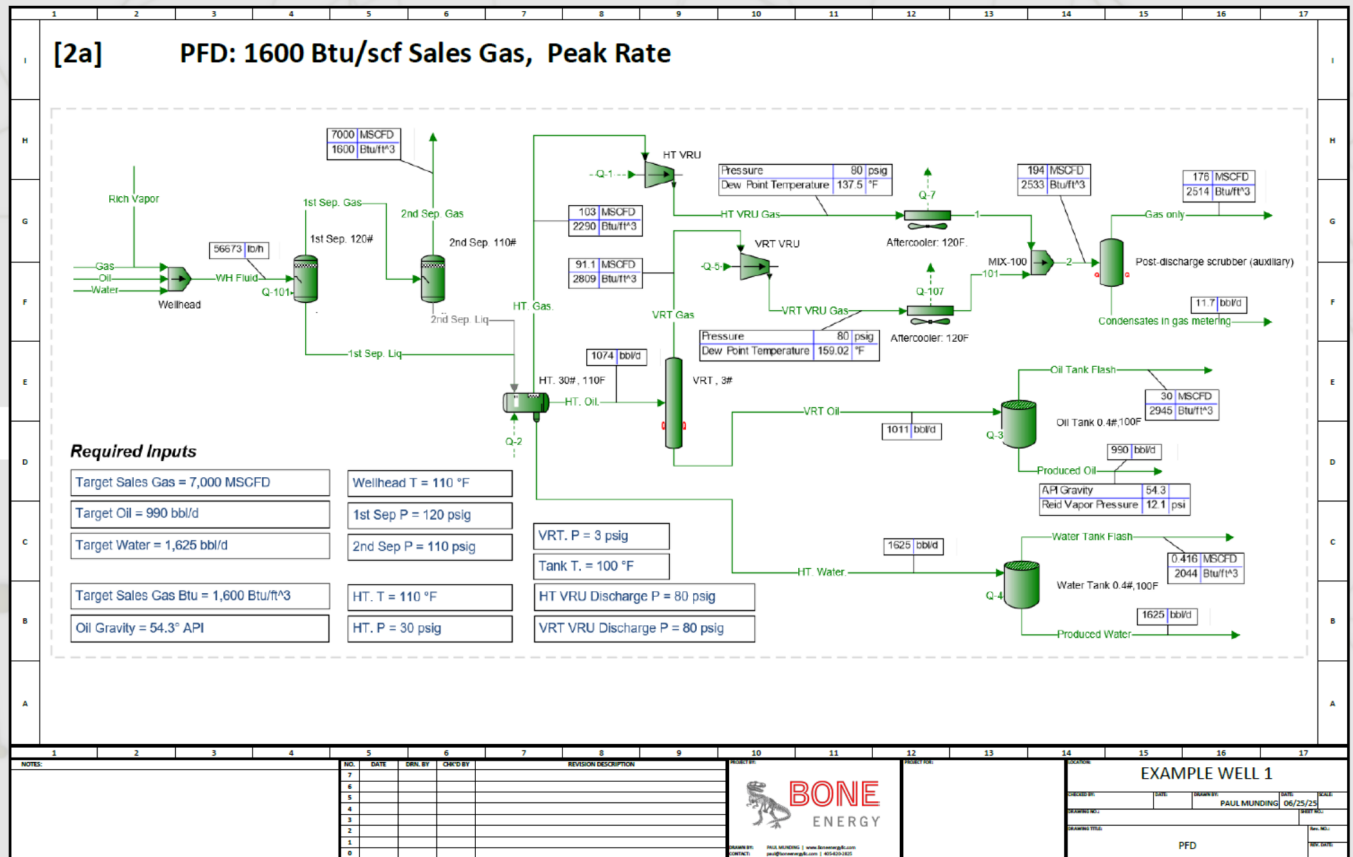


Vapor Recovery Sizing

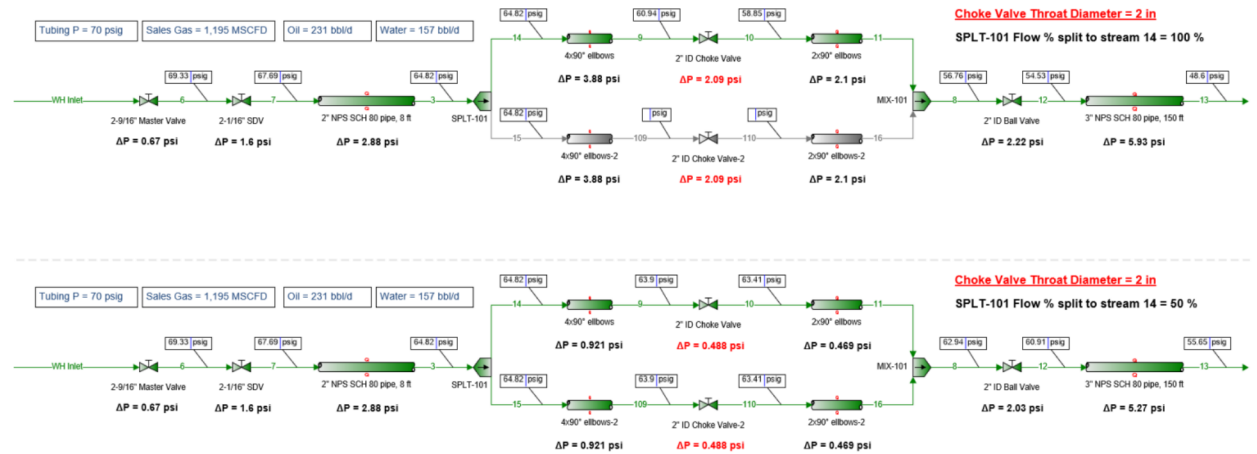
Equipment Sizing & Flash Gas Rate Predictions



Friction Analysis

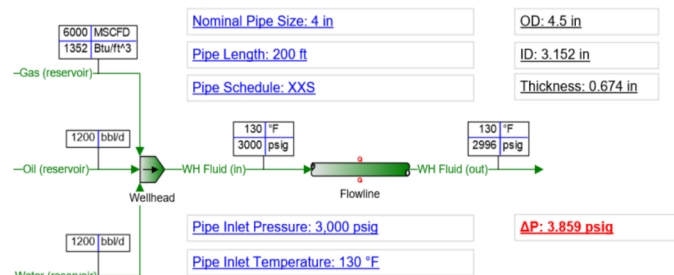
Pipe Sizing & Flow System Optimizations

[1a2] 2" Choke: One-Way Flow vs. Two-Way-Split Flow



PIPE FRICTION ANALYSIS [Part 1: 500# ~ 3000#]

SIMULATION SCREENSHOT EXAMPLE



EXECUTIVE SUMMARY

Frictional pressure drops were evaluated for a 200-ft wellhead flowline transporting 6,000 Mscf/d gas, 1,200 BOPD oil, and 1,200 BWPD water. Simulations were run across the following parameter ranges:

- Line size: NPS 3-in and 4-in
- Wall thickness: Schedule 80, Schedule 160, and XXS
- Inlet pressure: 500–3,000 psig (500-psig increments)

Results are summarized in the table at right.

The friction drops are bigger at low pressures due to the expansion of gas causing more friction in the restricted pipe space.

Nominal Pipe Size [in]	OD [in]	ID [in]	Thickness [in]	Length [ft]	Pipe Schedule	Inlet P [psig]	Inlet T [°F]	ΔP [psig]
3	3.5	2.9	0.3	80	160	500	130	32.1
						1000		14.6
						1500		9.8
						2000		7.7
						2500		6.6
						3000		5.9
	3.5	2.624	0.438	200	160	500		56.3
						1000		24.8
						1500		16.6
						2000		13.0
						2500		11.1
						3000		9.8
4	3.5	2.3	0.6	80	XXS	500		124.4
						1000		51.0
						1500		33.1
						2000		25.8
						2500		22.0
						3000		19.6
	4.5	3.826	0.337	80	160	500		7.1
						1000		3.5
						1500		2.3
						2000		1.8
						2500		1.6
						3000		1.4
4	4.5	3.438	0.531	200	160	500		12.5
						1000		6.0
						1500		4.1
						2000		3.2
						2500		2.7
						3000		2.5
4	4.5	3.152	0.674	80	XXS	500		20.3
						1000		9.5
						1500		6.4
						2000		5.0
						2500		4.3
						3000		3.9