

GE Powers 3C-26HZ Bradenhead Pressure Rise

9/26/2016



Executive Summary

Background

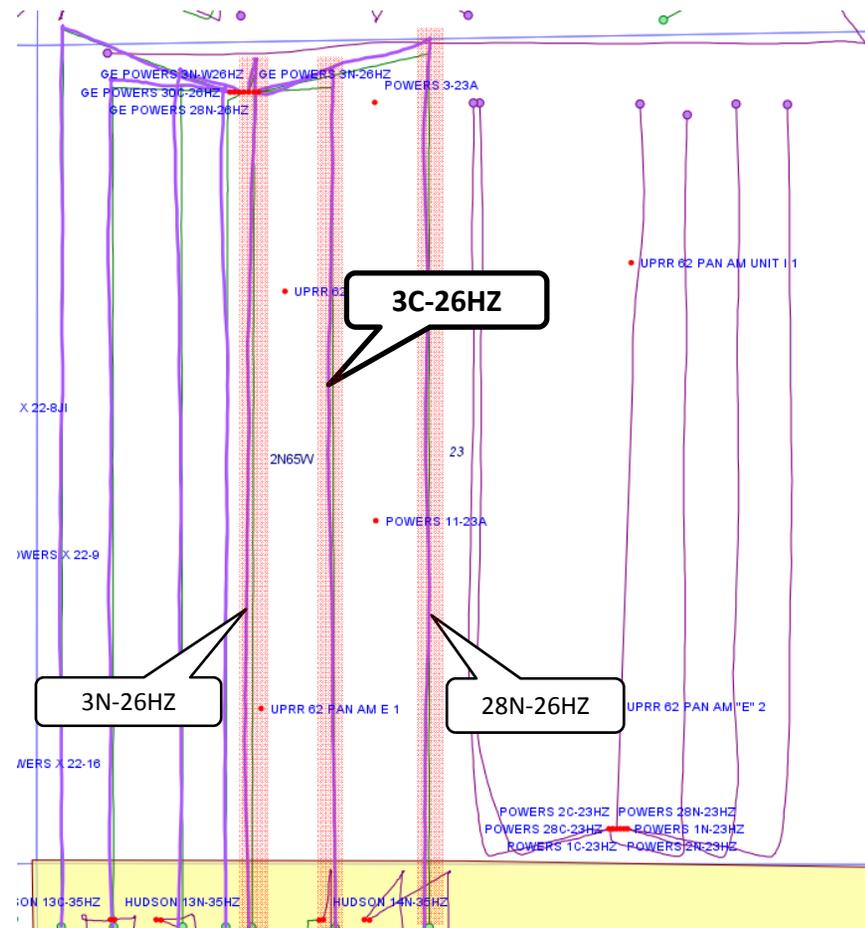
- A rise in bradenhead pressure was recorded on the 9-5/8" X 5-1/2" annulus of the GE Powers 3C-26HZ
- The rise in bradenhead pressure occurred after completing the final stage of the three well zipper frac

General Well Information

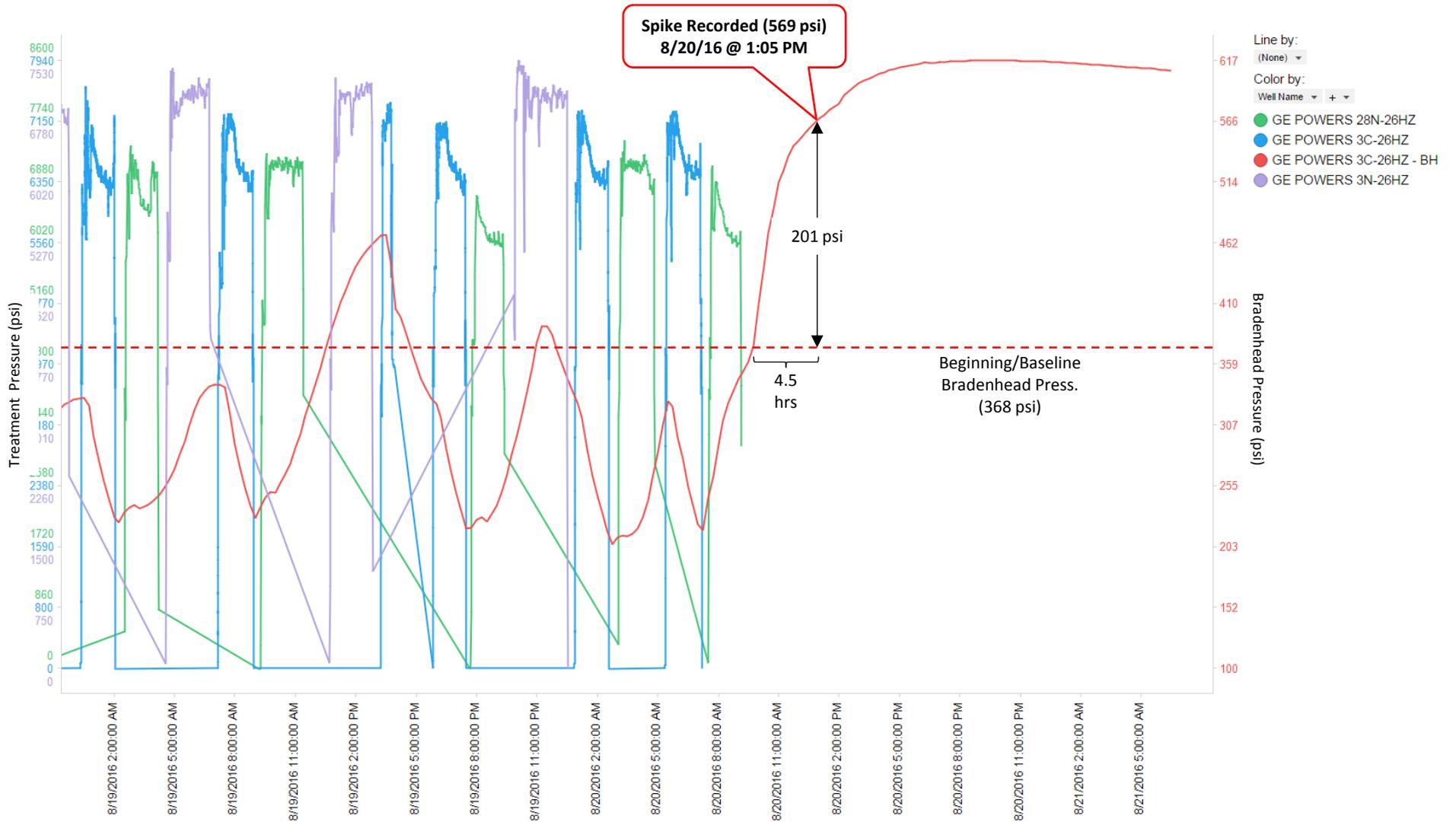
- API: 05-123-41914
- 9-5/8" set to 1,834' MD
- Three (3) Well Zipper: 3C-26HZ, 3N-26HZ, and 28N-26HZ

Conclusion

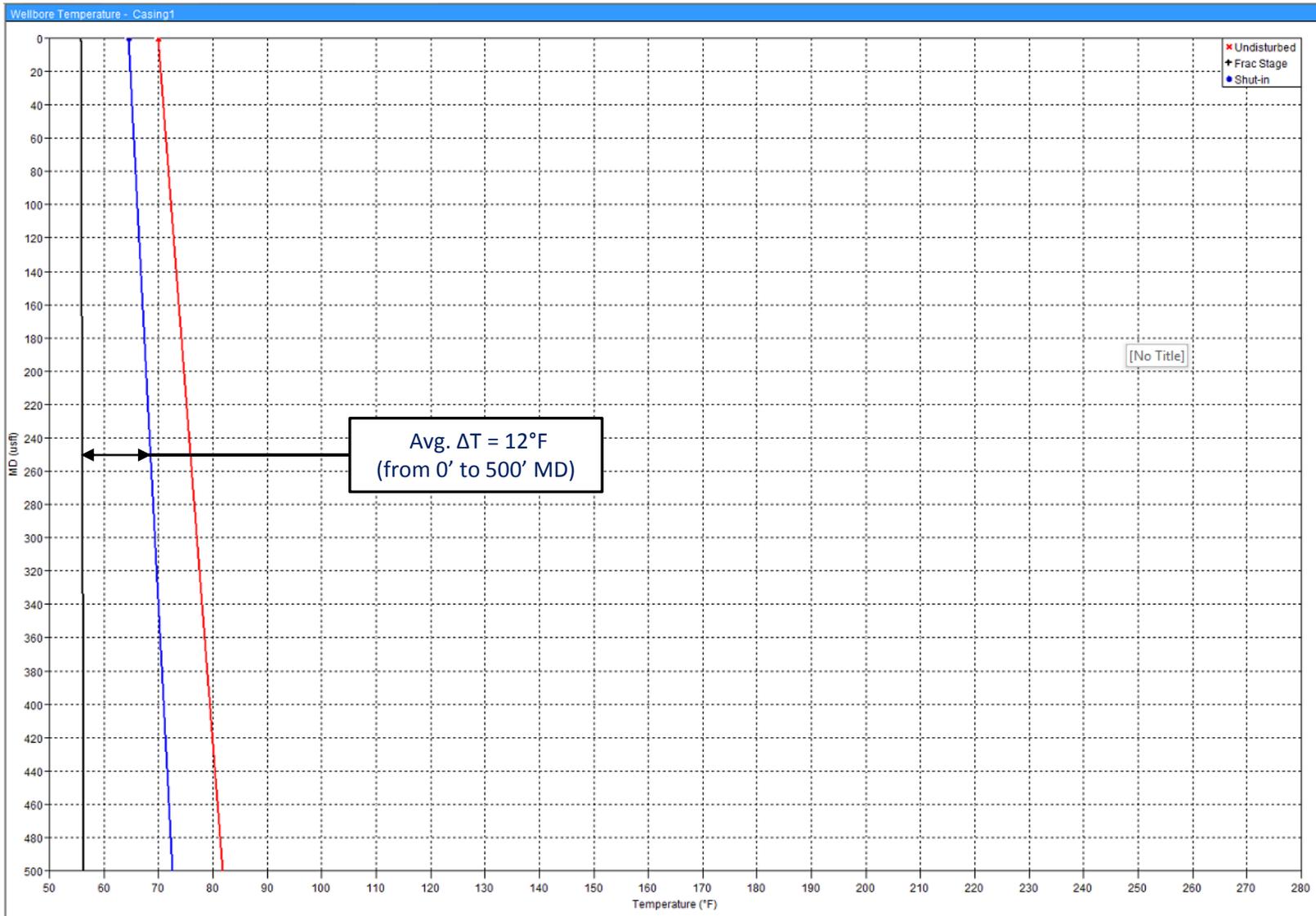
- The rise in bradenhead pressure recorded following the frac can be attributed to thermal expansion of annular fluids



Bradenhead Pressure & Treatment Pressures



WELLCAT Temperature Profile



WELLCAT Pressure Simulation Results

Temperature Effects

- *The average annular increased by approx. 12° F due to geothermal heating*
 - Exposure time of 4.5 hrs (shut-in period)

Conclusion

- *Calculated annular pressure increase due to geothermal heating is within range of what was recorded during the shut-in period*
 - Reported: 201 psi increase
 - Calculated: 289 psi increase
- *The change in bradenhead pressure can be explained by thermal expansion of annular fluids*

MultiString Annular Fluid Expansion Summary - Frac Warm						
	String Annulus	Region			Incremental AFE Pressure (1) (psi)	Incremental AFE Volume (2) (bbl)
			Top (usft)	Base (usft)		
1	5 1/2" Production Casing	Region 1	13.0	500.0	289.00	0.0
2						
3	(1) Pressure change caused solely by the Annular Fluid Expansion (AFE) phenomenon.					
4	(2) Volume change caused solely by the Annular Fluid Expansion (AFE) effect.					

