CASE STUDY

DRILLING AND GEOLOGY INTEGRATION EXTENDS BIT LIFE AND REDUCES TIME TO TARGET IN CHALLENGE-RIDDEN RESERVOIR

Real-Time Intelligence Enables Proactive Decisions For Better Drilling Outcomes in the Travis Peak

Challenge

The Travis Peak is a set of interbedded formations in the Haynesville shale with rock strengths that vary from 7 to <20 kpsi in terms of compressive strength. Operators drilling in this formation are all too familiar with the uncertainty this reservoir presents and that if not drilled carefully with the ability to proactively respond to the challenges presented, can cause excessive wear, cutter damage and ultimately lead to early bit failure.

One such operator drilling in this area reached out to H&P to design a specialized drilling program where a transition would be made to controlled-depth-of-cut drilling prior to encountering the Travis Peak in order to ensure proper bit engagement and extend drilling life. For the first well on the pad, the challenge remained that the exact depth the Travis Peak would come in was unknown. Adjusting the drilling parameters too early could lead to slower than needed drilling in earlier formations, while failure to adjust in time could result in premature bit failure and an unnecessary trip. Combating uncertainty with a holistic suite of advanced solutions was critical to delivering the best possible outcome for the operator.

Solution

To enable accurate execution of the drilling roadmap, key gamma markers were identified prior to drilling that would indicate if the Travis Peak true depth was different from that projected in the geological prognosis. H&P's automated Formation Top Detection algorithm identified these markers in real-time as drilling commenced, providing an early warning to whether the drilling roadmap needed to be adjusted deeper or shallower as the Travis Peak was approached. This combination allowed for confident, proactive drilling while minimizing the risk of accidental bit damage.

Outcomes

As the intermediate section was being drilled, the key formation tops were detected as coming in much shallower than the geological prognosis had predicted. As a result of this real-time intelligence, the operator was able to quickly switch to depth-of-cut drilling 100 feet earlier than had been originally planned. This change was key, as the Travis Peak actually came in 95 feet shallow. By quickly reacting to the gamma data, unnecessary bit damage was avoided and a possible extra trip was saved. The roadmaps for additional wells on this pad were then updated with this new information to help ensure there won't be any future surprises.

PROJECT OVERVIEW

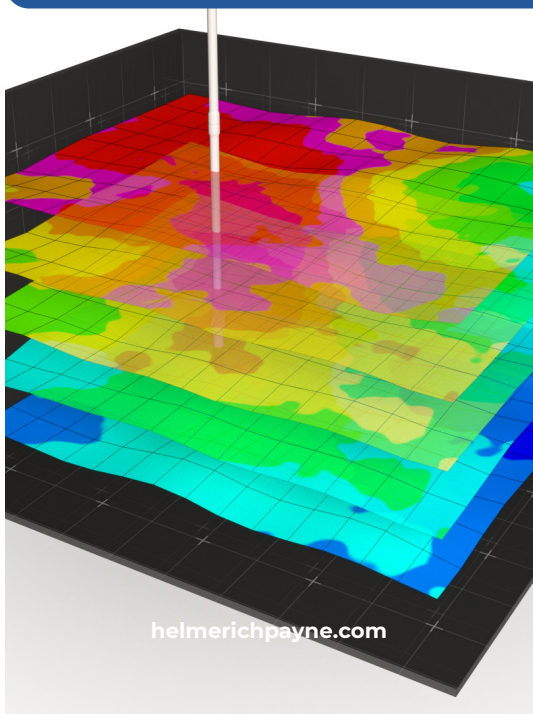
Location
Haynesville Shale, Travis Peak

Outcomes
- Enhance Bit and BHA Integrity
  - Reduce Failures and Repair Costs
- Reduce Time to Target
  - Increase Rotating ROP

Technology & Services
- Formation Top Detection

Are you looking to achieve a similar outcome?

Contact us today.

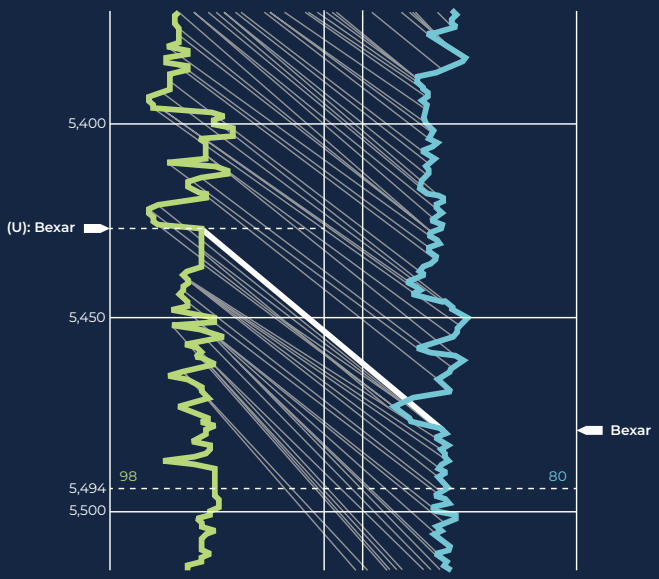


OUTCOMES THAT OUTPERFORM

Real-Time Intelligence Tipped Off Operator to Switch to Depth-of-Cut Drilling 100 feet Earlier Than Planned

			DEPTH (MD)	
HOLE SIZE	HOLE SECTION	FORMATION	MD	TVD
14.75	Surface		107	107
14.75	Surface	SCP	2,350	2,340
10.625	Intermediate	SCP	2,350	2,340
10.625	Intermediate	Rapids	2,974	2,960
10.625	Intermediate	Pauluxy	3,223	3,207
10.625	Intermediate	Upper Glen Rose	3,264	3,247
10.625	Intermediate	Mooringsport	4,166	4,143
10.625	Intermediate	Ferry Lake Top	4,954	4,925
10.625	Intermediate	Ferry Lake Base	5,204	5,173
10.625	Intermediate	Rodessa	5,360	5,328
10.625	Intermediate	Bexar	5,590	5,556
10.625	Intermediate	James	5,783	5,749
10.625	Intermediate	Pine Island	6,062	6,028
Top of Sligo - Swap from WOB to DOC Drilling				
10.625	Intermediate	Sligo (Pettet)	6,232	6,198
10.625	Intermediate	Travis Peak (A)	6,823	6,789
10.625	Intermediate	Travis Peak (B)	7,445	7,410
10.625	Intermediate	Travis Peak (C)	9,219	9,184
10.625	Intermediate	Knowles	9,844	9,809
10.625	Intermediate	Cotton Valley (Upper)	10,322	10,287
10.625	Intermediate	Cotton Valley (Lower)	10,535	10,500
10.625	Intermediate	Bossier	10,760	10,725
10.625	Intermediate	Bossier - ICP	10,835	10,800

Drilling Roadmap with Description of where drilling changes were needed.



Formation Top Detection automatically Identifies that geology is coming in earlier than was planned for in the drilling roadmap.

	PROGNOSIS		ACTUAL	
MARKER NAME	KBTVD	SS	KBTVD	SS
Rapides	2960	-2711	2911	-2662
Palaxy	3207	-2958	3089	-2840
Glen Rose	3247	-2998	3127	-2878
Mooringsport	4143	-3894	4021	-3772
Ferry Lake Top	4925	-4676	4781	-4532
Ferry Lake Base	5173	-4924	5049	-4800
Rodessa	5328	-5079	5225	-4976
Bexar	5556	-5307	5427	-5178
James Lime	5749	-5500	5624	-5375
Pine Island	6028	-5779	5912	-5663
Sligo (Pettet)	6198	-5949	6080	-5831
Travis Peak	6789	-6789	6694	-6445

Comparison of Pre-job Geology Prognosis with Observed Formation Tops. The actual formation tops consistently came in 100 feet shallower than the prognosis predicted.

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