Geosteering Laterals
Critical To The Success
Of Horizontal Wells

Across the country, horizontal drilling has become the norm for many operators looking to drill and produce in conventional and unconventional zones. Many operators agree that how the well is drilled is a key factor in that well’s overall production. For drilling laterals, geosteering is a crucial element in the process.

Using geological markers to help pinpoint and visualize the right spot in the reservoir and keep the bit in that spot for thousands of feet can be a daunting task for geologists. The drilling engineer, meanwhile, is faced with weighing the goals of the team while keeping costs down and still drilling a profitable well. Navigating this delicate balance can be difficult at times. A group of geosteering experts provided two days of technical content in Wichita, KS.

Titled Geosteering in Complex Environments, workshop organizers sought to provide regional attendees with both geology and engineering perspectives related to geosteering. The two-day event featured Tom Arnold from Paladin Surface Logging, Daniel Wright from Slider/Schlumberger, KC Oren from Horizontal Well solutions, and Doug Davis, a regional consulting geologist.

Day one began with a discussion of the essentials of geosteering led by Arnold. He is the director of training for Paladin, and over his more than 30-year career has had a passion for innovation and drilling education. His presentation covered the basics of geosteering, reminding the group that all geosteering comes down to geology, and that the better one can visualize the formation he is drilling into, the more successful his wells are likely to be.

Arnold encouraged the group to try not to think that geology was set up in pancake-like layers, and that once a wellbore was in zone, all the driller had to do was drill a straight line. Rather, he said successful geosteering required knowledge of where the wellbore was within the target zone. Specifically, it is important that when the driller sees that his drilling angle is greater or lesser than his bed dip, he needs to be able to calculate when the bit might exit the target zone and make adjustments accordingly.

Additionally, Arnold covered basic geosteering requirements, focusing on the data one needs to adequately geosteer a well. He highlighted that the accuracy of one’s data was critical in designing the well. He noted that if an operator was using inaccurate data, small problems could become large as he worked to stay in zone. Arnold discussed calculating bed dip, and highlighted essential geosteering considerations, including understanding that when one identified an offset between the drilling inclination and the bed dip, he would see a change in the gamma pattern. He mentioned that drilling azimuth also could affect drilling response, and that it was important to understand that while the beds might be dipping up or down, they might be dipping in a certain azimuth.

On day two, KC Oren from Horizontal Solutions International began his conversation by discussing how operators judged the success of a well. Oren also has a career that spans more than 30 years, working in both the drilling and geoscience sectors.

He discussed how the temptation to reduce rig time and make unnecessary sacrifices to save money during the job might actually cost more money in the long run. He stated that for many operators, just drilling wells as fast as possible was not turning out to be as profitable as once thought, and that to optimize well design and drill a more effective well actually could be more profitable in the long run.

During his presentation, Oren posed the question: What happens when company personnel don’t work together to meet objectives, and what are the pitfalls in drilling a perfect horizontal well?

He began by highlighting the frustration that sometimes opposing members of the team had when trying to meet company objectives. He said the only way to avoid frustration during the drilling operation was to plan for the unexpected.

Oren highlighted four lessons that illustrated this. First, he discussed targeting methodology was key to staying in zone, and that when designing a horizontal drilling program, including cross-departmental goals was important to the success of a well and that sometimes compromise was needed.

In addition, Daniel Wright from Slider discussed directional pipe rocking and the physics of reducing drag, while consulting geologist Doug Davis provided a regional directional drilling case study from a job he helped steer. Overall, the two days provided good information that will be especially useful as operators continue to drill longer, optimized laterals.

Jeremy Viscomi is director of technology transfer for the University of Kansas Tertiary Oil Recovery Program and is Mid-Continent regional director for PTTC. He has more than a decade of experience in developing and organizing technical conferences and special events.