

XL-Rock Large-Volume Rotary Sidewall Cores for Tight Rock Analysis of Pennsylvania Shale

Sample volume more than 300% of previous-generation technology with core location confirmed by FMI formation microimaging

CHALLENGE

Collect sidewall cores that are representative of specific shale intervals in a north central Pennsylvania well.

SOLUTION

Obtain XL-Rock* large-volume rotary sidewall cores with a sample volume more than 300% of that of previous-generation sidewall coring service, which is sufficiently large that tight rock analysis can be conducted on a single sample instead of combining multiple small samples.

RESULTS

Determined composition, texture, and rock physical properties from 96% recovery of 100 planned core points with a visual confirmation of sample locations from FMI* fullbore formation microimager logs.



Core material needed for analysis

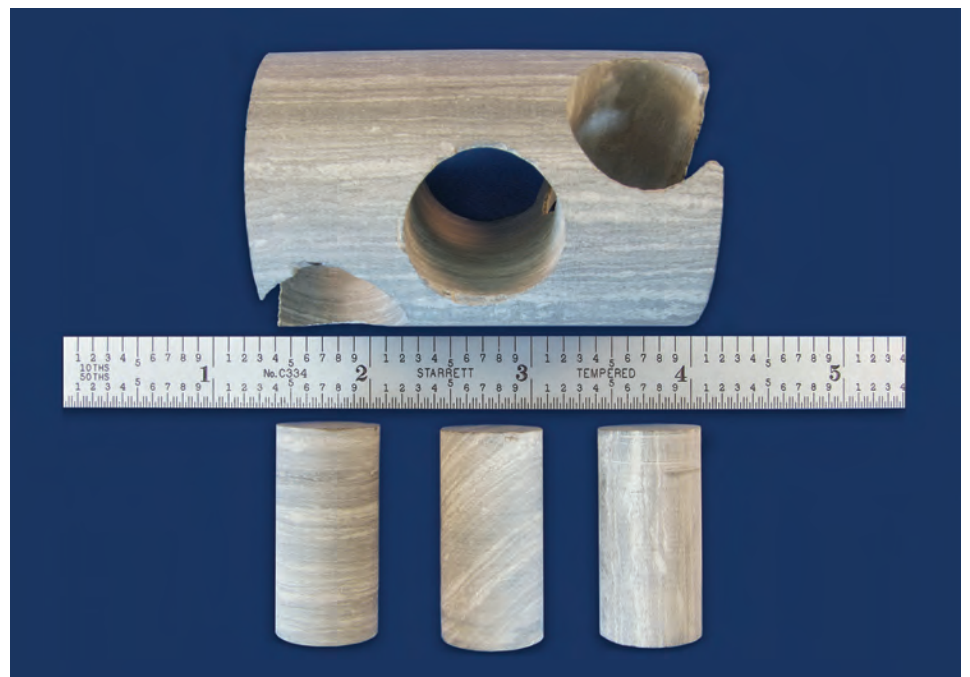
An operator drilling a well in north central Pennsylvania wanted formation samples from a black shale targeted for unconventional gas. In this environment, core samples would be valuable for determining composition, texture, and physical properties of the rock. Conducting rotary sidewall coring would be more efficient than coring the full openhole interval, but uncertainty would be introduced for some analytical techniques, such as tight rock analysis, that would require combining sidewall core samples to have a sufficient volume of core material.

Large-volume sidewall cores

XL-Rock large-volume rotary sidewall coring services closes the gap between core plugs from continuous conventional coring and wireline-conveyed rotary sidewall cores. Retrieving up to fifty 1.5-in-OD by 2.5-in-long

sidewall core samples from a single descent, XL-Rock service delivers cores that are more than 300% of the volume of previous-generation sidewall cores. XL-Rock core samples deliver a rock volume equivalent to that of conventional core plugs, matching the industry's standard sample size for analysis and enabling key answers in less time and at lower cost than conventional coring.

Operational risk is greatly reduced by using XL-Rock service. Only 37 ft long, the XL-Rock tool is the shortest rotary sidewall coring service in the market today. Real-time control of the physical drilling parameters such as weight on bit ensures that the tool is coring at the optimal settings for each core point. If the core bit were to become stuck in the formation, the XL-Rock tool incorporates an optional controlled release of the bit.



Large-volume XL-Rock sidewall cores recover a sufficient volume of rock to extract three triaxial minicores for full analysis of completion quality, which previously required samples taken from conventional core.

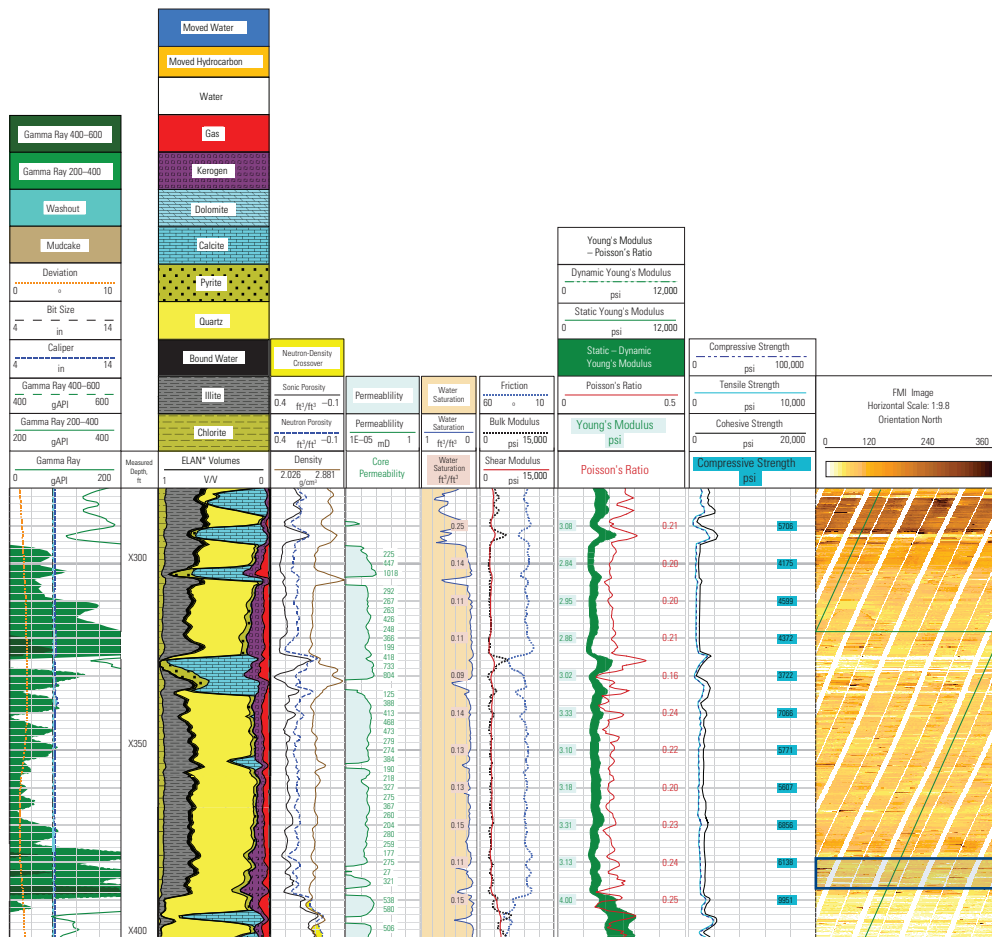
Answers in context

Of the 100 core points planned for the full openhole interval, 96 of the samples were brought to surface, achieving 96% core recovery. The large-volume samples improved measurement precision by enabling analytical techniques, such as tight rock analysis, to be conducted on a single sample instead of having to combine multiple small samples.

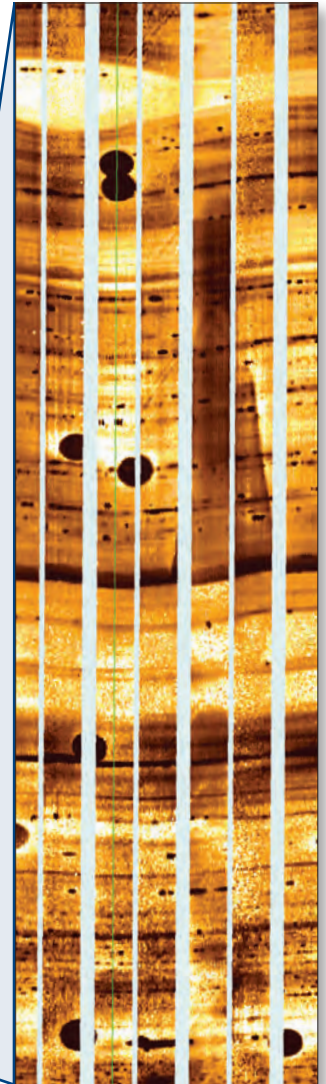
The XL-Rock coring operation was followed by FMI fullbore formation microimager logging. XL-Rock coring leaves a 2.5-in-diameter hole in the borehole wall where the 1.5-in-diameter rock sample was extracted.

These holes show up vividly on the high-resolution image acquired by the FMI tool, providing visual confirmation of the exact place on the borehole wall from which the core was taken. The core analysis program and subsequent integration with logs greatly benefit from the visual check of whether the samples taken are representative of the interval and from knowing their precise context with respect to the log measurements.

Based on the wealth of information delivered, the operator has made XL-Rock service with a confirmatory FMI image an integral part of the standard exploration logging program.



Core point locations in the shale formation were depth controlled with the gamma ray log (Track 1) and then confirmed with an FMI image log (far right) in which the 2.5-in-diameter holes left by core sample removal are readily visible as dark horizontal features.



1:8-scale FMI image log clearly showing where XL-Rock core samples have been taken.