

November 2021 – CSUR Technical Webinar #2

Core Labs' D-Code Method – A New Way to Extract Key Rock Property & Reservoir Data from Existing Drilling Data

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**TECHNICAL
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**A NEW METHOD FOR EXTRACTING
PETROPHYSICAL PROPERTIES ALONG
LATERAL WELLS**

PRESENTED BY
CAROLYN CURRIE, P.GEO
CORE LABORATORIES CANADA

Carolyn Currie, Manager of the Rock Properties Division at Core Laboratories Canada, was on hand to introduce her organization's new method to mine critical rock property and petro-physical data from existing drilling or Pason data. As indicated by the speaker, the number of cores being cut from new drills continues to decline mainly due to budgetary constraints. Therefore, operators are left without the ability to measure or determine key parameters needed to optimize their new drills & completions.

Typically, analysis of drill cuttings can be used to extract various rock, fluid, geological, and geochemical properties. However, Core Labs' new D-Code technique could also potentially be utilized to determine critical information for companies. The D-Code method, which has roots right here in Alberta's prominent Duvernay Formation, uses algorithm based PDC (Polycrystalline Diamond Composite) Bit drilling data. It is a proprietary process that derives key geo-mechanical information such as Young's Modulus and Poisson's Ratio. This derived data is then calibrated against other engineering and geological datasets to construct a complete picture of the horizontal section for subsequent well stimulation purposes. The calculations also present the ability to delineate various pressure profiles (pore, fracture, closure) along the wellbore for use in drilling optimization efforts (wellbore stability, optimal mud weights, rate of penetration, etc.) in offset wells.

Typically, in the absence of key data, operators simply rely on what other operators in the area have done and just duplicate the process. While documenting several case histories, Carolyn indicated that the D-Code methodology takes a more scientific approach to mitigate drilling and completion issues as it is based specifically on drilling forces encountered / measured by the bit against the formation.

SUMMARY

In a Land with Few New Cores – Can we Determine Key Rock Properties from the Horizontal? A New Method for Extracting Petrophysical Properties along Lateral Wells

If nothing else, these past years in the Canadian oil and gas industry, have really taught us to think outside the box and hone in on collected datasets to glean as much information as possible and generate new data. The foundation of our interpretations and modelling are based on vertical wells in which core is taken and analyzed. But what happens when good core analysis is not readily available in the area of interest and/or budget constraints don't allow for core to be taken? Or while drilling and completing a planned lateral, problems are encountered such as loss of circulation or stages not performing as anticipated – is there a way to diagnose and geologically engineer completions jobs by utilizing rock property data 'collected' along the length of the horizontal leg?

Core Laboratories has been doing just that – this presentation highlights a new method (D-Code) of extracting key rock property data necessary for assisting in the evaluation and planning of effectively fracking key reservoirs. By leveraging drilling/pason data that is routinely gathered on every well drilled, important geomechanical data, such as Young's Modulus and Poisson's Ratio can be delineated at a much finer scale than sonic logs and other traditional methods. Along with mineralogical data gathered on cuttings samples, this mechanical data can be calibrated using Core Laboratories extensive global database of core triaxial data. Linking the geomechanical and mineralogical data can help explain various lithological changes along the horizontal and their associated mechanical strength and the ability to effectively stimulate a frac.

By deriving algorithms based on force calculations, instead of an MSE (mechanical specific energy) type calculation, we can go far beyond the mechanical properties of the rock, but also define key associated pressure data. This includes, pore pressure, closure and fracture gradients, which leads to optimizing mud weight windows and minimum mud weights in order to maintain wellbore stability and assist in maximizing drilling speed.

The sky is definitely not the limit where this technology is concerned, we are just scratching the surface. Core calibrated datasets will always be cadillac, but when that is not available, D-Code provides an alternative to guessing what's happening a mile out from a vertical.

PRESENTER: *Carolyn Currie P.Geo., Core Laboratories Canada.*

Carolyn Currie's primary position as senior geologist and project lead has included work on various unconventional plays in North America and globally including Duvernay, Montney, Wilrich, Eagleford, Marcellus, Midland Basin and Deep-Water Mozambique. She currently serves as the Manager of Geology and Integrated Studies, leading such projects as the Duvernay, Montney and Wilrich/Spirit River consortia studies in the Canadian office. Throughout her time at Core Laboratories and previous projects (including her master's project), she had logged, described, interpreted and integrated 500+ cores ranging from unconventional shales, tight sand formations, deep water sandstones, heavy oil/oil sand cores.



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TECHNICAL WEBINAR

A New Method for Extracting Petrophysical Properties along Lateral Wells

presented by Carolyn Currie, Core Laboratories Canada.

Tuesday, November 23rd, 2021 | 10:00am MT
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