Accurate NMR Porosity Measurement on Shale Cuttings

The use of drill cuttings in reservoir characterization is becoming increasingly significant to understanding reservoir properties.

This is especially heightened in today's world where conventional coring is not always an option. Nuclear Magnetic Resonance (NMR) has proven to be an invaluable tool in the analysis of unconventionals. We are now adding to its value by presenting a new cuttings porosity measurement that could be used in the lab as a cost-effective core analysis technique. This idea has been around for some time but has had limited success…until now.

Where other methods have used cut-offs to account for the overestimation in porosity due to water on the surface of the cuttings, our method takes physical measures to remove the surface water and then measure the porosity directly. An added benefit of removing the surface water allows us to perform these measurements on cuttings of a much smaller size, down to 1/70th of an inch. This is important for cuttings derived using modern drill bits such as Polycrystalline Diamond Compact (PDC). This measurement can be performed on fresh cuttings straight from the wellsite or on historical samples from a cuttings database.

Below is a table showing the accuracy of our measurement comparing porosity of core plugs to cuttings from the same respective depth. These specific samples are from the Utica Shale play.

Core Sample	Sample Depth (ft)	Porosity	Cuttings Sample	Sample Depth (ft)	Porosity
1	12139.9	4.1 p.u.	1a	12130 – 12140	3.9 p.u.
2	12187.4	5.1 p.u.	2a	12190 – 12200	5.1 p.u.
3	12239.9	6.8 p.u.	3a	12230 – 12260	7.2 p.u., 6.6 p.u.
4	12275.5	8.1 p.u.	4a + 5a	12260 – 12290	8.2 p.u., 7.8 p.u.
5	12287.0	7.5 p.u.			

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H2 Laboratories is committed to providing innovative solutions for lab-based analysis of rock core via Nuclear Magnetic Resonance (NMR). Our products and services offer fast, accurate, non-destructive analysis of rock core samples used by the oil and gas industry in exploration and reservoir characterization.

H2 Laboratories is a subsidiary of Green Imaging Technologies (GIT), the world leader in lab-based NMR rock core analysis. Building on GITs expertise in expanding the suite of measurements that can be done with NMR, H2 Laboratories has the goal of making NMR core analysis accessible to all oil companies, oil service companies and academic institutions, regardless of size.

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