DCN: W17R004.A1

GASVIEW SERVICE

Cased-hole gas saturation evaluation.

Now there is a better method for identifying gas and measuring gas saturation in cased holes. Baker Hughes is proud to introduce the GasView™ service, a high-resolution measurement that produces an exceptionally clear picture of the reservoir gas.

APPLICATIONS OF THE GASVIEW SERVICE

- Production monitoring in gas and three-phase reservoirs
- Gas-injection monitoring in enhanced recovery and gas storage applications
- Analysis of new well gas content when openhole logs are not available

WHAT THE GASVIEW SERVICE MEANS TO YOU

Sensitivity means you find more gas. Increased gas sensitivity comes from improved instrumentation that measures larger volumes of the reservoir. The result is three times the sensitivity—and three times the ability to find gas—compared with traditional pulsed-neutron instrumentation. You can more accurately identify smaller volumes of formation gas than ever before.

IMPROVED INSTRUMENTATION

Accuracy means you can quantify gas saturation. Conventional gas overlay interpretations cannot quantify gas saturation. At best, under favorable reservoir conditions, you get qualitative identification.

The GasView service uses a comprehensive response database and improved interpretation methodology to calculate quantitative gas saturation. And because GasView analysis is not dependent on connate water salinity, measurements are accurate in all formation waters.

Transparency means you can be fully confident in the saturation analysis. Shales, coal streaks, and tight zones have traditionally been problematic when pulsed-neutron services are used to identify formation gas. With the GasView service, however, the effects of changing porosity and mineralogy are clearly shown in the Dynamic Gas Envelope (DGE™) presentation, but they are removed from the gas saturation solution. This yields a transparent saturation analysis in which you can have a very high level of confidence.

Versatility means you can have more knowledge of the reservoir. Increased instrument sensitivity allows analysis of tighter porosities, larger boreholes, and more complex completions. The response characterization and DGE algorithm extend these solutions to complex reservoirs and enhance analysis of problems encountered in three-phase reservoirs and pressure depletion. A broader application range provides the ability to obtain greater knowledge of the reservoir and a better ability to manage reservoirs to their full profitability.

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The three high-resolution detectors in the RPM-C instrument are arranged to receive both capture and inelastic gamma rays and to sample the neutron-gamma transport over a longer baseline than conventional tools.

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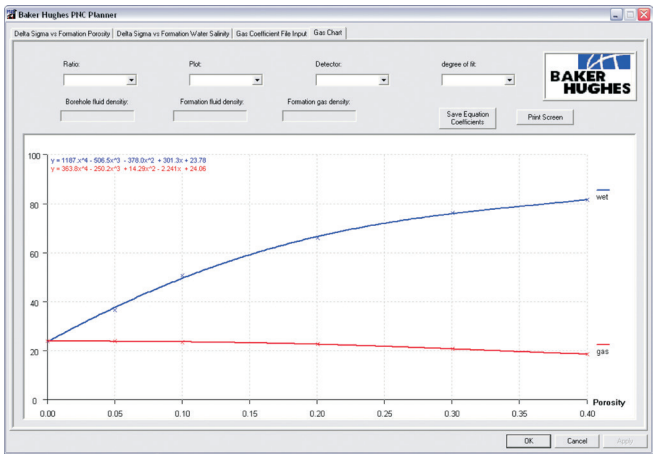
Three advancements enable measurement of formation gas saturation behind casing. Baker Hughes has enhanced the Reservoir Performance Monitor (RPM™) service by introducing improved instrumentation, a new characterization, and advanced interpretive techniques.

More sensitive instrumentation. The three high-resolution gamma-ray detectors in the improved RPM-C instrument allow additional measurements to be taken over longer spacing than conventional instruments. Because it measures a greater volume of the reservoir, the instrument is substantially more sensitive to the presence of gas-filled porosity. This improved sensitivity allows the instrument to resolve the presence of gas where conventional instruments cannot, and it provides the resolution needed for accurate gas-saturation calculations.

More accurate saturation quantification. Characterization of the gas response of the measured curves allows more accurate quantification of saturation. A global gas-response database has been constructed for standard openhole and cased-hole completions; it quantifies the expected response of the gas measurements for varying combinations of mineralogy, fluid density, and gas pressure and density. More complicated reservoir and borehole conditions can also be individually characterized. This information is captured in the GasView job planner, a tool that allows predictive forward modeling of the logging results and assists in optimizing logging and interpretive procedures.



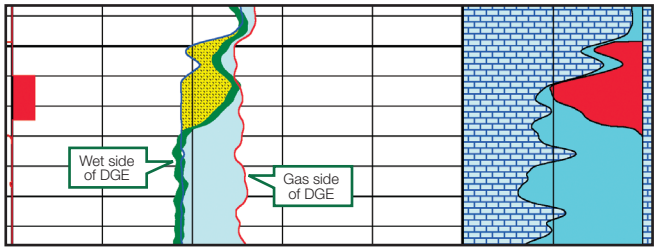
The GasView job planner enables design of optimal logging programs.

A NEW CHARACTERIZATION

Add clarity with DGE interpretation. The DGE interpretation explicitly accounts for variations in porosity and mineralogy in the saturation result. While these effects must be removed from the saturation solution, they are included in the visual DGE representation for greater insight into the processing.

The resulting picture of tool response to the formation and its contents—porosity and mineralogy, as well as gas—clearly shows the separate effects of these properties. Not only is the gas saturation solution better, how the saturation solution is derived becomes apparent. The DGE interpretation produces greater insight, greater understanding of the process, and greater confidence in the solution.

With the GasView service, Baker Hughes brings a better method for identifying gas and measuring gas saturation behind casing. This is one more example of our ongoing commitment to provide tools and support you



The DGE interpretation technique accounts for mineralogy and porosity variations and adds insight and confidence to the interpretation solution.

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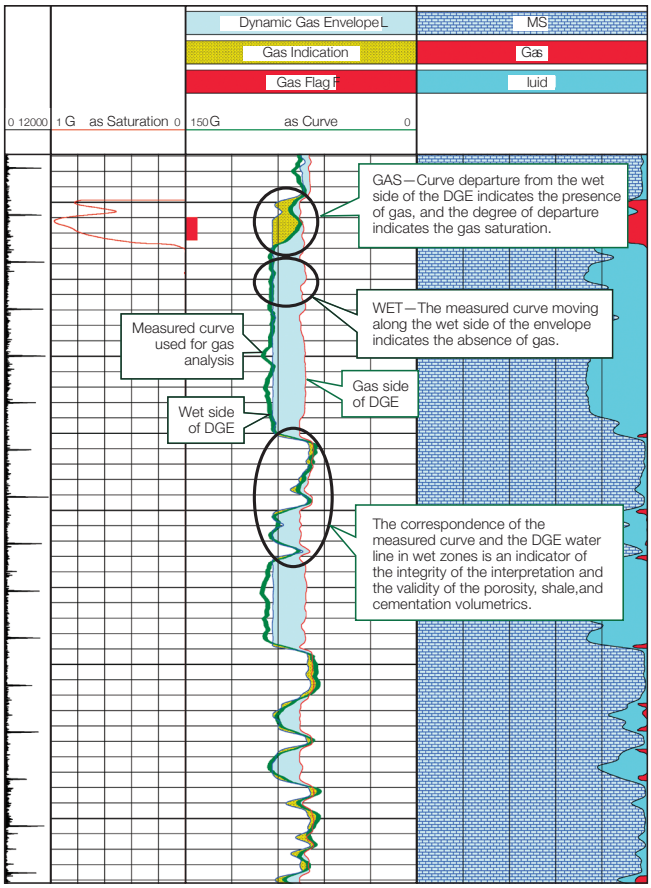
GASVIEW EXAMPLES

MONITOR GAS SWEEP IN AN EOR PROGRAM

This example from a limestone reservoir under gas-injection EOR illustrates some of the features of the DGE interpretation and the clarity of the gas solution that results. The DGE interpretation technique accounts for mineralogy and porosity variations and adds insight and confidence to the interpretation solution.



IDENTIFY PRODUCTION TARGETS IN TIGHT GAS SANDS

This example from a sand/shale reservoir shows application of the DGE interpretive method in a complex reservoir environment. Because the well was drilled with casing, there were no openhole logs; and all of the analysis data came from a single pass of the RPM-C instrument over a 5,000-ft. interval. The results, part of which are shown here, clearly define the wet sands and the gas targets.