

Landing and Characterizing STACK Laterals using AHS's RVStratsm

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AHS's RVStratsm is now being successfully applied to pick landing zones in pilot holes, and to characterize the pay distribution and variation in rock properties in laterals, especially in the STACK.

This talk will discuss the lessons now realized from 23 STACK wells we've analyzed, as well as some Permian Basin wells, and other wells from basins around the world. The focus will be mostly on more than a dozen STACK laterals.

Determining landing zones and characterizing STACK laterals for WBM wells are both best done using washed and gently dried WBM cuttings sealed at least 24 hours after capture from drilling wells. Older WBM cuttings can also be used.

OBM cuttings can potentially be analyzed immediately at the well site, as the diesel in the OBM sufficiently ages the cuttings to reveal these details as soon as they reach the surface.

The best lateral production is had by landing the lateral in the middle of an oil pay zone.

Pay zone cuttings have low aromatics/(aromatics+naphthenes) ratios, other cuttings have higher values. This reflects the greater tendency for aromatic hydrocarbons to be left behind adhering to rocks as oil moves through formations, as opposed to the naphthenes.

In STACK laterals, AHS data reveals the sections of the lateral in the pay zone, and the variations of rock properties.

6 rock property categories are mapped out. 1) larger natural oil filled fractures; 2) smaller natural oil filled fractures; 3) Low Oil and Low Gas; 4) Low Oil and High Gas; 5) High Oil and Low Gas; and 6) High Oil and High Gas. The significance of these mapped zones is actively being researched and will be discussed. Natural Oil filled fractures show up as oil spikes on RVStratsm logs. Examples of several STACK laterals are shown below.

AHS RVStratsm data base of STACK laterals is now allowing successful prediction of how significant oil production will be in new STACK laterals, within a day or two of reaching TD.

If a pilot well is drilled, or if the lateral is heel-down, AHS RVStratsm can be used to locate the best landing zone before the lateral is drilled by rapid analyses of cuttings back at our Tulsa Lab. A well site unit is under design to help steer laterals in real time.

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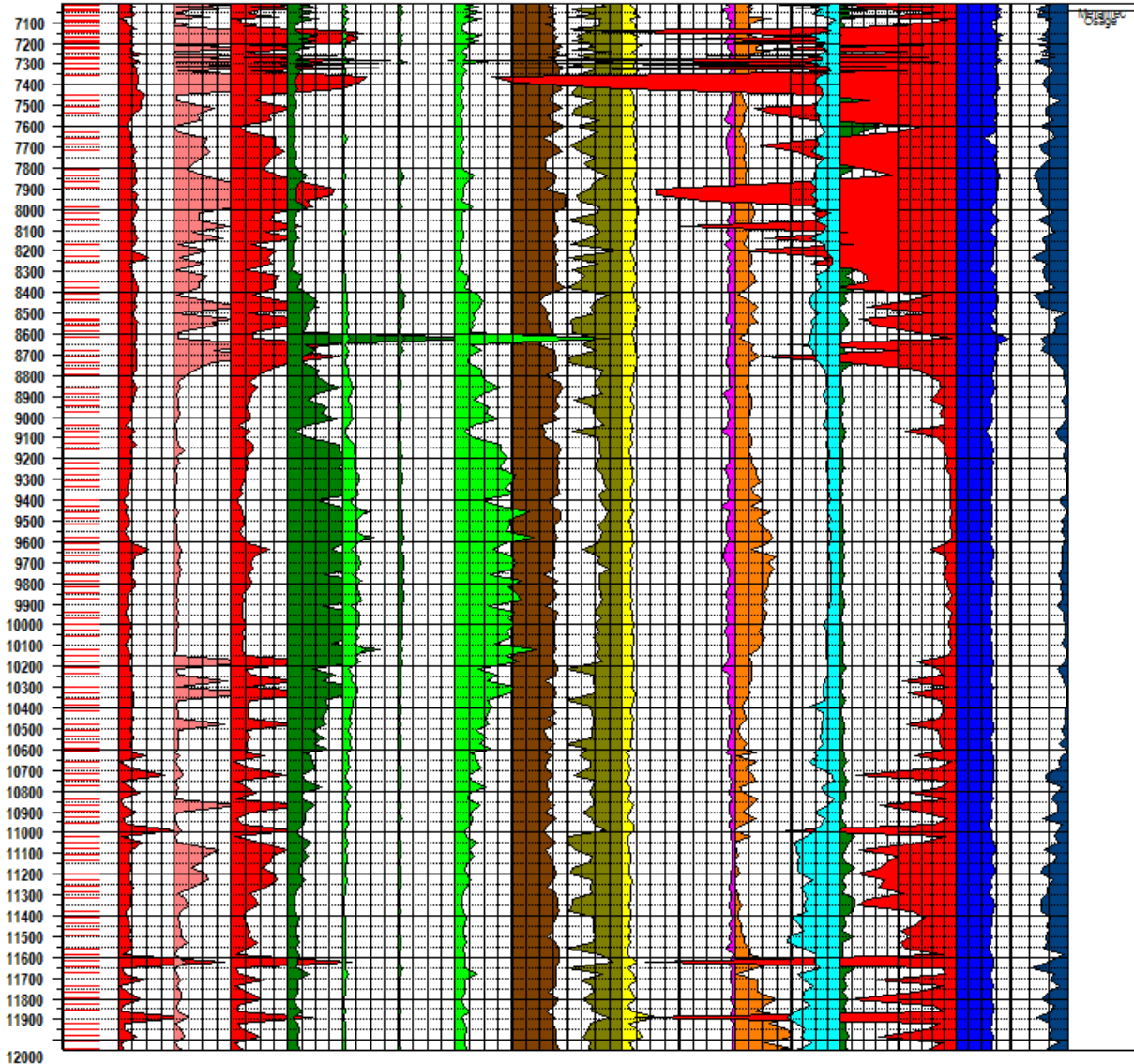
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AHS Loaded-In-Lab Rock-Volatiles Property-Log

Washed and Dried Cuttings. Bagged at Well. Loaded in Lab. Sampling Usually Averaged Over Sampling Interval. Handling History Unknown.

DEPTH	SAMPLES	METHANE Volume	C2 to C4 Volume	TOTAL GAS Volume	C5 to C10 Paraffins	C6 to C10 Naphthenes	C6 to C8 Aromatics	TOTAL OIL Volume	Frackability	Permeability Alliquot 2 vs 1	Proximity to Pay	Formic Acid Proximity to Pay	Acetic Acid Proximity to Pay	Relative Index	Oil Saturated Water	Oil Loss Index	Toluene/ Benzene	(C5+.. +C10)	(C9+C10) Subject to Gas Loss	GOR	Paraffins/ Naphthenes	Paraffins/ Naphthenes	TOPS	
		0	3000	3000	3000	5	5	5	20	2	100	-100	0	0	100	0	0	0	40	300000	20	100	100	20

GAS <-Analytical Values, ppm(Rock Volume) SUM ALL DATA-> **OIL RESERVOIR (THIS ALIQUOT)** **PRODUCT (SUM ALL DATA)**



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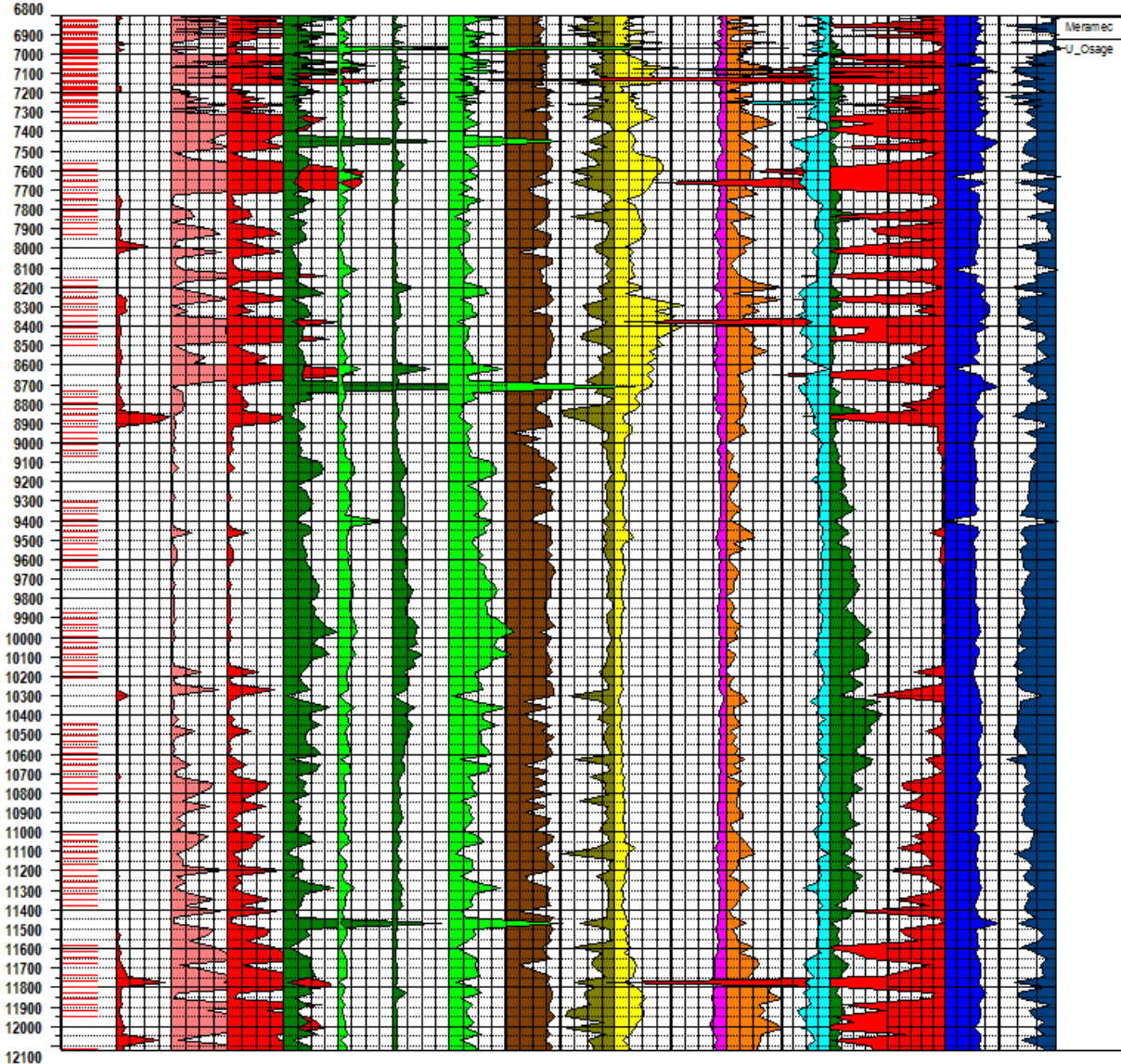
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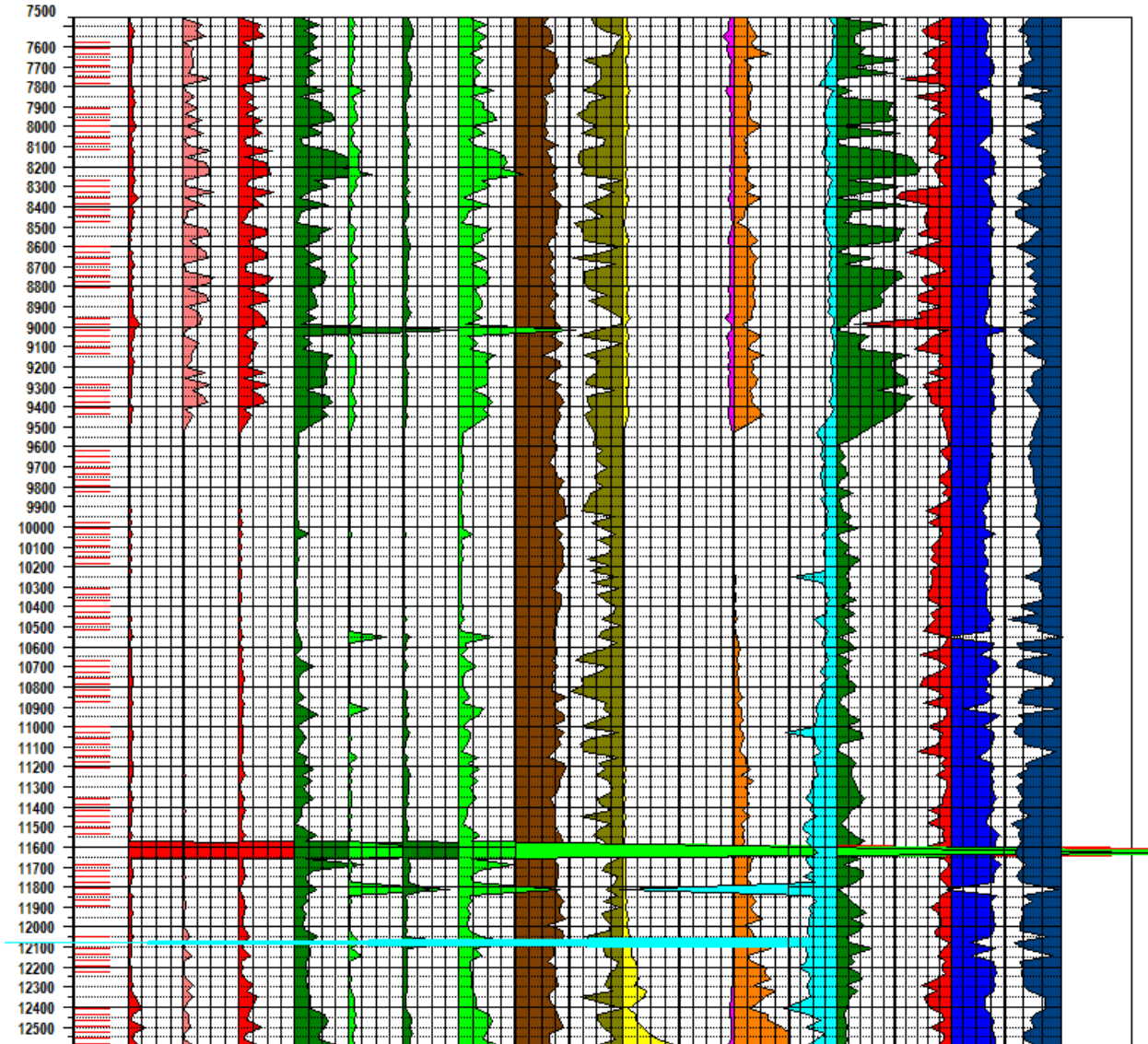
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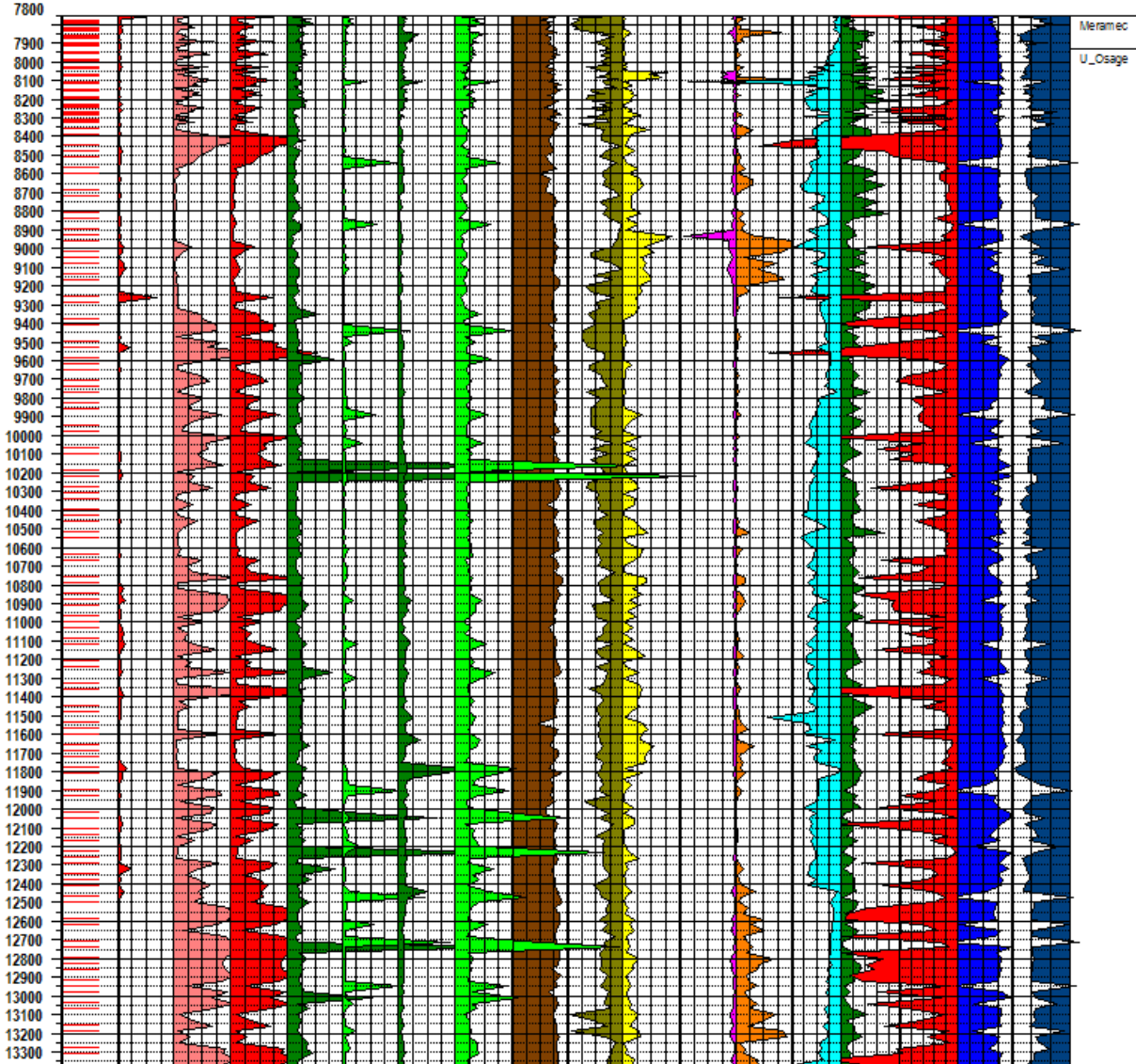
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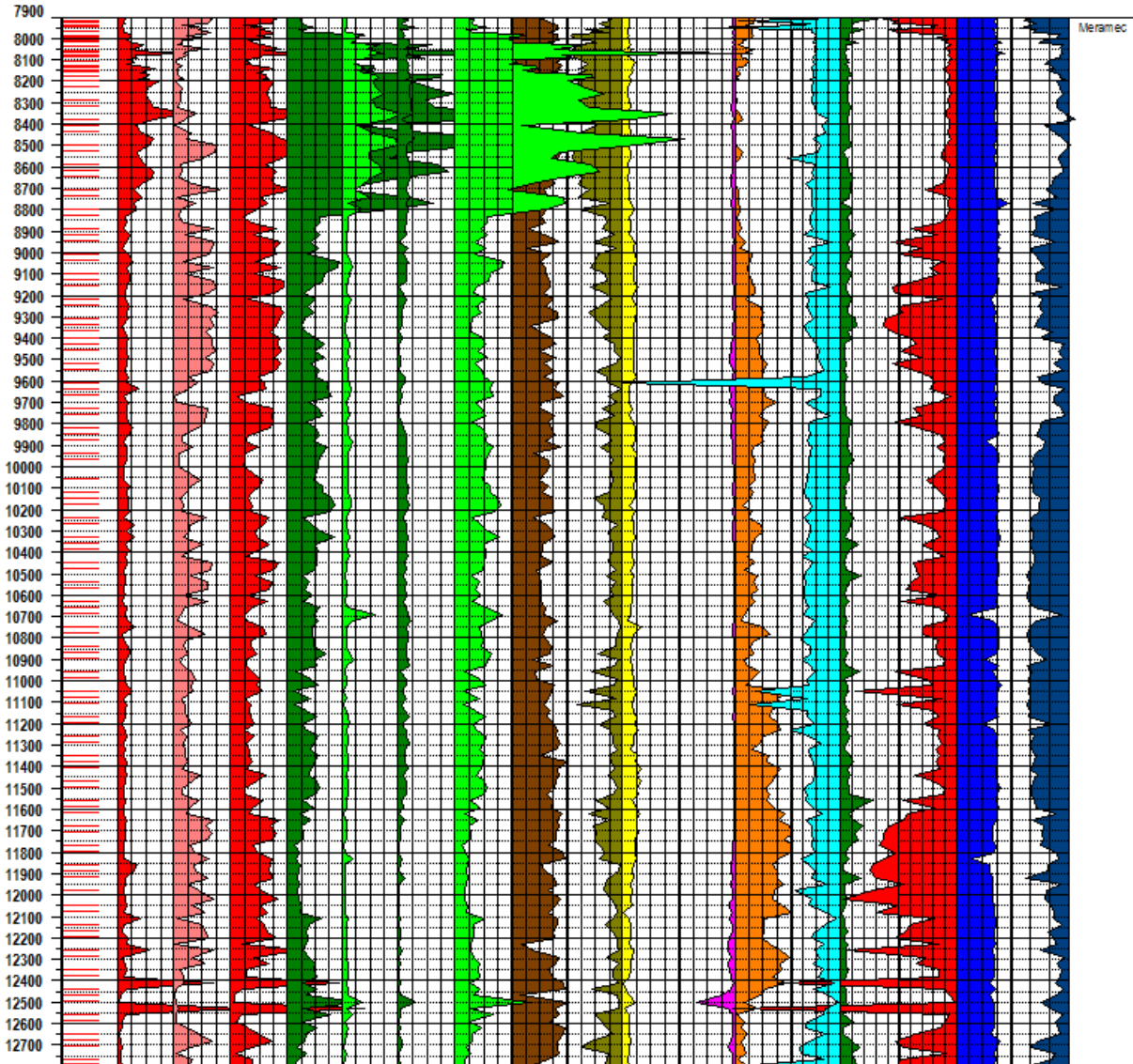
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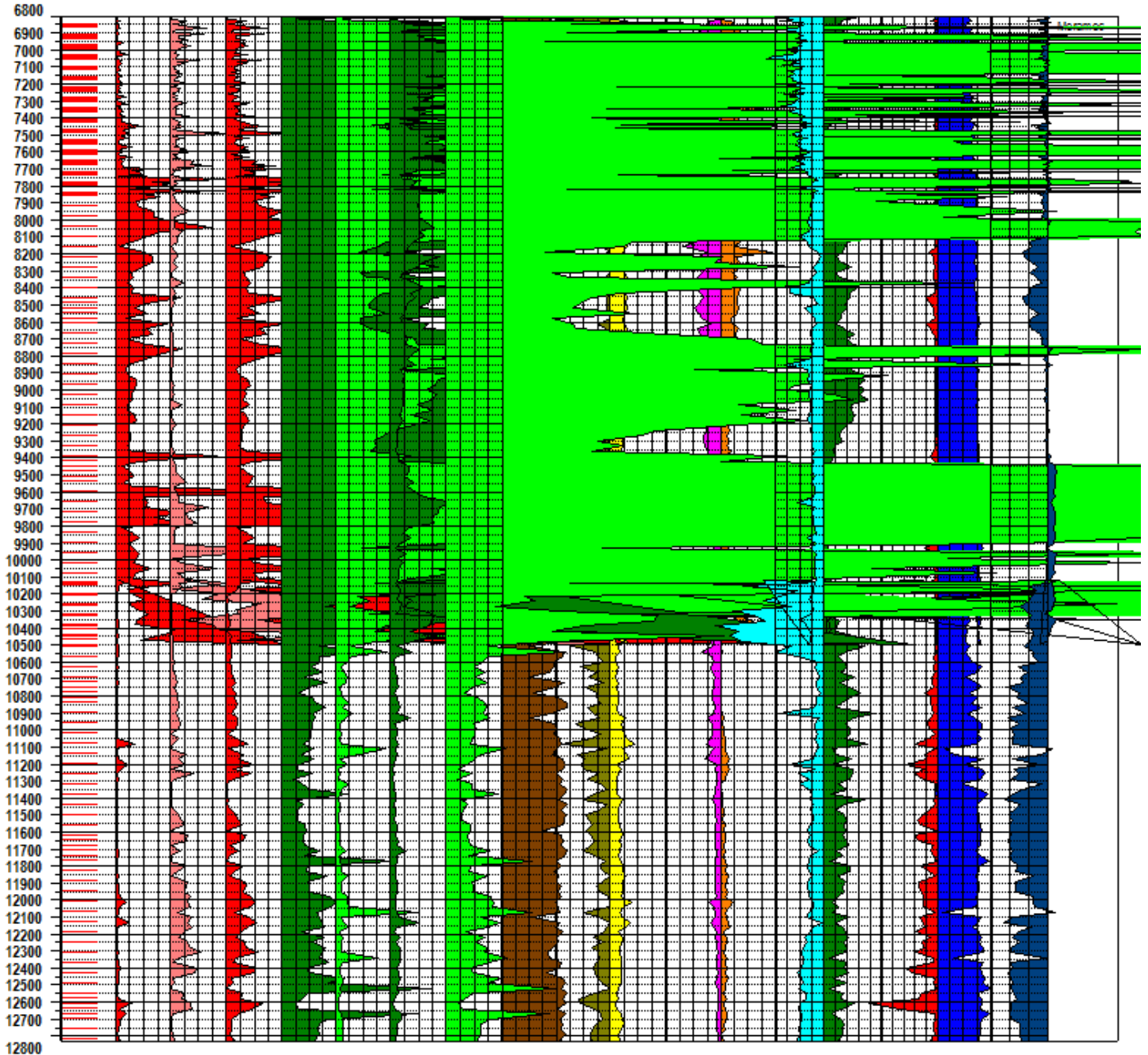
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