

HORIZON

WELL LOGGING, INC.

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DISCRIMINATION BETWEEN FORMATION OIL AND OIL BASED MUD

Drilling for oil using an oil based mud (OBM) facilitates the drilling process but is often confusing for the mudlogging geologist. Some of the formation oil qualities that are readily apparent in water based systems are bright fluorescence and solvent cuts. Both of these attributes are also present when using OBM whether there is any formation oil present or not. Often OBM is used where the target is a high gravity oil that doesn't stain the cuttings brown from the oil. Steve Greason of Sitelab Corporation in West Newbury, MA graciously agreed to test a set of eight samples for OBM vs formation oil. Three different tests on each of the eight samples were performed using Sitelab's UVF-3100D. An additional test using Sitelab's TD-500D analyzer was also performed on all eight samples. The test data shows marked elevation of Polyaromatic Hydrocarbons (PAH's) in the crude oils plus in the OBM that contained crude oils. Very low values for these same PAH's were observed in the unused OBM, pure LVT (mineral oil base of the OBM), and in CFR (a mud additive that also fluoresces).

The eight samples tested are listed below:

- A - LVT - nearly pure hydro treated mineral oil, this is OBM base oil
- B - OBM - from the mud company before being used to drill (contains LVT, Mul I & II (oil/water emulsifiers), Lime, and Claytone (clay that is receptive to oil - fairly inert))
- C - Crude oil - 30 gravity (fairly high)
- D - Crude oil - 44 gravity (high gravity - runny like water)
- E - OBM with some crude oil - used in drilling
- F - Crude oil - same oil in OBM above - skimmed from sump - may have some rig oils but believed fairly pure crude
- G - CFR - mud additive that also has a characteristic fluorescence
- H - Crude oil - 35 gravity - from a different well but brings participation from another major - sitting 3 years

The equipment shows a clear distinction between the OBM and formation oil when they are extracted from their liquid state. Further tests should include testing of the actual cuttings during realtime drilling.

Attachments:

DrillingMuds_HorizonWells_July27-2012
UVF-3100 Quick reference Guide
UVF-3100D Components Checklist
Sitelab 2012 Price List