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Formation Evaluation of well in order to find very perspective gas and oil in east of Kalimantan area by using mud logging service

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ABSTRACT : *Geological modeling is not an objective in itself. It may have different purposes such as IGIP, validating well locations, optimizing well trajectory reservoir studies and constraining geological models for production forecast. Geological model methodology depends on the main objective of the model ,the available data, and the geological understanding of field. The geological model evolves of life of the field. Also the main objective to get good surface logging on the rig site with good quality of sensors such as gas chromatograph and gas detector which shown us main indicators such as tops formations, tops of reservoir The Mud Logger's sample descriptions provides the oil company with a wealth of geologic information. The logs generated in the logging unit are used by many departments within the exploration and production divisions to determine reservoir characteristics. The logs form a valuable component in the evaluation of potential reservoirs, and usually provides important clues which allow production decisions to be made with added confidence. The remainder of this section will deal with those sample descriptions, and some geologic interpretations those descriptions provide.*
We make this new technology to evaluated well in Kalimantan by using service logging(GEOLOG INTERNATIONAL LTD. And logs interpretation by using logs unit which stay in location site.
Keywords : *geological, Geolog, logging, East Kalimantan, gas & oil.*

I. INTRODUCTION

The Kalimantan has integral part of almost virgin South Eastern area of Sangatta field. The wells test results showed additional untapped reserves in this part of the field encouraging further devilment of this area. Oil base mud is used in current devilment drilling performance and borehole stability that necessitated change of logging program. In addition to the base logging suites and due to the complexity of the remaining reservoir facies special distribution PT petremina DOH Kalimantan acquired Oil- Base Microlmager (OBMI) data to help guide in the development of this virgin part of Sangatta field .

Good quality of OBMI data were obtained for detailed sedimentary and reliable structure dip data in OBM environment, allowing geologic facies analysis and accurate spatial distribution interpretation of reservoir. In this Sangatta fluvio – deltaic environment of deposition, the OMBI image data along with the conceptual geological model allowed very good control in mapping the architecture of the reservoir facies.

In this research a case of OBMI data will be presented demonstrating the methodology and results of comprehensive approach to sedimentological interpretation of borehole image data using the OBMI and relevant other subsurface data. Borehole imaging and dip meter tools have been extensive used in reservoir geological and petro physical evaluation. Reservoir facing evaluation, which offers best substitute for conventional coring and provides continuous non- destructive core like image of the formation.

This is the geological study of sangatta field and assessment of management implications are based on a short 10 day period of reconnaissance in February 1999. Available literature, including the 1:250,000 Systematic Geological Map of Indonesia (Balikpapan Sheet 1814, 1914) has been sourced in the Proyek Pesisir Office in Balikpapan. A valuable though general background is provided by McKinnon et al (1996) **[1].** Field visits included ground survey incorporating a 200 km traverse around the entire bay, boat survey to the head of the bay and a two hour overflight by helicopter. Nonetheless the conclusions reached here must be regarded as tentative and further investigations are recommended.

II. Field site study

This study was conducted from 11 March to 24 April 2012 by GEOLOG company, area in Balikpapan East Kalimentan The data used is the evaluated well x data. Well data used was collected from a variety of companies, both nationally and internationally among others, logs interpretations lab, and Geophysics (BMKG), Indonesia, with operation companies such TOTAL, VICO. **[2]**

III- BASIC PRINCIPLE OF THIS PAPER

This paper describes the various well-logging , Surfaces logging equipment at the disposal of geologists and reservoir engineers today. It follows two volumes on carbonates. The geologist's goal is to understand the processes of hydrocarbon accumulation. For, simply, the better these are understood, the better are the chances of discovering new hydrocarbon reserves. The fields of geological study are several: sedimentology, structural geology, geochemistry, fluid geology, geophysics. Techniques are becoming continually more sophisticated to keep pace with the demands of modern hydrocarbon exploration. Well-logging plays a particularly important role in geophysics: **[3]** .

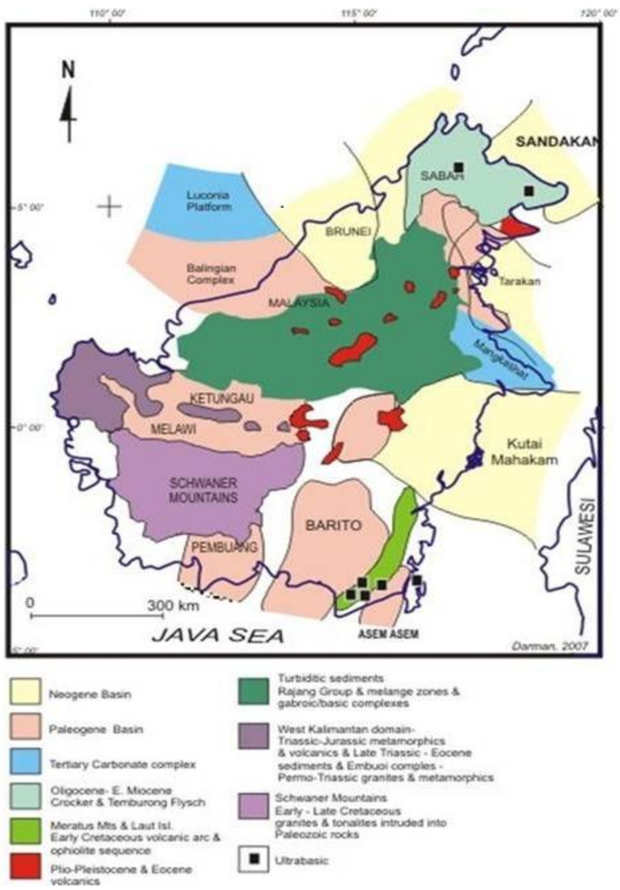


Figure 1. Order tectonic and sedimentary basins in Kalimantan.

IV-SENSOR POSITIONS

Logging unit sensors are located around the rig to order to monitor all drilling and circulation system. In most cases these are independent of the rig's sensors although, in some , a mud logging signal pick- up is piggy-backed, or parasitical to an existing rig sensors.

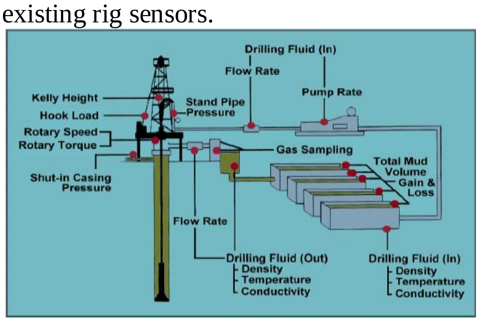


Figure 2.Show the Sensor position.

The most important measurement taken from the draw – work, elevator, and traveling block- the drill string lifting and suspension system in the total depth of the well which, at any time, is the principal datum against which all order well and formation measurements are logged.

IV-A- DEPTH AND RATE OF PENETRATION

Rate of penetration, the change of bit depth with time, also an important indicator of rock strength related to mineralogy, induration and porosity. When tripping, the bit position and speed of movement of drill string in bore hole are necessary data for calculation of swab surge pressure and hole fill- up requirements.

IV-B- CIRCULATION SYSTEM MEASUREMENTS

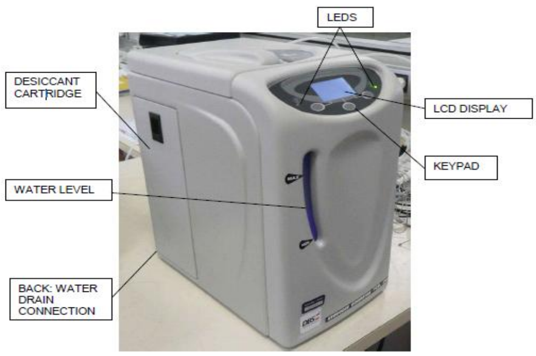
When mud loggers first began working with geo-pressure calculation, The first new logging measurements added to support them were drilling fluid sensors. This is because Many geo – pressure parameters involve changes in the chemical nature of the returning drilling fluid. A major purpose of geo-pressure logging is to determine optimal drilling fluid properties to balance and control down- hole formation pressure. Unlike weight on bit, and rotary speed, there were no automated drilling fluid measurement system available on most rigs. Mud density mad viscosity were measured manually on an hourly basis using very equipment, Other properties requiring more skilled analysis were measured no more than twice day.

IV-C- MUD WEIGHT DENSITY.

The oldest drilling fluid measurement made by mud loggers in mud density, because was the important measurement needed in pressure evaluation calculation, and it was, at the time, the least automated on the rig , Now in some area, mud density sensors mud density sensors in active mud pit and the flow line are almost standred mud logging equipment. It is therefore disappointing that mud density sensors are probably the least reliable and almost the least accurate of any mud logging sensors. The oldest type of mud density sensors is the hydrostatic dip- tube gauge. The simplest of these consist of two tubes of equal diameter and different length. They are bolted together immersed in the drilling mud and air is bubbled thought both tubes. Each tube will sustain an internal air pressure equal to the hydrostatic pressure of mud outside (If the internal pressure less than the mud would invade the tube, if it were more, then the air would blast freely from the tubes.) **[3]**

IV-D- HYDROGEN GENERATOR (PGH2)

The hydrogen generator produces pure H2 (and oxygen as a by-product) by the electrolysis of water; the hydrogen is used to provide both the carrier and auxiliary flow to push the gas sample through the detect circuit for Total Gas and Chromatograph analysis and together with a combustion line enable to ignite the flame on the FID detector.



Hydrogyn Generation

Gas Detector

Figure 3 Showing both gas detector and Hydrogen generation **[4]**

IV-E- TOTAL GAS DETECTOR

The TGD-11 is constituted by mainly by an electronic module and a pneumatic module. The electronic module controls the analyzing signal process while the pneumatic system allows the gas sample to flow inside the detection system. The frontal panel is the user interface which enables the monitoring of the gas readings and the calibration process. In the rear panel are located the power supply socket and switch, the signal connector and the gas sample inlet / outlet.

IV-F- GAS CHROMATOGRAPH DUALFID

The Gas analyses DUALFID has been designed to run a continual chromatographic analysis on the hydrocarbon mixture from C1 to n-C5 released from the mud during drilling operations for petroleum and gas exploration. Once the gas is extracted from the mud, it is sucked into a gas line using an external pump connected to the instrument via one of two available entry ports. On the front area of the instrument is also a third sample inlet that allows separate calibration and test operations.

Analysis is carried out by the chromatographic separation of the seven required components: C1, C2, C3, n-C4, i-C4, i-C5 and n-C5, with a fast analysis time which can range from 45 to 60 seconds (or more if required), with a perfect separation of C1 and C2 (Methane and Ethane). This is achieved by using two specific separation columns. The first has high retention properties which effectively separates C1 & C2, whilst the second column with lower retention properties allows for the separation of the C3 to nC5components. By using a powerful HW (Hardware - based on PC standard PC-104) and its associated analysis software, combined with Ethernet link capabilities, the instrument is designed for use in field environments. Its dimensions (19 inch. 7U), also allow for the instruments easy installation standard rack for field.

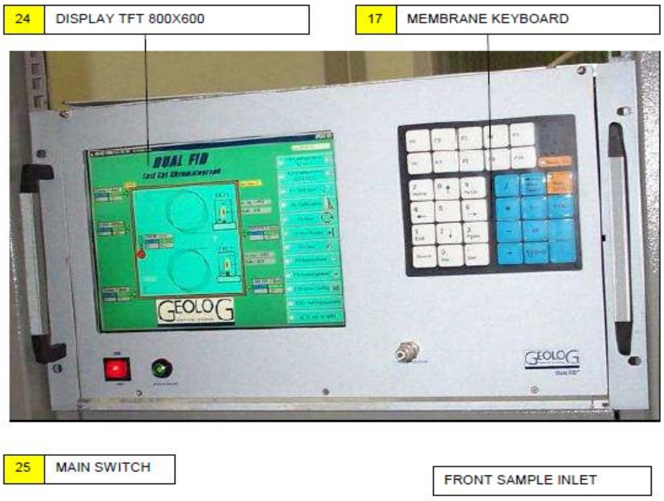


Figure 4 Gas Chromatograph, Frontal Externaland Top View of Instrument **[4]**

V. Mud Logs interpretation

Several kinds of information are produced by the mud log:

1- Measurement of gas entrained in the drilling mud.
2- Total combustible gas from drill cutting.
3- Oil from mud and cuttings.
4- Rate of penetration.
5- Lithology log with estimated porosity
6- Drilling mud properties.
7- Data pertinent to the well’s operations.
8- Detailed data on subsurface characteristic.

VI-Conclusion and Results

First of all the main scope of this paper is to evaluate the formation and through this evaluated we can show the lithology and well profile of this well

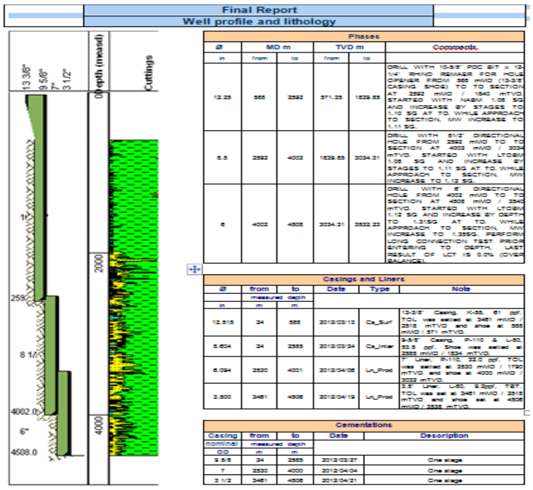


Figure 5 Showing well profile and Lithology.

Technical details of all Geolog equipment are available on request. Calibration and maintenance data are available Ratios utilized: For QC we have used: Total Gas vs sum HC. We have conventionally considered the interval $0.8 < x < 1.2$ as the required specification for the gas data quality.

For Gas analysis we have used the following ratios:**}**

And in the other hand the absorbed on this paper was showing the amount of gas which produced, The X well was logged by Geolog using the following gas detection system: Gas Chain: a CVD gas trap installed on the flow line, connected to a mono flex gas line, which carried the extracted gases to the logging cabin. In the logging cabin the gas sample was dried through a CaCl2 cylinder, then through a coalescence filter, a particulate filter, and finally was conveyed into the Geolog Gas Distribution System GDS.Gas detectors: the GDS then distributed the gas to two separate detectors: A FID Total Gas detector, with 5 seconds sampling time, is utilizing air as carrier gas and H2 to ignite the oven flame. A Dual Fid chromatograph, analyzing the sample from C1 to nC5, with a 60 second cycle. H2 originated by a H2 generator was used for carrier gas and combustion, C1 vs sum HC cross plot: to evidence the main variations in the fluid composition. Wetness (Wh):

$Wh = \left(\frac{C2 + C3 + C4 + C5}{C1 + C2 + C3 + C4 + C5} \right) x100$ it increases with the fluid density.

Balance (Bh): $Bh = \frac{C1 + C2}{C3 + C4 + C5}$ inverse to the Wh ratio.

Character (Ch): compares proportion of heavy hydrocarbons to determine what fluid is associated with the gas recorded. $Ch = \frac{C4 + C5}{C3}$

Generally Gas Quality Ratio, referred to complete well, gives an acceptable correspondence between both gas instruments. Most of the section shows good correspondence between the two detectors.**[4]**

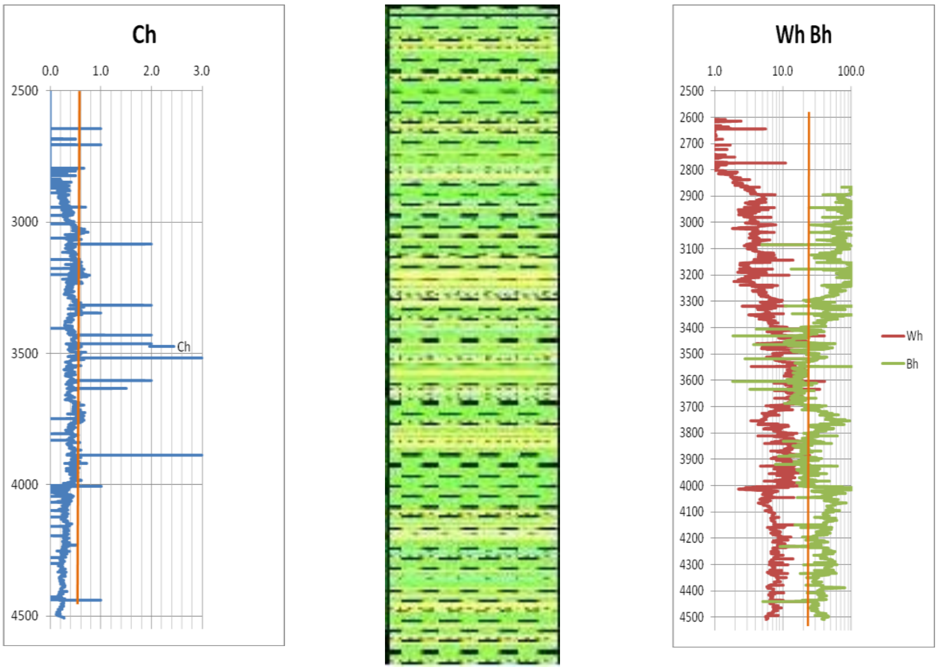


Figure 6 Showing both gas analysis

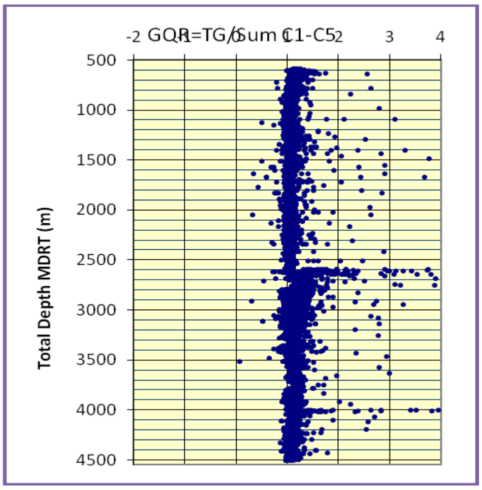


Figure 7 Most of the section shows good correspondence between the two detectors

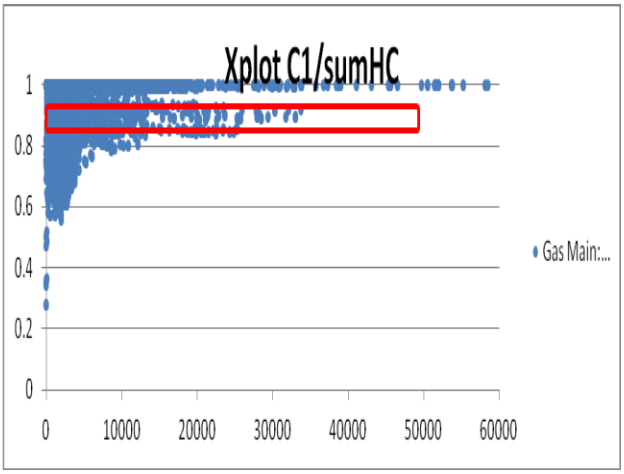


Figure 8 In the above chart, C1 composition is shifted towards the heavier components, with a fluid composition not completely homogeneous

Throughout the entire section from 2800 m downwards, there is constant presence of all the species from C1 to C5. The main variations in the absolute readings are related to formation changes or to section change. The porosity of the formation seems in this case to be the main mechanism guiding the hydrocarbon shows.

In the above chart, C1 composition is shifted towards the heavier components, with a fluid composition not completely homogeneous.

Wetness/Balance

We have further analyzed the basic parameters Wh, Bh, Ch of the section:
The entire final 8.5" and 6" section maintains a constant fluid composition. In the graph above, there are some gas contacts, where the Wetness versus Balance trend is slightly crossed.
The main changes in the ratio trends are caused by variations in the absolute gas readings.
Wh increases towards 10-15, Bh decreases towards 15 at 3516 – 3658 m MD, there is possible productive gas.

VII. Acknowledgements

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REFERENCES

[1] Oil Base Micro Imager (OBMI) Application in sangatta field :A case study Patricius sembiring ,Agustinus SR Nouri Bashir, Herui, Danardatu and sanggam Hutabart. High frequency borehole Seismic Acquisition and It is Application for reservoir delineation of the sanggan field . Offshore Kalimantan ,Indonesia.

[2] Williams, P.R., Johnston, C.R., Almond, R.A., Simamora, W.H.,. Late Cretaceous to Ear Tertiary structural elements of West Kalimantan. Tectonophysics 1988, 148, 279–298.

[3] Vingoe, P., ***Electrical Resistivity Surveying***, 1972. Geophysical Memorandum.

[4] Geolog International LTD manual 2003.