# Well Log Application for Determined CBM Resources of Sajau Formation, Berau Basin, Indonesia

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**Abstract:** *The coal reservoir quality for the CBM production such as coal thickness, gas contents, coal porosity and permeability, reservoir pressure and critical reservoir are generally influence the CBM production. Among of them the porosity and permeability of coal are the main factors controlling the potential of the coal seams for the CBM reservoir. The wire line logs have been used to identify the petrophysical of Sajau Coal Formation in Tanah Kuning , Mangkupasi and Kasau area , Berau Basin to assess the potential of coal bed methane (CBM) reservoir in the field. The coal seam permeability data for 13 major coal seams, The estimation of seam permeability values ranging 5.03 md to 25.06 md. The gas contents were different between seams which have ranges of 11.32 – 32.36 cc/g . Based othe CBM reservoir parameters and the gas contents; the Sajau coal has a good for CBM development.*

**Keywords:** Sajau coal Formation, Berau basin, wire lne log, CBM, permeability

## 1. Introduction

In Indonesia the coal is the most abundant fossil fuel resource. At favorable depths, coal may contain a significant volume of natural gas that can be used as a source of energy. Coal gas is composed primarily of CH4 (80 – 95% by volume) with a small volume of CO2, ethane, propane and butane. Based on the study of the ARI [1,2] the hypothetical CBM resources in Indonesia approximately 453 TCF, which are distributed in several major coal basins.

The main factors that affect the gaseous hydrocarbon generation from coal are macerals composition, degree of thermal maturity, type of organic matter [3, 4]. One the method for determined gas content from the coals is from the canister well log measurements. Other coal parameters which can be determined from wire logs technique in CBM Exploration and production are ash content and other proximate parameters for the estimation of gas content, and CBM reservoir parameter such as porosity and permeability [5,6 and 7].

Several studies have been published on the coal and CBM exploration in Berau Basin, but mostly of works have been carried out only for Miocene Coal of Latih Formation [8, 9 and 10 ]. Limited studies have been done for Pliocene to Pleistocene coal deposits in Berau basin ([11, 12].

The objective of this paper is to show the wide application of well log analysis in the CBM exploration; to determined the reservoir quality of CBM including coal porosity and permeability and finally to measure the gas content of Sajau coal Formation in Berau Basin..

## 2. Study Area

The Mangkupadi coalfield located in the northern part of Kalimantan Island is roughly spoon-like shaped, its longer axis running northwest–southeast (Fig. 1). The dip of the

Formation in general is southerly ($15^0$). The general stratigraphic succession of Sajau coalfield is given in figure 1 [12]. The stratigraphic units of the Kalmerah-1 well in the Sajau area was marked by the presence of two coal-bearing horizons: the Latih Formation and the Sajau Formation. Latih Formation coals of which exposed in the western part of basin are of Miocene age deposited in fluvio/deltaic condition having coal rank from sub-bituminous to low volatile bituminous coal and are considered as potential reservoir for CBM [8]. The other coal bearing formation is a low rank coal (lignite to sub-bituminous) of Sajau formation which were exposed in the eastern part of the basin are also considered as the Pliocene to Pleistocene CBM reservoir in the basin [13]
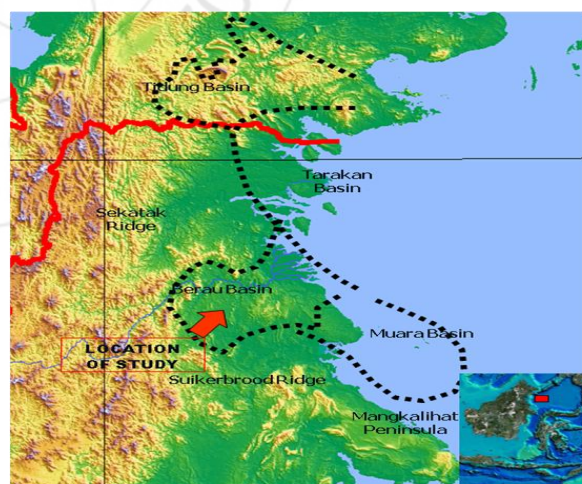


**Figure 1:** The research location map in Berau Basin, North Kalimantan, Indonesia )

## 3. Wireline Logs Coal Analysis

### 3.1. Coal Identification from Well logs

The identification of coal from wire line log is done by making cross plot and cross section in the area of research.