

# Analisa total organic carbon maturity brittleness index dan inversi seismik untuk mengidentifikasi potensi gas serpih di formasi baong bagian bawah-cekungan Sumatera Utara = Total organic carbon maturity brittleness index and seismic inversion analysis to identification of shale gas potential of the lower baong formation North Sumatera basin

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## Abstrak

[<b>ABSTRAK</b><br>

Formasi Baong bagian bawah bertanggung jawab sebagai batuan induk yang mengisi reservoir batupasir pada lapangan minyak dan gas di bagian tenggara Cekungan Sumatera Utara. Penelitian ini mengungkapkan data dan fakta dari laboratorium, pengeboran, wireline well log dan seismik melalui studi analisa petrofisika, geokimia, geomekanika dan geofisika Formasi Baong bagian bawah. Pemahaman tentang geokimia, mineralogi dan geomekanika serpih sangat penting untuk memahami bagaimana reservoir serpih memiliki potensi untuk cadangan dan produksi ketika dilakukan stimulasi. Analisis laboratorium geokimia digunakan untuk menentukan kekayaan, kematangan dan kerogen tipe. Penelitian ini mengklasifikasikan serpih berdasarkan kekayaan organik, kematangan, jenis, kekuatan serpih, kerapuhan serpih dan kandungan clay. Formasi Baong bagian bawah yang menjadi target pada studi ini terletak pada kedalaman 1778-2428 m (TVD), memiliki material organik yang kaya dengan TOC berkisar antara 1,88-3,85% wt, tingkat kematangan 12% sudah matang dan 88% belum matang, serta menghasilkan 20% kerogen tipe III dan 80% kerogen tipe II/III sehingga dapat dijadikan sebagai batuan induk yang berpotensi menghasilkan gas dan gas/minyak. Rigiditas Formasi Baong bagian bawah sangat sangat brittle dengan memiliki rata-rata kandungan mineral kuarsa 33,7% dan mineral brittle seperti kalsit 8,8%, dolomit 1,8% dan siderit 0,9%, serta brittle 80% dan less brittle 20%, sehingga dapat dilakukan hydraulic fracturing dengan baik. Nilai impedansi serpih Formasi Baong bagian bawah berkisar antara 20203 - 24615 ((ft/s)\*(g/cc)).

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<b>ABSTRACT</b><br>

The Lower Baong Formation is responsible for source rock filled up sandstones reservoir in the oil and gas field in the southeastern part of North Sumatra Basin. This study reveals the data and facts from the laboratory, drilling, wireline well logs and seismic through the analysis study of petrophysics, geochemistry, geomechanics and geophysics of Lower Baong Formation. An understanding of shale geochemistry, mineralogy and geomechanics is very important to understand how the shale reservoir has the potential to reserve and

produce when carried out stimulation. Geochemical laboratory analysis is used to determine the richness, maturity and kerogen type. This study classifies shale based on organic richness, maturity, type, shale strength, shale brittleness and clay content. The Lower Baong Formation being targeted in this study lies at a depth of 1778-2428 m (TVD), has a rich organic material with TOC ranging from 1.88 to 3.85 wt%, the maturity level of 12% is mature and immature 88%, and generate 20% kerogen type III and 80% kerogen type II / III so it can be used as a source rock potential to produce gas and gas / oil. Lower Baong Formation rigidity are very brittle by having the averages 33.7% quartz mineral content and brittle minerals such as 8.8% calcite, 1.8% dolomite and siderite 0.9%, and brittle 80% and less brittle 20%, so it can be done hydraulic fracturing very well. Sahlé values of Lower Baong Formation bottom ranges from 20203-24615 ((ft/s)\*(g / cc)). The Lower Baong Formation is responsible for source rock filled up sandstones reservoir in the oil and gas field in the southeastern part of North Sumatra Basin. This study reveals the data and facts from the laboratory, drilling, wireline well logs and seismic through the analysis study of petrophysics, geochemistry, geomechanics and geophysics of Lower Baong Formation. An understanding of shale geochemistry, mineralogy and geomechanics is very important to understand how the shale reservoir has the potential to reserve and produce when carried out stimulation. Geochemical laboratory analysis is used to determine the richness, maturity and kerogen type. This study classifies shale based on organic richness, maturity, type, shale strength, shale brittleness and clay content. The Lower Baong Formation being targeted in this study lies at a depth of 1778-2428 m (TVD), has a rich organic material with TOC ranging from 1.88 to 3.85 wt%, the maturity level of 12% is mature and immature 88%, and generate 20% kerogen type III and 80% kerogen type II / III so it can be used as a source rock potential to produce gas and gas / oil. Lower Baong Formation rigidity are very brittle by having the averages 33.7% quartz mineral content and brittle minerals such as 8.8% calcite, 1.8% dolomite and siderite 0.9%, and brittle 80% and less brittle 20%, so it can be done hydraulic fracturing very well. Sahlé values of Lower Baong Formation bottom ranges from 20203-24615 ((ft/s)\*(g / cc)).]