Shale gas potential in North Sumatra basin: results of an integrated geology, geochemistry, petrophysics, and geography analyses = Potensi shale gas Sumatra Utara: hasil analisis geologi, geokimia, petrofisika, dan geofisika terpadu

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Abstrak

A detailed combined geological and geophysical study in North Sumatra basin has shown that prospective formations for shale play containing gas sweet spots are found to be shales from Bampo, Belumai, and Baong Formations. Bampo Formations Exhibits low shale gas potential with very low to medium in organic material contents, maturity index of immature to mature, and moderate brittleness. Rocks within the formation tent to be reactive to highly reactive to water, with a moderate degree of swelling capacity. Porosity varies within 5.8-7.4% with permeability raging from 0.37 to 3.2 mD. Sweet spots in the formation found around Basilam-l and Securai-l wells occupy about 21% of the formation. On the other hand, Belumai Formation shows moderate to good shale gas potential, with low to high organic material contents, immature to mature levels of maturity, and moderately brittle to brittle. Sweet spots areas in the formation fpund around the two wells are about 29% of the formation. For Baong Formation, analysis reveals moderate to good shale gas potential, with low to medium contents of organic material, immature to mature in maturity index, moderately brittle to brittle in brittleness, and tendency of being reactive to highly reactive to water but with low degree of swelling capacity. Sweet spots in the formation found around two wells occupies are roughly 11% of the total formation volume in the area. Basin modeling leading to gas resources estimation for Baong, Belumai, and Bampo Formations has led to estimated volumes of 6, 379 TCF, 16, 994 TCF, and 25,024 TCF, respectively, with a total amount of 48, 397 TCF. The resources figures are speculative in nature and do not incorporate any certainty and efficiency factors.