ANALISIS AVO *(AMPLITUDE VERSUS OFFSET)*, ATRIBUT SEISMIK DAN PROPERTI FISIKA BATUAN UNTUK IDENTIKASI GAS RESERVOIR KARBONAT *REEF BUILD UP,* LAPANGAN 'KATIMAN' CEKUNGAN JAWA BARAT BAGIAN UTARA

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Abstrak

Metode AVO populer digunakan untuk identifikasi litologi dan fluida pada reservoir batu pasir. Padahal, eksplorasi pada reservoir batu gamping menjadi topik yang menantang pada saat ini. Pada penelitian ini dipaparkan hasil analisa AVO dan atribut seismik pada reservoir karbonat reef build up. Data yang digunakan meliputi 1 data semur dan data CDP gather di lapangan Katiman cekungan Jawa Barat bagian Utara. Berdasarkan analisa petrofisika, didapatkan zona prospek gas yang cukup besar pada bagian atas formasi Baturaja. Selanjutnya dilakukan analisa AVO, atribut AVO (*Intercept, gradient, product, scaled poisson's ratio* dan *fluid factor*), angle range limited stack (near, mid, far) dan atribut seismik (*Instantaneous frequency, amplitude envelope* dan *sweetness*) untuk melihat respon gas karbonat. Analisa AVO dilakukan pada karbonat formasi Baturaja yang mengandung gas dan formasi Parigi. Hasil analisa menunjukan bahwa metode AVO dapat membedakan respon fluida pada batuan karbonat, dimana pada formasi Baturaja nilai amplitudo lebih kecil dan pengalami pengurangan yang lebih drastis dibandingkan formasi Parigi yang tidak mengandung gas. Sebagai validasi dilakukan juga analisa AVO menggunakan sintetik seismogram seismik dari data sumur Tole_1, dan hasilnya menunjukan kemiripan dengan analisa pada data seismik. Analisa angle limited stack pada offset near (1^0-14^0), mid (14^0-29^0) dan far (29^0-42^0) menunjukan efek anomali dim spot pada zona gas Baturaja. Analisa gradien dan atribut AVO *intercept (A), gradient (B)* dan *product (A*B)* dapat menunjukan persebaran top dan base reservoir gas dengan baik. Atribut AVO *scaled poisson's ratio* dapat mengidentifikasi keberdaan fluida dengan jelas, sedangkan pada atribut *fluid factor* keberadaan gas

reservoir karbonat tidak begitu jelas. Analisa atribut seismik menunjukan keberadaan gas karbonat *reefbuild up* formasi Baturaja dicirikan dengan anomali *low Instantaneous frequency*, anomali *high amplitude envelope*, dan anomali nilai tinggi pada atribut *sweetness,* dan atribut *sweetness* lebih sensitif terhadap keberadaan gas reservoir karbonat.

Kata Kunci : AVO, karbonat *reef build up*, atribut AVO, atribut seismik.

AVO (AMPLITUDE VERSUS OFFSET), SEISMIC ATTRIBUTES, AND ROCK PHYSICAL PROPERTIES ANALYSIS FOR GAS OF CARBONATE REEF BUILD UP RESERVOIR IDENTIFICATION, KATIMAN FIELD NORTHWEST JAVA BASIN

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Abstract

AVO method is a popular method for lithology and gas identification in sandstone reservoir. Whereas, the study about exploration in carbonate became a challenging topic today. In this study, presented the results of AVO and attributes seismic analysis in carbonate reef build up reservoir. The data used are one well data and seismic CDP gather from Katiman field, northwest java basin. Based on petrophysics analysis, the prospect of gas zone was found at the upper side of Baturaja formation. Then, applied AVO analysis, AVO attributes (Intercept, gradient, product, scaled Poisson's ratio, and fluid factor), angle range limited stacks (near, mid, and far stack), and seismic attributes (instantaneous frequency, amplitude envelope, and sweetness) for knowing the response of gas. AVO analysis was applied at carbonate Baturaja formation which is contain gas, and carbonate of Parigi formation. The results of AVO analysis show that the method can distinguish fluids response at carbonate reservoir, with amplitude value of Baturaja formation more smaller and more drastic down than Parigi formation which is not contain gas. As a validation was applied AVO analysis using seismic synthetics seismogram from well Tole_1, the results show similarities with seismic data analysis. Angle range limited stack analysis at near (1^0-14^0), mid (14^0-29^0) dan far (29^0-42^0) stack was showed dim dim spot charactiristic anomaly at gas zone of Baturaja formation. Gradient analysis and AVO attributes using intercept (A), gradient (B) and product (A*B) methods can show properly the distribution of top and base gas reservoir. Scaled Poisson's ratio AVO attribute can identify the gas accumulation, while in fluid factor attribute section the gas accumulation is not clear enough. Seismic attribute analysis result show that gas carbonate reef build up at baturaja

formation has low instantaneous frequency attribute value, high amplitude envelope attribute value, and high sweetness attribute value, and Sweetness attribute has more sensitive to predict gas carbonate accumulation.

Key words : AVO, carbonate *reef build up*, AVO attributes, seismic attributes.