

SARI

Daerah penelitian yang berlokasi pada Lapangan CA termasuk ke dalam reservoir karbonat pada interval *Mid Main Carbonate*, Formasi Cibulakan Atas, Cekungan Jawa Barat Utara. Reservoir batuan karbonat memiliki karakteristik yang lebih kompleks daripada reservoir silisiklastik, dimana hubungan porositas dan permeabilitas yang memiliki heterogenitas tinggi akibat proses pengendapan dan diagenesis. Reservoir karbonat interval *Mid Main Carbonate* terdiri atas litofasies *massive coralline bafflestone*, *foraminiferal packstone – grainstone*, *skeletal coralline algal floatstone*, *skeletal algal foraminiferal wackestone – packstone*, *skeletal foraminiferal mudstone – wackestone*, dan *calcareous shale*, dengan lingkungan pengendapan terdiri atas *platform interior*, *platform margin*, dan *slope (detrital)*, *inner shelf – lagoonal* dengan proses diagenesis yang berkembang adalah pelarutan, neomorfisme, mikritisasi, dan sementasi pada lingkungan diagenesis freatik air tawar dan freatik air laut. Proses pengendapan dan diagenesis yang kompleks menyebabkan pengelompokan karakter reservoir untuk menentukan unit aliran fluida dan prediksi permeabilitas menjadi sulit. Konsep *rock typing* diharap menjadi solusi dalam permasalahan tersebut. Pada penelitian ini, sumur produksi yang tersedia sebanyak 16 sumur di Lapangan CA, dengan data penelitian berupa log sumur, batuan inti, serta laporan pemboran dan *mud log*. Hasil analisis petrofisika menggunakan metode probabilistik multimin berupa sifat petrofisika reservoir berupa nilai porositas sebesar 18,3% - 32,9% serta tipe porositas sekunder yang terbentuk adalah *vuggy* dan *moldic*, dengan nilai permeabilitas sebesar 0,5 mD – 684 mD. Perbandingan kedua metode *rock typing* yaitu *flow zone indicator* (FZI) dan Winland R35, memiliki kelemahan dan kelebihan masing – masing. Berdasarkan hasil integrasi konsep geologi (litofasies, lingkungan pengendapan, dan diagenesis), sifat petrofisika (porositas dan permeabilitas), serta sifat aliran fluida (diperoleh dari tekanan kapiler dan saturasi air), diperoleh metode *flow zone indicator* (FZI) merupakan metode terbaik dalam mengelompokkan *rock type* dan prediksi permeabilitas pada Lapangan CA. Kemudian, *rock type* disebarkan secara vertikal ke interval dan sumur yang tidak memiliki data batuan inti dengan metode *multi resolution graph – based clustering*.

Kata kunci: Interval *Mid Main Carbonate*, Reservoir Karbonat, Petrofisika, *Rock Typing*, Prediksi Permeabilitas.

ABSTRACT

The study area located in CA Field, is a carbonate reservoir in Mid Main Carbonate interval, Upper Cibulakan Formation, Northwest Java Basin. Carbonate reservoirs have complex characteristics than siliciclastic reservoirs, where the porosity and permeability relationship has a high heterogeneity due to deposition and diagenetic processes. The carbonate reservoir in Mid Main Carbonate interval consists of lithofacies which are massive coralline bafflestone, foraminiferal packstone – grainstone, skeletal coralline algal floatstone, skeletal algal foraminiferal wackestone – packstone, skeletal foraminiferal mudstone – wackestone, and calcareous shale, with diagenetic processes such as leaching, neomorphism, micritization, and cementation in depositional environments of platform interior, platform margin, and slope (detrital), also diagenetic environments of freshwater phreatic and marine phreatic. The complexity of deposition and diagenetic processes caused difficulty to classify the reservoir characteristics to determine their flow unit and also permeability prediction. Therefore, rock typing methods are expected to be the solution of this problem. In this research, there are 16 production wells available in CA Field, with research data consist of well log, core, also drilling report and mud log. Petrophysical analysis result by using multimin probabilistic method are porosity range from 18,3% - 32,9%, with secondary porosity formed are vuggy and moldic, also permeability range from 0,5 mD – 684 mD. The comparison between two rock typing methods, which are flow zone indicator (FZI) and Winland R35 have their own benefits and weakness. Based on the integration between geological properties (lithofacies, depositional environments, and diagenesis), petrophysic properties (porosity and permeability), also flow unit (from capillary pressure and water saturation), obtained the flow zone indicator is the best method for classify rock type and permeability prediction in CA Field. Then, rock types are distributed vertically by multi resolution graph – based clustering methods on uncored interval/well.

Keywords: *Mid Main Carbonate Interval, Carbonate Reservoir, Petrophysics, Rock Typing, Permeability Prediction.*