

## ABSTRAK

### **GEOLOGI, FASIES TURBIDIT, DAN POTENSI RESERVOAR FORMASI KEREK DI DAERAH SOJOMERTO DAN SEKITARNYA, KECAMATAN GEMUH, KABUPATEN KENDAL, JAWA TENGAH**

**Joseph Emmanuel Ardine**

**111190006**

Keterdapatan klaster rembesan minyak dan gas di daerah penelitian merupakan fenomena unik. Secara regional, lokasi rembesan minyak dan gas termasuk dalam Formasi Kerek pada zona *fold-thrust belt* sebagai bagian dari Fisiografi Zona Kendeng. Hal tersebut menjadi latar belakang utama dalam penelitian ini. Penelitian ini bertujuan untuk mengetahui kondisi geologi, karakteristik fasies dan lingkungan pengendapan serta hubungannya dengan potensi reservoir. Metode penelitian yang digunakan yaitu pemetaan lapangan geologi, analisis profil, analisis mikropaleontologi, analisis petrografi, analisis kalsimetri, dan analisis potensi reservoir. Analisis potensi reservoir meliputi analisis kualitatif (petrografis) dan analisis kuantitatif (analisis inti batuan).

Geomorfologi daerah penelitian dibagi menjadi empat satuan bentuk lahan yaitu Perbukitan Lipatan Terdenudasi Kuat (D1), Perbukitan Terkikis (D2), Tubuh Sungai (F1), dan Dataran Fluvial (F2), dengan pola pengaliran Subtrellis, Subdendritik, dan Subparalel. Stratigrafi daerah penelitian dibagi menjadi empat satuan batuan, diurutkan dari tua ke muda yaitu Satuan Batulempung Karbonatan Kerek (Miosen Tengah – Miosen Akhir), Satuan Breksi Kaligetas (Pliosen – Pleistosen), Satuan Batupasir Damar (Pliosen – Pleistosen), dan Satuan Endapan Aluvial (Holosen – Resen). Lingkungan pengendapan dari Satuan Batulempung Karbonatan Kerek adalah pada lingkungan kipas bawah laut pada zona batial tepi – batial luar (200 – 2000 meter). Lingkungan pengendapan dari Satuan Batupasir Damar dan Satuan Breksi Kaligetas adalah lingkungan darat. Struktur geologi yang berkembang pada daerah penelitian adalah kelompok sesar anjak dan lipatan, kelompok sesar mendatar, dan kelompok kekar berpasangan dengan tegasan utama dari selatan. Fase perkembangan geologi dibagi menjadi tiga fase utama Fase *Pre-Thrusting*, Fase *Syn-Thrusting*, dan Fase *Post-Thrusting*.

Fasies yang hadir di daerah penelitian yaitu kelompok fasies *Classical Turbidite* (CT), kelompok fasies *Massive Sandstone* (MS), dan kelompok fasies *Debris Flow* (DF) (Walker, 1978) dan fasies *coarse grain high-density turbidite* (Lowe, 1982). Fasies kelompok *Classical Turbidite* hadir paling dominan diantara fasies lainnya. Lingkungan pengendapan berjenis *Fine-grained, mud-rich complex; elongated submarine fan*. Analisis kualitatif menunjukkan bahwa nilai porositas total dengan rentang 2,01% - 15,55%. Analisis kuantitatif menunjukkan nilai porositas pada rentang 2,8-10,7% dan nilai permeabilitas dengan rentang 5,8-12,5 mD. Nilai porositas dan permeabilitas batuan dipengaruhi oleh fasies. Formasi Kerek di daerah penelitian tidak berpotensi sebagai batuan reservoir.

**Kata kunci:** *Geologi, Fasies, Reservoir, Formasi Kerek*

## **ABSTRACT**

### **GEOLOGY, TURBIDITE FACIES, AND RESERVOIR POTENTIAL OF KEREK FORMATION IN THE SOJOMERTO AREA, GEMUH DISTRICT, KENDAL REGENCY, CENTRAL JAVA**

**Joseph Emmanuel Ardine**  
**111190006**

*The presence of oil and gas seepage clusters in the study area is a unique phenomenon. Regionally, the location of oil and gas seeps is included in the Kerek Formation in the fold-thrust belt zone as part of the Kendeng Zone Physiography. This is the main background of this research. This study aims to determine the geological conditions, facies characteristics, and depositional environment and their relationship with reservoir potential. The research methods used are geological terrain analysis, profile analysis, micropaleontology analysis, petrographic analysis, calcimetry analysis, and reservoir potential analysis. Reservoir potential analysis includes qualitative analysis (petrographic) and quantitative analysis (core analysis).*

*The geomorphology of the study area is divided into four landform units, namely Strong Denuded Folded Hills (D1), Eroded Hills (D2), River Body (F1), and Fluvial Plain (F2), with Subtrellis, Subdendritic, and Subparallel flow patterns. The stratigraphy of the study area is divided into four rock units, sorted from old to young, namely the Kerek Calcareous Claystone Unit (Middle Miocene - Late Miocene), Kaligetas Breccia Unit (Pliocene - Pleistocene), Damar Sandstone Unit (Pliocene - Pleistocene), and Alluvial Sediment Unit (Holocene – Recent). The depositional environment of the Kerek Carbonate Claystone Unit is in the underwater fan environment in the outer bathyal zone (200 – 2000 meters). The depositional environment of the Damar Sandstone Unit and the Kaligetas Breccia Unit is a terrestrial environment. The geological structures that develop in the study area are groups of factoring and folding faults, horizontal fault groups, and paired joint groups with the main stress from the south. The geological development phase is divided into three main phases: the Pre-Thrusting Phase, the Sin-Thrusting Phase, and the Post-Thrusting Phase.*

*The facies present in the study area are the Classical Turbidite (CT) facies, the Massive Sandstone (MS) facies, and the Debris Flow (DF) facies (Walker, 1978) and the rough grain high-density turbidite facies (Lowe, 1982). The Classical Turbidite facies is the most dominant among the other facies. The depositional environment is fine-grained complex, rich in silt; elongated submarine fans. Qualitative analysis shows that the total porosity value ranges from 2.01% - 15.55%. Quantitative analysis showed porosity values in the range of 2.8-10.7% and permeability values in the range of 5.8-12.5 mD. The value of porosity and permeability of rocks is affected by facies. The Kerek Formation in the study area has no potential as a reservoir rock.*

**Kata kunci:** *Geology, Facies, Reservoir, Kerek Formation*