ABSTRAK

ANALISIS POTENSI BANJIR TERHADAP INFRASTRUKTUR OPERASI PENGEBORAN PT PERTAMINA DI WILAYAH KERJA MIGAS BLOK JAMBI MENGGUNAKAN *SPATIAL MULTI CRITERIA ANALYSIS (*SMCA)

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Banjir merupakan bencana hidrometeorologi yang berpotensi mengganggu operasional infrastruktur pengeboran minyak dan gas bumi di wilayah rentan genangan. Penelitian ini bertujuan menganalisis potensi banjir pada infrastruktur operasi PT Pertamina Hulu Rokan di Blok Jambi, khususnya Pulai Gading, menggunakan Sistem Informasi Geografis (SIG) sebagai dasar mitigasi dan pengelolaan risiko banjir.

Metode yang digunakan adalah *Spatial Multi-Criteria Analysis* (SMCA) dengan teknik *weighted overlay* terhadap enam parameter, yaitu kemiringan lereng, ketinggian lahan, curah hujan, jenis tanah, kerapatan sungai, dan jarak terhadap sungai. Validasi dilakukan menggunakan data historis banjir tahun 2017–2026 melalui metode *confusion matrix*.

Hasil penelitian menunjukkan bahwa wilayah penelitian didominasi oleh kelas potensi banjir sedang seluas 41.622 ha (72,01%) dan kelas tinggi seluas 16.179 ha (27,99%). Kondisi tersebut mengindikasikan bahwa sebagian besar area operasi memiliki potensi banjir yang dapat memengaruhi aksesibilitas, aktivitas pengeboran, dan keberlangsungan operasional.

Sebagai upaya mitigasi struktural, area rencana memiliki elevasi 18,25 meter dengan kemiringan lereng 1:3 sehingga diperlukan timbunan sekitar ±1,25 meter pada lokasi terendah. Hasil validasi menunjukkan nilai *Overall Accuracy* sebesar 93,75%, sehingga peta potensi banjir yang dihasilkan memiliki akurasi tinggi dan layak digunakan sebagai dasar mitigasi banjir serta pengambilan keputusan pengelolaan wilayah.

Kata kunci: banjir, SIG, SMCA, *weighted overlay*, pengeboran MIGAS.

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ABSTRACT

ANALYSIS OF FLOOD POTENTIAL AFFECTING DRILLING OPERATION INFRASTRUCTURE OF PT PERTAMINA IN THE JAMBI OIL AND GAS WORKING AREA USING SPATIAL MULTI CRITERIA ANALYSIS (SMCA)

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Flooding is a hydrometeorological disaster that has the potential to disrupt the operation of oil and gas drilling infrastructure in flood-prone areas. This study aims to analyze flood potential in the operational infrastructure of PT Pertamina Hulu Rokan in the Jambi Block, particularly in Pulai Gading, using a Geographic Information System (GIS) as a basis for flood mitigation and risk management.The study employed the *Spatial Multi-Criteria Analysis* (SMCA) method with a *weighted overlay* technique based on six parameters: slope, elevation, rainfall, soil type, river density, and distance from rivers. Validation was conducted using historical flood data from 2017–2026 through the *confusion matrix* method.The results indicate that the study area is dominated by moderate flood potential, covering 41,622 ha (72.01%), followed by high flood potential, covering 16,179 ha (27.99%). These findings suggest that most operational areas have flood potential that may affect accessibility, drilling activities, and operational continuity. As a structural mitigation measure, the planned site has an elevation of 18.25 m with a 1:3 slope, requiring approximately ±1.25 m of embankment fill in the lowest areas. Validation results yielded an *Overall Accuracy* of 93.75%, indicating that the generated flood potential map has high accuracy and is suitable for supporting flood mitigation and regional management decision-making.

Keywords: flood, GIS, SMCA, weighted overlay, oil and gas drilling.