

ABSTRAK

ANALISIS KESTABILAN LERENG *INPIT DUMP* UEW MENGUNAKAN METODE KESETIMBANGAN BATAS DENGAN PENDEKATAN PROBABILISTIK PADA PENGALIHAN SUNGAI ASAM-ASAM, KALIMANTAN SELATAN

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Operasi penambangan batubara PT Jorong Barutama Greston di sekitar area *Inpit Dump* UEW, Kabupaten Tanah Laut, Kalimantan Selatan memerlukan pengalihan Sungai Asam-Asam guna mengakses cadangan batubara di bawah alur sungai. Perubahan aliran sungai berpotensi meningkatkan infiltrasi air ke dalam tubuh lereng sehingga menaikkan muka air tanah dan tekanan air pori yang memengaruhi kestabilan lereng timbunan. Penelitian ini bertujuan menentukan nilai FK dan PoF pada enam kondisi skenario, mengevaluasi pengaruh pengalihan sungai terhadap kestabilan lereng, serta menyusun rekomendasi desain geometri lereng sesuai Kepmen ESDM No. 1827/K/30/MEM/2018. Analisis menggunakan metode *Limit Equilibrium* Morgenstern-Price dengan pendekatan probabilistik simulasi Monte Carlo melalui metode pencarian bidang longsor *Entry and Exit* dan *Cuckoo Search* pada dua penampang lereng, dengan data sekunder berupa hasil uji SPT, sifat fisik dan mekanik material, data topografi, serta data muka air tanah. Hasil analisis menunjukkan lima kondisi stabil, sementara Kondisi 4 (*Pasca* Pengalihan-Sempadan Sungai 100 m) merupakan kondisi paling kritis dengan FK terendah 0,59 dan PoF 97% akibat peningkatan tekanan air pori *pasca* aktifnya muka air banjir. Redesain geometri lereng dengan penurunan elevasi dari RL -10 ke RL -20 berhasil memenuhi seluruh kriteria keamanan. Penelitian ini menyimpulkan bahwa pengalihan Sungai Asam-Asam tidak menimbulkan ketidakstabilan permanen apabila desain rekomendasi diterapkan secara konsisten.

Kata kunci: *inpit dump*, kestabilan lereng, metode Morgenstern-Price, pengalihan sungai, *probability of failure*

ABSTRACT

SLOPE STABILITY ANALYSIS OF INPIT DUMP UEW USING LIMIT EQUILIBRIUM METHOD WITH PROBABILISTIC APPROACH ON THE ASAM-ASAM RIVER DIVERSION, SOUTH KALIMANTAN

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Coal mining operations by PT Jorong Barutama Greston near the Inpit Dump UEW area, Tanah Laut Regency, South Kalimantan require the diversion of the Asam-Asam River to access coal reserves beneath the riverbed. This river diversion potentially increases water infiltration into the embankment slope, raising the groundwater level and pore water pressure that directly affect slope stability. This study aims to determine the Factor of Safety (FoS) and Probability of Failure (PoF) values under six scenario conditions, evaluate the effect of river diversion on slope stability, and formulate slope geometry design recommendations in accordance with the Minister of Energy and Mineral Resources Decree No. 1827/K/30/MEM/2018. Analysis was conducted using the Limit Equilibrium Morgenstern-Price method with a probabilistic Monte Carlo simulation approach through Entry and Exit and Cuckoo Search failure surface search methods on two slope cross-sections, utilizing secondary data comprising SPT test results, physical and mechanical material properties, topographic data, and groundwater level data. Results indicate that five conditions were classified as stable, while Condition 4 (Post-Diversion-100 m River Buffer Zone) was the most critical with the lowest FoS of 0.59 and PoF of 97% due to significant pore water pressure increase following flood water level activation. Slope geometry redesign through lowering the base elevation from RL -10 to RL -20 successfully satisfied all safety criteria. This study concludes that the Asam-Asam River diversion does not cause permanent instability provided the recommended slope geometry design is consistently implemented.

Keywords: inpit dump, Morgenstern-Price method, probability of failure, river diversion, slope stability