

## Intisari

Pada tanggal 31 Agustus 2017 pukul 14.31 WITA, terjadi gangguan dengan indikasi fasa ST km 30.2 pada Saluran Udara Tegangan Tinggi (SUTT) 150 kV *line* Barikin–Rantau, Kalimantan Selatan. Saat gangguan terjadi, terdapat miskordinasi pada rele jarak di GI Rantau arah Barikin yang tidak bekerja dan OCR di GI Tanjung arah Barikin *line* 1&2 yang bekerja dengan indikasi *setting highset backup* rele  $0,6 I_n$ . Akibatnya, Sistem Barito mengalami *Black Out* (BO). Karena terjadi miskordinasi pada rele proteksi, kerja rele proteksi tersebut perlu dievaluasi.

Evaluasi kerja rele proteksi mengacu pada kronologi gangguan dan standar IEC 60909 menggunakan program bantu DigSILENT *PowerFactory* 15.1.7. Simulasi dilakukan dengan resistans gangguan minimum diasumsikan sebesar  $0,1 \Omega$ , dan resistans gangguan maksimum ditentukan dengan metode iteratif sehingga memenuhi kondisi sesuai dengan kronologi gangguan tersebut.

Hasil evaluasi menunjukkan bahwa koordinasi rele jarak sudah tepat, sehingga tidak bekerjanya rele jarak di GI Rantau arah Barikin kemungkinan disebabkan oleh kesalahan parameter rele. *Underreach* pada rele jarak di GI Cempaka arah Rantau disebabkan oleh resistansi gangguan yang cukup besar, namun *underreach* tersebut tidak dapat diatasi hanya dengan mengubah jangkauan resistif rele. Bekerjanya OCR di GI Tanjung arah Barikin *line* 1&2 disebabkan oleh *setting highset* rele yang terlalu rendah, sehingga *setting highset* OCR dapat dinonaktifkan, atau dapat disetel menjadi  $1,6 I_n$  dengan tunda waktu 400 ms.

**Kata kunci :** SUTT 150 kV *line* Barikin–Rantau, SUTT 150 kV *line* Tanjung–Barikin, Hubung Singkat, Resistans Gangguan, *Highset* OCR

### ***Abstract***

*On 31 August 2017 at 14.31 WITA, a fault occurred at High Voltage Overhead Transmission Line (SUTT) 150 kV Barikin-Rantau, South Kalimantan, indicated in ST phase km 30.2. When the fault occurred, there are miscoordinations of the operation of distance relay at Rantau substation towards Barikin that didn't trip and the OCR at Tanjung substation towards Barikin line 1&2 that tripped with indication of setting highset backup  $0,6 I_n$ . Thus, Black Out (BO) occurred in Barito System. Due to miscoordination of the protection relays, the operation of the protection relays should be evaluated.*

*The evaluation refers to the chronology of the fault and IEC 60909 standard. The simulation is performed in DigSILENT PowerFactory 15.1.7 with minimum fault resistance is assumed at  $0.1 \Omega$ , and the maximum resistance obtained by iterative method so the result of the simulation matches the chronology of the fault.*

*The results shows that the distance relays' coordination is correct, thus the wrong operation of distance relay in the Barikin substation towards Rantau is probably caused by the error in the relay parameters. Underreach in Cempaka substation towards Rantau is caused by the fault resistance, but the underreach can't be solved simply by changing the resistive reach of the relay. OCR in Tanjung substation towards Barikin line 1&2 is operatif due to highset setting that set too low, thus the highset setting of the OCR could be disabled, or can be set to  $1.6 I_n$  with time delay of 400 ms.*

**Keywords :** *SUTT 150 kV line Barikin–Rantau, SUTT 150 kV line Tanjung–Barikin, Short–Circuit Fault, Fault Resistance, Highset OCR*