

## *Abstract*

*Feeder design is one of the things that affects the level of reliability of an electric power system. Many distribution networks are operated as closed loops to improve the reliability of electricity distribution. A reliable feeder design must be balanced with a reliable protection design. The protection system design is carried out at the level of coordination using Directional Over Current Relay (DOCR) relays.*

*In the development of the electric power system it can be ascertained that there will be additional new power plants that enter the closed loop distribution system. The addition of the power plant will change the amount of short circuit current at each point. Therefore, it is necessary to resetting DOCR so that the relay continues to work coordinatively and selectively.*

*In the results of the simulation analysis, several errors were found in the relay operation after the addition of DG. For example a short circuit fault on Saluran 2 causes Rele 5, Rele 6, and Rele 7 to operate incorrectly. This happens because the short circuit current increases from 2.92 kA to 3.50 kA. The relay working time does not change either before or after the addition of DG for the main relay works at 0.05 seconds and the relay backup is 0.35 seconds.*

**Keywords :** *Protection system, coordination protection, closed loop, directional over current relay*