A comprehensive power restoration approach using rule-based method for 11kV distribution network

ABSTRACT

Restoration of supply to the unaffected areas is an important issue in distribution control centers, especially when a fault occurs at a particular section in a distribution network. The concerns are to optimize power dispatch, achieve rapid restoration plan with minimal number of switching involved and to reduce technical loss (I2 R) without violating technical and operational constraints in the network. This requires fast computation time and selection of best restoration plan for customerøs satisfaction. This paper presents a restoration algorithm based on a Rule-Based approach. The algorithm is computationally programmed to provide multiple solutions and to recommend the best option of switching for a dispatcher. The effectiveness of the proposed method is demonstrated using an actual 11kV underground cable distribution network. The chosen test configuration includes three commonly occurring cases in a distribution network - namely one feedback, two feedbacks and three feedbacks respectively. Developed algorithms are tested in two scenarios i.e. with and without technical and operational violation. The result shows that the proposed method is able to generate the best possible restoration plan, whilst ensuring a continuous supply to the unaffected customer. Therefore this method can be considered as an alternative to the conventional way currently being implemented in many utilities to improve the restoration procedure.