

Southern California Edison
WSD-001 – 2020 WMP

DATA REQUEST SET SPD - SCE - V e r b a l - 0 0 1

To: SPD
Prepared by: Arturo Torres
Job Title: Senior Engineer
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Response Date: 7/21/2020

Question 002:

How does SCE guarantee that the open phase detection system will for both sides of a transmission line, with electricity fed from both ends, activate on the presence of an open phase (i.e. one substation does not trip before the other can detect the open phase)?

Response to Question 002:

The Open Phase Detection was designed to be independent (i.e., standalone) and not requiring the need for costly communications. On transmission lines with two terminals, the Open Phase Detection will operate as designed by opening both terminals for an Open Phase condition. This is typical for our Bulk Power Transmission system. However, most of the relays we implemented with this new scheme utilize communications for the primary protection elements and therefore we are able to capitalize on this medium to also transfer trip for an Open Phase detection. Additionally, the Open Phase Detection operates on fast current detection. When a broken conductor condition occurs, the current rapidly drops to zero at both ends which is quickly detected by both end relays. Similar operation time delay ensures that both relays will operate simultaneously and avoid the case of one end tripping before the other end detects the situation. For our subtransmission system, we find the challenge of multi-terminal lines (i.e., 3-Terminals). For transmission lines with multi-terminals, the Open Phase Detection is limited to detecting an Open Phase condition from the terminal to the first tap section. The remaining two terminals will not be able to detect this break because they are still supplying the loads to the remaining terminals. The solution for an Open Phase condition on a multi-terminal transmission line is to transfer trip to the remaining terminals from the terminal that detected the Open Phase condition. This approach will ensure that all terminals are open and therefore de-energizing the transmission line.