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Nov. 23, 2005

PRE-LOCATING A CABLE FAULT ON PRIMARY CABLE USING MAGNETIC WAVE DETECTION

If your magnetic wave detection instrument is using the peak method of detection, your instrument will not work. The receiving antenna must be in the "NULL" mode.

When a thumper is connected to a faulted conductor, the ground side of the thumper is connected to the neutral. In theory, all of the energy leaving the thumper will go down the isolated conductor, arc at the point of fault to the neutral and return to the thumper.

Unfortunately this is not always true. In reviewing a primary cable in the ground, the neutral is connected to a ground rod at both ends. When the voltage pulse from the thumper arcs to the neutral, most of the energy will travel the neutral directly back to the thumper. The far end ground rod is still connected, and some of the energy will go to the far end ground and then try to find its way back to the thumper ground. This is a voltage divider circuit and since some of the current is going to the far end ground, the magnetic wave may be detected beyond the cable fault.

Even though some success can be obtained using magnetics to pre-locate a cable fault, understanding the magnetic wave and why the readings are what they are will go a long way in helping solve the problem.

Since the magnetic wave can travel beyond the fault because of grounds, the ideal locate could be made if ground rods were not available beyond the fault. If the fault current cannot see any conductive path beyond the fault, all if it will travel back to the thumper and a complete loss of magnetic wave will take place at the fault.

Jacketed primary in or out of a duct. Disconnect the neutral and the conductor at the far end. Since the neutral is isolated from the other phases by way of the semi-con jacket, pre-locating a jacketed primary using magnetics is easy.

Un-Jacketed primary in a duct. If it is a single phase, disconnecting the neutral at the far end will work. If more than one phase is in the same duct, de-energizing all of the phases will be required. Since the neutrals on un-jacketed primary will be touching each other over the

entire route of the cable run, all neutrals will have to be disconnected at the far end to eliminate a conductive path to ground beyond the cable fault.

Un-jacketed primary buried directly in the earth. Disconnecting the grounds at the far end will serve no use. The neutrals are in direct contact with the soil and as a result, they are grounded over the entire cable route beyond the cable fault.

WARNING --- BEFORE DISCONNECTING ANY CABLE GROUND, THAT CABLE SHOULD BE CHECKED FOR NEUTRAL CURRENT FLOWING. IF A GROUND IS DISCONNECTED ON A CABLE WITH NEUTRAL CURRENTS PRESENT, THAT NEUTRAL COULD THEN HAVE A VOLTAGE PRESENT. HOW MUCH VOLTAGE WOULD DEPEND ON HOW MUCH CURRENT WAS PRESENT BEFORE THE GROUND WAS REMOVED.