
Delta to Wye System Conversions

Caution should be exercised when converting Delta systems to Wye.

You must ensure that all unintentional grounds are removed before the system is converted.

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There have been a number of incidents and fires where, as part of a distribution system upgrade, the system transformer has been changed from a “Delta” secondary (3 Wire) to a “Wye” secondary (4 Wire) system.

Problem

By design, a ground fault condition on a Delta system will not operate an overcurrent device, but will only indicate a grounded phase conductor.

A potential fire could be introduced when the supply transformers are changed to a Wye secondary system if all ground faults are not removed prior to the new service being energized. A fault would be introduced into a grounded system. Closing a switch into a fault can be extremely hazardous.

The results may be immediate, with the operation of the overcurrent device. Or, if the fault is of a high enough impedance, it may allow significant current to flow, without the overcurrent device operating, causing a fire

Solution

The following Safety Procedures, in addition to the normal procedure is suggested when converting Delta to Wye

1. Inspect the Electrical system being converted, paying particular attention to the status of the Ground Fault Indication Lights (GFI) and make sure that the GFI's are functioning properly.
2. If the GFI indicates a fault (indicators of different brightness could be a sign of partial faults) further tests should be conducted to find the source of the fault. The fault may be further inside the building, outside the building or in another building on the same system. **ALL FAULTS MUST BE CLEARED BEFORE CONVERSION IS ATTEMPTED.**
3. It is important that a “Grounded Circuit Conductor” (or neutral) be brought into the building as per Rule 10-204 and Bulletin 4-9-* and solidly grounded,

- regardless whether or not the customer does not have an immediate or perceived need for a neutral. This connection is essential for clearing faults on the system.
4. Check to see if the service ground conductor requires resizing from Table 18 to Table 17. Also, a check should be performed to see if the existing equipment is rated high enough for any increase in Available Fault Current (AFC) Level. See Rule 14-012 and 14-014
 5. Once converted, the loads can be connected and checked again for ground faults. A check for current on the ground conductor may be an indication of a potential problem.
 6. Overcurrent devices that operate once energized, could be an indication of a fault remaining on the system and should not be ignored. Further investigation shall be conducted.
 7. The redundant Ground Fault Indicators should be removed.
 8. A connection authorization from ESA shall be arranged, before re-energization.

Note: On large services that are solidly grounded, Rule 14-102 may require the addition of Ground Fault Protection.