

Resonant Earthing – A Paradigm Shift for Australia

Introduction:

Resonant earthing is a well established form of system earthing in the northern hemisphere, with applications ranging from 11kV to beyond 220kV in various networks including rail, mining, distribution and transmission. This earthing technology has however failed to gain acceptance in Australia until now, with recent technological advancements in power electronics reinvigorating interest in the technology. As a result, a resonant earthing trial was initiated this year at United Energy Distribution's (UED) Frankston South Zone Substation located in the Melbourne area. Resonant earthing provides an opportunity for Australian electricity distribution companies to make a paradigm change to the design of their networks, resulting in a step increase in performance. On the basis of the data obtained to date plus international application experience, Jemena is recommending a strategy to introduce resonant earthing into every distribution zone substation.

Bushfire:

- Probability of fire ignition linked to earth fault energy
- GFN minimises energy during an fault earth fault
- Explosive failure reduced – no surge energy, no shower of sparks
- No arcing to serve as a means of fire ignition
- Increased earth fault detection sensitivity (factor of 10)

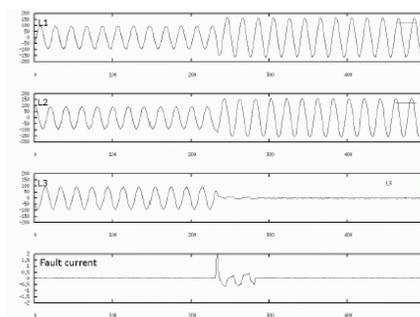
Safety:

- The fault current and fault voltage are minimised
- Reduces risk of conductor clashing & plant failure
- Reduces probability of flash burns
- Improved 'Step & Touch' voltage performance
- Fault detection sensitivity is improved
- The GFN will compensate faster than conventional protection

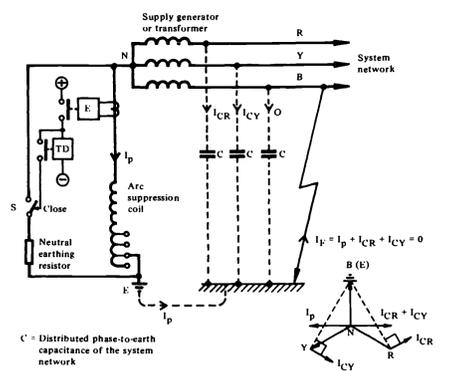
Reliability:

- Reduction in customer outages
- Transient earth faults become self clearing
- Reduction in secondary damage

Operation:

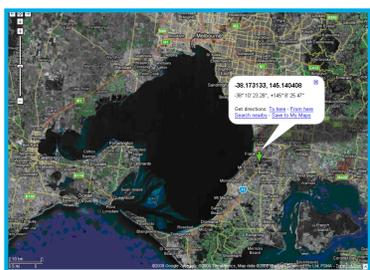


Fault Current / Voltage

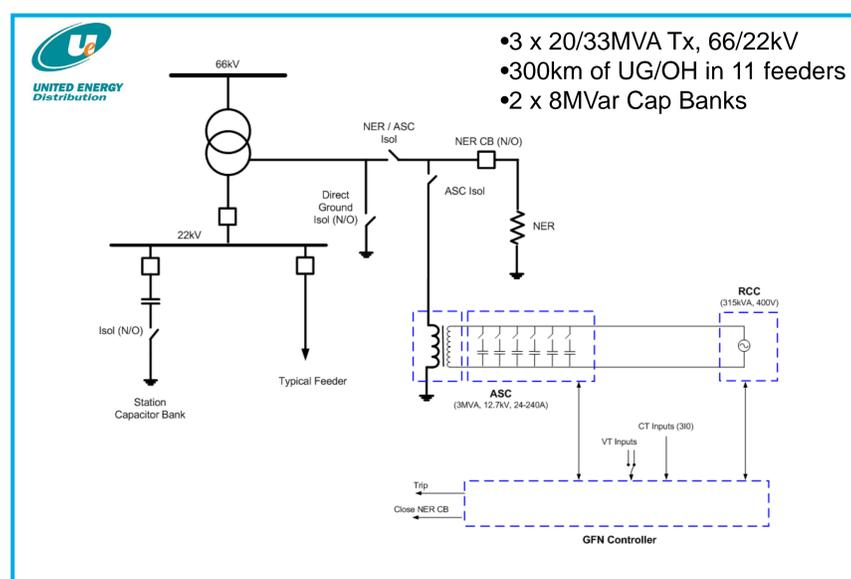


Fault Diagram

The Frankston South Ground Fault Neutraliser (GFN) Trial Installation:



Frankston South - Location



Frankston South – Simplified Single Line Schematic



Arc Suppression Coil (ASC)



GFN Controller



Residual Current Compensator (RCC)

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