

Substation Engineers Need to Know the Condition of a Substation's Grounding Facilities

Correct operation of substation apparatus is greatly dependant on the integrity of the substation's ground grid. Critical relay operation during fault conditions depends on a grounding system performing the way it was intended.

When transmission substations are upgraded and new high voltage lines are installed, the condition of the substation's grounding system is a critical design point. If the substation grounding facilities are assumed to be as specified when the substation was first built, but instead have unknowingly deteriorated, substation operations will be negatively affected. This will have a destabilizing effect on the power grid and can result in power outages and possibly severe damage to facilities.

The fact is that the moment copper is buried in the ground, deterioration begins. Rates of deterioration vary depending on local conditions. As a facet of Bulk Electric System's Critical Infrastructure Protection, a transmission substation's grounding system may be a hidden weak point and a challenge for maintaining a stable regional power grid.

Positron's GPR Services portfolio includes an analysis of the condition of a substation's ground grid using the latest in Smart Ground Meter technology and strictly applied IEEE Standards and methods offering you a detailed report of the condition and layout of the buried grounding facilities. The actual layout of the ground grid and the condition of bonds and ground electrodes can be clearly established. These are then compared to original design specification to determine if the ground grid is sufficient either for daily operations in a broader power grid or to accommodate transmission line upgrades.

Basic GPR Studies

Service Code 770001

- Mounting of HVI equipment
- Make-Ready work for Telco connection
- Circuit Turn-up and Test

Premium GPR Studies

Service Code 772001

- Overview of Grounding System
- Assessment of transmission and distribution lines subtending the site
- Detailed report of Soil Resistivity Test
- Report on how the two-layer model is determined
- Detailed drawings of Computer Modeled Ground System Design
- Safety calculations and recommendations
- Report of split factor derivation
- Details of the Ground Potential Rise GPR calculations
- Written report with executive summary

Basic Substation Grounding Analysis

Service Code 770002

- Point-to-point continuity measurements of the substation ground grid
- Step and touch potential measurements at various locations within the substation
- Locating of the various metallic grid elements within a substation

Advanced Substation Grounding Analysis

Service Code 772002

- Detailed report of Soil Resistivity Test
- Safety and Calculations and recommendations
- Report on how the two-layer model is determined
- Locating of the various metallic grid elements within a substation
- Detailed drawings of Computer Modeled Ground System Design
- Point-to-point continuity measurements of the substation ground grid
- Step and touch potential measurements at various locations within the substation

On-Site Diagnostics and Troubleshooting

Service Code 770003

- Issue identification
- Determine probable cause of issue
- Solution recommendation

Basic HVI Installation Services (EF&I)

Service Code 771004

- Mounting of HVI equipment
- Make-Ready work for Telco connection
- Circuit Turn-up and Test

Premium HVI Installation Services (EF&I)

Service Code 772004

- Trenching
- Laying of conduit
- “H-frame” erection
- Mounting of HVI equipment
- Station cable routing
- Circuit Turn-up and Test

HVI Project Management

Service Code 770005

- Project management of broad HVI deployments or upgrades

HVI Integrity Audit

Service Code 770006

- Audit of existing HVI installation related to safety and to ensure isolation integrity

Lightning Damage Investigation

Service Code 770007

- Perform root-cause analysis on damage caused by lightning and provide recommendations

Service Code	Description
770001	Basic GPR Study
772001	Premium GPR Study
770002	Basic Substation Ground Analysis
771002	Advanced Substation Ground Analysis
770003	On-site Diagnostics and Troubleshooting
771004	Basic HVI Installation Services (EF&I)
772004	Premium HVI Installation Services (EF&I)
770005	HVI Project Management
770006	HVI Integrity Audit
770007	Lightning Damage Investigation

Contact a Positron Representative today to learn how you can benefit from Positron's network of substation specialists to get the information you need to “keep the lights on”.

For information, please contact Positron Customer Service

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