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IEEE Guide for Protective Grounding of Power Lines

IEEE Power and Energy Society

Sponsored by the
Electrical Safety and Maintenance of Lines Committee

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(Revision of IEEE Std 1048-2003)

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Abstract: Guidelines are provided for Temporary Protective Grounding (TPG) of electric power lines to assist in protection of workers from voltages and currents that might develop at a de-energized worksite during maintenance of ac overhead and underground, transmission and distribution lines, cables, and equipment. Other forms of worker protection include isolation and insulation. These methods are described in other documents and guides and are not discussed here.

Keywords: bracket grounds, combination grounding, grounding, IEEE 1048™, protective grounds safety, worksite grounds

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Introduction

This introduction is not part of IEEE Std 1048-2016, IEEE Guide for Protective Grounding of Power Lines.

This revision of IEEE Std 1048 is the first revision since the revision in 2003. The Working Group determined the guide needed a common method for evaluating different temporary protective grounding methods, more detailed explanation of electric and magnetic field induction, clarification on the definition of equipotential zones (EPZ), and example calculations for realistic temporary protective grounding work scenarios.

An equipotential zone (EPZ), with respect to protective grounding, is relative to the exposure voltage and tolerable current of the worker. Any arrangement of temporary protective grounds that achieves limiting exposure voltages to allow less current through the worker (in a defined work area) than the tolerable current is considered to create an EPZ. This is obtainable by worksite grounding, bracket grounding, and combination grounding as is described by the Guide, and performed safely in the industry.

Worksite grounding, bracket grounding, and combination grounding are different arrangements of temporary protective grounding commonly used in industry due to specific types of repairs and maintenance required on a line. The intent of the guide is to ensure the safety of the worker drives the temporary protective grounding procedures. Appendix B is included as a normative reference to compare these grounding arrangements to one example of a worksite.

This guide was developed through the collaborative effort of an international group of volunteers with expertise in many disciplines. While this guide represents a consensus among this volunteer group, it is not the only view on the issues addressed herein. As with any guidance, use of this guide and the procedures and positions herein does not proof or guarantee safety. Use and compliance with this IEEE guide are wholly voluntary.

Contents

IEEE Guide for Protective Grounding of Power Lines

1. Overview

This document provides guidelines for temporary protective grounding of electric power lines to aid in the protection of workers from voltages and currents that might develop at a de-energized worksite during maintenance of ac overhead and underground, transmission and distribution lines, cables, and equipment.

Other forms of worker protection including isolation and insulation are acceptable methods, when used properly, in the place of temporary protective grounding. Details of these other methods are described in other documents and guides and are not further discussed here.

1.1 Purpose

This guide suggests several practices, technical information, and safety criteria for temporary protective grounding of power lines during de-energized maintenance. As an IEEE guide, this document does not have mandatory requirements. Following the suggestions in this guide helps to mitigate risks. Reasonable steps are to be taken by users to minimize all risks associated with protective grounding of power lines during de-energized maintenance.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., the understanding and use of each referenced document is cited and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

ASTM F855, Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment.[1]

ASTM F2249, Standard Specification for In-Service Test Methods for Temporary Grounding Jumper Assemblies Used on De-Energized Electric Power Lines and Equipment.

[1]ASTM publications are available from the American Society for Testing and Material (http://www.astm.org/).