The Grounding Procedure

GEN-SP-4103-01

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Revision List

Rev Number	Date	Comments
0	01/28/2021	Issue for use.
0.01	05/08/2023	Changed document name to The Grounding Procedure. 6.6.1 - Section Deleted - When there isn't an Electrical Supervisor on site, only Journeyman Electricians normally stationed at that site (non-resource shared) may apply and remove grounds. 7.2.5 - The switchgear ground and test device shall be installed according to the following procedure by a minimum of two qualified workers. At least one of the qualified workers shall be a Journeyman Electrician

1. Purpose

1.1. This document defines the requirements for safe electrical grounding work practices on circuits >120v at all generating sites.

2. Scope

2.1. This document applies to all Evergy employees and visitors when at any Evergy Generation facility or while performing Generation duties.

2.2. Contractors that do business with Evergy Generation shall comply with the Contractor Safety Requirements (CSR) document.

2.3. If local, state or federal laws and/or regulations pertaining to any given condition are more stringent than the Evergy rule, the more stringent law or regulation shall take precedence.

3. References

3.1. OSHA Laws and Regulations

3.2. NFPA-70E – 2015 Edition

4. Definitions

4.1. Electrical Supervisor – this shall be the Electrical Foreman, Shift Foreman or others serving in that capacity.

4.2. Grounding and Testing Device or Grounding Breaker – a grounding and testing device is a switchgear assembly accessory device that can be inserted in place of a draw-out circuit breaker for the purpose of grounding the main bus or the external circuits connected to the switchgear assembly, or for primary circuit testing.

4.3. See GEN-SR-4103: Electrical Safety for additional definitions.

5. Responsibility

5.1. All Evergy employees and visitors shall comply with this document when at any Generation facility or while performing Generation duties.

6. Safety

6.1. Voltages referenced in this procedure are nominal voltage and refer to both phase-to-ground voltage and phase-to-phase voltage, unless specifically stated otherwise.

6.2. Tagged LOTO isolation components shall not be physically removed.

6.2.1. Breakers LOTOed in the racked-out position may be removed, providing there is no lock or tag on the breaker itself. See GEN-MP-003: Switchgear Circuit Breaker Testing Procedure.

6.3. The use of a grounding and testing device for the purpose of grounding and/or testing of the bus by way of the main, reserve and tie breaker compartment presents additional hazards which must be identified and controlled to ensure the safe application of the device.

6.4. Grounds shall not be closed up or hidden behind a door or cover unless the outside of the door or cover is clearly marked that a ground has been installed.

6.5. Before any ground is installed, the employee shall become familiar with the circuits, lines, locations, voltages and equipment involved through the pre-job briefing process. Verify that the equipment has been properly de-energized, isolated, locked and tagged out, and the tagging is accurate.

6.6. Shorts and Grounds shall only be installed on systems rated >120v by qualified Journeyman Electricians.

6.7. The tables and procedures presented in this section are offered as minimum requirements. Personnel shall apply good judgment based on knowledge of the electrical hazards, experience, common sense, and the facts and ideas presented in this procedure to properly apply shorts and grounds.

6.8. When shorts and grounds are applied, some method of tracking installation and removal shall be used to ensure that grounds are not left in place when reenergizing equipment. This method may be electronic or manual but shall be approved by Safety and Plant Management.

7. Instructions

7.1. Applying Protective Grounds

7.1.1. Before applying protective grounds on high voltage lines and equipment, the following conditions shall be observed and followed:

7.1.1.1. All isolating points from which the circuit, line or equipment could become energized shall be tagged in accordance with GEN-SR-4202: Legacy East Energy Control or GEN-SR-4302: Legacy West Energy Control (as applicable).

7.1.1.2. Select the appropriate Grounding Cables using Attachment 9.1.

7.1.1.3. Clean and inspect the ground lead clamps prior to use.

7.1.1.4. Inspect hot line tools and protective rubber goods prior to use in accordance with GEN-SR-4103: Electrical Safety and GEN-SR-5107: Hand and Power Tools.

7.1.1.5. Test that the circuit, line or equipment to be grounded is de-energized with appropriate test equipment per GEN-SR-4103: Electrical Safety.

7.1.2. Wire used for low voltage grounds shall be sized appropriately for the fault current.

7.1.3. To attach the ground:

7.1.3.1. The ground end shall be attached first to the established ground conductor.

7.1.3.2. Using insulated hot line tools, the grounding clamps going to the line, cable or equipment, shall be attached.

7.1.4. To remove the ground:

7.1.4.1. Using insulated hot line tools, the grounding clamps shall be removed from the line, cable or equipment that was grounded.

7.1.4.2. The ground end shall be removed last.

7.2. Manual Ground and Test Device - Installation Procedure

7.2.1. Follow the manufacturer's recommendations whenever using a manual ground and test device.

7.2.2. A pre-job briefing in accordance with GEN-SR-1103: Job Safety Planning shall be conducted prior to installing or removing grounding and testing devices.

7.2.3. Grounding devices (without leads installed) can be installed prior to placing the LOTO at the request of the Electrical Supervisor or a Journeyman Electrician.

7.2.3.1. Installing Grounding devices shall be done as a "grounding device" step rather than an isolation step.

7.2.3.2. Grounding leads shall not be installed until the LOTO is granted and the equipment has been tested deenergized.

7.2.4. Grounding devices may be installed after a LOTO has been granted if there is not a LOTO prohibiting the installation of the grounding device.

7.2.4.1. The Electrical Supervisor or a Journeyman Electrician shall inform the Control Authority of the need to install a grounding device.

7.2.4.2. The Electrical Supervisor shall ensure that all authorized employees signed/locked on the affected LOTO(s) that are onsite are notified that the grounding device is to be installed and that it will not affect the protection of the LOTO.

7.2.5. The switchgear ground and test device shall be installed according to the following procedure by a minimum of two qualified workers. At least one of the qualified workers shall be a Journeyman Electrician.

7.2.5.1. Clean and inspect the ground test device. Grounding and testing devices shall be stored in a dry area and protected from dust, dirt, and moisture.

7.2.5.2. Following the manufacturer's instructions, open the circuit breaker, rack it out and remove it from the switchgear cubicle.

7.2.5.3. Look at the finger assemblies on the ground and test device to be sure they are the same size and configuration as the finger assemblies on the breaker that was just removed.

7.2.5.4. Check to be sure the ground clamps or pads have been removed from all six terminals in the ground test device and that the ground bus end of the ground cables are connected to the test device ground bus.

7.2.6. Double check to be sure the grounding clamps are not attached to any of the six (three line, three load) terminals in the ground test device and then rack the ground test device into the connected position.

7.2.7. If the LOTO is not granted, **stop here**. Do not connect the leads to the ground test device until after the LOTO is granted.

7.2.8. While wearing high voltage PPE and using an appropriate high voltage tester:

7.2.8.1. Inspect and check the high voltage tester with an approved battery-operated testing source or a known live source of equal voltage to that which is being tested.

7.2.8.2. Test the three terminals inside the presumed de-energized compartment of the ground test device for no voltage with the appropriate high voltage tester.

7.2.8.3. Test the three terminals inside the presumed energized compartment of the ground test device for voltage with the appropriate high voltage tester. This will verify that the ground and test device is properly racked into the connected position.

7.2.8.4. Re-test the high voltage tester to verify that the high voltage tester is working properly with an approved battery-operated testing source or a known live source of equal voltage to that which is being tested.

7.2.8.5. Lock or secure the energized compartment on the ground test device.

7.2.9. Attach the ground clamps to the three proven de-energized terminals using a shotgun-hotstick. If equipment configuration does not allow enough space for ground clamp installation in the cubicle, then:

7.2.9.1. Remove the ground test device from the cubicle.

7.2.9.2. Install the ground clamps on the three proven de-energized terminals.

7.2.9.3. Re-install the ground test device to the connected position in that cubicle.

7.2.10. The door to the switchgear cubicle shall be closed and latched before racking in the ground test device on models that have this feature.

7.2.11. There shall be no delays, interruptions, or personnel changes during this process; otherwise, the procedure shall be re-started from the beginning.

7.2.12. The circuit is now grounded.

7.2.13. Record the grounds installation using the approved method.

7.3. Manual Ground and Test Device - Removal Procedure

7.3.1. LOTOs with associated grounds shall not be released until the grounds have been removed.

7.3.2. Notify personnel signed onto the LOTO that grounds are being removed.

7.3.3. Rack out the ground test device.

7.3.4. Record the grounds removal using the approved method.

7.4. Grounding in Substations and Switch Yards

7.4.1. Personal protective grounds shall be in place on transformers, circuit breakers, coupling capacitors, lightning arrestors and similar station equipment while workers are on or within the minimum approach distance (OSHA 1910.269 Standard Subpart R, Table R-6) of the current-carrying components.

7.4.2. Protective grounds shall be attached by:

7.4.2.1. Connect to a common copper grounding lead on equipment or structure.

7.4.2.2. Place on each bushing lead of the equipment.

7.4.2.3. In performing certain tests, the bushing grounding jumpers may be temporarily disconnected using insulated hot line tools as long as the tests are performed in compliance with GEN-SR-4202: Legacy East Energy Control or GEN-SR-4302: Legacy West Energy Control (as applicable) and the ground is re-established as soon as the test is completed.

8. Documentation and Recordkeeping

8.1. Generation Safety will maintain this document. The original will be stored electronically by Generation Safety and a copy will be available for use on the Safety website. A signed hard copy will be maintained by Generation Safety. There will be no other hard copies produced or maintained. This procedure shall be reviewed periodically by Generation Safety in accordance with department policy. Superseded revisions shall be archived in accordance with corporate policy.

8.2. To request a revision to this procedure, see your supervisor or Safety Coordinator.

9. Attachments

9.1. Generation Safety Shorts and Grounds Table

9.2. High Voltage Shorts and Grounds Configuration