

ESWPM Addendum 3 Rev. 003

Callaway Energy Center Safety Grounding Requirements

1.0 Purpose of Addendum 3 to the ESWPM Rev.4:

The requirements for placing and removing grounds are covered under section 4.13 of the ESWPM Rev. 4, and these requirements will be followed. This addendum provides specific guidance on how grounds are tracked, equipment configuration when grounds are installed, ground inspection requirements prior to use, and requirements for PPG grounds as far as size and length based on Callaway calculations.

2.0 Grounding Definitions Specific to Callaway Energy Center:

2.1 WPA Grounds – grounds that are placed as part of hanging WPA in accordance with APA-ZZ-00310 Appendix E. These types of grounds shall be used when an electrically safe work condition with two electrical breaks or one electrical break with a blocking device are unable to be established. This form of ground shall be able to dissipate full fault current should there be an inadvertent re-energization. These grounds must be of sufficient size to dissipate the current should a fault occur. These grounds are also what had been referred to in the previous revisions to the ESWPM Addendum 3 as Personal Protective Grounds (PPG).

2.2 Static/ Capacitance Grounds – grounds that are applied to dissipate any buildup of induced voltage or capacitance charge from an electrical circuit or electrical component that has been rendered electrically safe by the establishment of electrical breaks (either two electrical breaks or one electrical break with a blocking device) and the hanging of WPA.

2.3 Mobile Equipment Grounds – grounds as specified by section 4.13.4 of the ESWPM Rev. 4. These grounds do not require tracking per section 3.0 of this addendum. These grounds will be controlled by the work evolution and location of the mobile equipment.

3.0 Tracking and Identification of Installed Grounds at the Callaway Energy Center:

3.1 WPA grounds are controlled through the WPA system and are installed using a planned work document. These grounds are identified with the requirements that are set forth by APA-ZZ-00310 and will have a hold-off tag hung on them. Since a WPA tag is required to be placed on this type of ground, tracking per section 3.4 of this addendum is not required.

3.2 Static / Capacitance grounds should be used when a circuit or component has two electrical breaks or one electrical break with a blocking device installed and the hanging of WPA. If static / capacitance grounds are to be installed on conductors that are normally energized, then the following tracking requirements will be followed:

3.2.1 Notify your supervisor prior to hanging grounds.

3.2.2 Craft must complete all information on a 'GROUND TAG' (green tag). These tags are available from the Maintenance Electrical Department.

3.2.3 Affix the top portion to the ground.

3.2.4 Place the bottom portion of the tag in the work package.

ESWPM Addendum 3 Rev. 003

- 3.2.5 Record the location of the ground in the 'Remarks' section of the tag.
- 3.2.6 It is permissible to place more than one tag on a ground conductor.
- 3.2.7 On the Work Management EMPRV WPA computer application, the supervisor must enter the information about the grounds in the 'Grounds' tab.
- 3.2.8 When grounds are no longer required, remove the 'GROUND TAG' corresponding to the work document and place the tag in the work package. Notify your supervisor that the tag has been removed.
- 3.2.9 The Supervisor MUST return to the Work Management EMPRV WPA computer application and document appropriately under the 'Grounds' tab that the tag has been removed.
- 3.2.10 If the craftsman is removing the last GREEN GROUND TAG on a ground then the craftsman MUST inform the supervisor. When the last GREEN GROUND TAG is removed, the supervisor MUST authorize the removal of the ground. The Work Management EMPRV WPA computer application MUST be updated accordingly after the removal of the ground.
- 3.2.11 It is acceptable to install a static or capacitance ground and not place a 'GREEN GROUND TAG' as long as the ground is not left unattended. If the tag will have to be left unattended then a 'GREEN GROUND TAG' shall be applied. No static/capacitance grounds shall be left installed and unattended without a 'GREEN GROUND TAG' unless there is a WPA Hold-off tag on the ground.

4.0 Removal of Equipment Cover(s) to Install Grounds:

4.1 If equipment covers have been removed to install grounds, these covers SHOULD remain off until the grounds are removed unless the ground can be clearly seen from the outside of the cover with the cover installed. A FME cover with clear vinyl shall be used so that the FME requirements of APA-ZZ-0801 are maintained.

- 4.1.1 If there are no FME clear covers available and a clear plastic sheeting is used, then an FME sticker must be applied to the sheeting.

5.0 Use of Ground Test Devices (GTD or Dummy Breaker):

5.1 Ground Test Devices are installed into the plant using a specific job in EMPRV, requires WPA, and can only be performed by an individual who has the required qualification in QualMaster.

ESWPM Addendum 3 Rev. 003

6.0 Ground Inspections prior to Use:

6.1 All grounds shall be inspected prior to use per section 4.13.1.6 of the ESWPM Rev.4, and if the grounds have any defects, they shall be returned to the ME Department for disposition.

6.2 All WPA grounds shall meet the requirements of 4.13.1.13 of the ESWPM Rev. 4. If a ground does not meet one of these two requirements then it shall be returned to the ME Department for disposition, and not be used in one of these two applications.

7.0 WPA Ground Usage Matrix:

System Voltage	Fault Current (kA)	PPG Length (ft)	PPG Ground Cable
345 kV	58.034	30	Use two parallel 4/0 cables 30 ft. or less in length
13.8 kV	36.899	23.12	Use one 4/0 cable 20 ft. or less in length
4.16 kV	36.365	23.46	Use one 4/0 cable 20 ft. or less in length
480 V Load Center	29.173	30	Use one 4/0 cable 30 ft. or less in length
480 V MCC	26.599	32.07	Use one 4/0 cable 30 ft. or less in length

The above table is the requirements for WPA grounds. Static and Capacitance grounds do not have to meet these requirements, but should be of sufficient size to dissipate the static/induced charge that could be created.