

## CALLAWAY ENERGY CENTER SAFETY GROUNDING REQUIREMENTS

### 1.0 **PURPOSE**

The requirements for placing and removing grounds are covered under Section 4.13 of the Electrical Safe Work Practices Manual (ESWPM), 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.

### 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.
  - 2.1.1. These types of grounds shall be used when an electrically safe work condition with two electrical breaks cannot be established.
  - 2.1.2. This form of ground shall be able to dissipate full fault current should there be an inadvertent re-energization.
  - 2.1.3. Two electrical breaks can be established by any of the following:
    - a. Breaker is open or fuse is removed, with blocking device installed.
    - b. Breaker is open, and physically withdrawn from the bus work, with all phases separated from the bus. This can be verified by Live-Dead-Live testing or visual confirmation of breaker stabs.
    - c. Disconnect blades can be visually verified open with disconnect operating arm removed and WPA tags placed.
    - d. Disconnect blades can be visually verified open with operating linkage locked, typically switchyard disconnects.
    - e. Electrical bus bar link removed, with visible gap, and WPA tags placed.
- 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 two electrical breaks and the hanging of WPA.

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- 2.3. Mobile Equipment Grounds – grounds as specified by the ESWPM, Section 4.13.4. These grounds do not require tracking per Section 3.0 of this addendum nor the use of an Electrical Safety Plan per the ESWPM, Section 5.1.1. These grounds will be controlled by the work evolution and location of the mobile equipment.
- 2.4. Grounds inside the Switchyard – For areas of the switchyard under the jurisdiction of Transmission Dispatch (TD), as described in ODP-ZZ-00310 Att. 2, grounds used in the switchyard will comply with the ESWPM, Section 4.13.3. For areas of the switchyard under the jurisdiction of Callaway, Section 2.2 for WPA grounds should be assessed for applicability.

### **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 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. Return the bottom portion of the tag to the Supervisor.
  - 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, enter the information about the grounds in the 'Grounds' tab.

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### **Step 3.2 Cont'd**

- 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. 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.
- 3.2.12. No static/capacitance grounds shall be left installed and unattended without either a GREEN GROUND TAG or 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.
  - 4.1.1. A FME cover with clear vinyl shall be used so that the FME requirements of APA-ZZ-0801 are maintained.
  - 4.1.2. 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 and can only be performed by an individual who has the required qualification in QualMaster.
- 5.2. Further information about use of a GTD is in the ESWM, Section 4.13.5.6.

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### 6.0 GROUND INSPECTIONS PRIOR TO USE

- 6.1. All grounds shall be inspected prior to use per the ESWPM, Section 4.13.1.6. If the grounds have any defects, they shall be returned to the Maintenance Electrical Department for disposition.
- 6.2. All WPA grounds shall meet the requirements the ESWM, Section 4.13.1. If a ground does not meet one of these two requirements, then it shall be returned to the Maintenance Electrical 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 lists the requirements for WPA grounds. Static / 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.

### 8.0 REFERENCES

- 8.1. Implementing
- 8.1.1. APA-ZZ-00310 Appendix E, Electrical Rules of Use
  - 8.1.2. ODP-ZZ-00310 Attachment 2, WPA, Local Control and Caution Tagging
  - 8.1.3. APA-ZZ-0801, Foreign Material Exclusion
- 8.2. Developmental
- 8.2.1. ESWM, Electrical Safe Work Practices Manual

## CALLAWAY ENERGY CENTER SAFETY GROUNDING REQUIREMENTS

### 9.0 SUMMARY OF CHANGES

Pages	Section or Step	Description
		<b>Incorporates 202402064-001</b>
1	2.0	Updated definitions
3	5.2	Added step to find more information on GTD, review ESWPM