**This AHA is provided as an example of content to consider during development of project-specific AHAs for like activities**

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| **Activity**:  Replace electrical parts in accordance with NFPA 70E |

| **HAZARDS** | | |
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| *JOB STEP* | *HAZARDS* | *ACTIONS TO ELIMINATE OR MINIMIZE*  *EACH HAZARD* |
| 1. Identify circuits | 1. Interference with other activities 2. Human error | 1a. Inform affected users of planned panel outage.  1b. Verify that efforts have been coordinated.   1. Mark or flag equipment and breakers that will be part of outage. |
| 1. Isolate power to electrical equipment by opening circuit | 1. Electric shock, Arc flash, Arc blast 2. Circuit being inadvertently re-energized 3. Human error | 1a. Verify that equipment is operating under normal operating conditions. If it is not, then barricade the work area per step 3, and wear arc flash and shock PPE that is identified for the task per the electrical risk assessment.  1b. Verify that all energized circuit parts are entirely enclosed within equipment (i.e., no openings, loose doors, panels, etc.).  1c. Stand to the side when operating breaker.  2. LOTO breaker after opening.  3. Maintain situational awareness, and stop and obtain further direction if something unexpected occurs. |
| 1. Barricade energized electrical work area at electrical equipment | 1. Unauthorized entrants to within the arc flash and/or limited approach boundary | 1a. Use red danger tape and stanchions (or similar) to encircle the electrical panel at the arc flash or limited approach boundary (whichever is greater).  1b. Position a worker outside of the physical barrier to also stand guard.  1c. Allow no one inside of the physical barrier who is not on the electrical team and who is not wearing the required arc flash and shock PPE that is identified for the task per the electrical risk assessment. |
| 1. Open electrical equipment | 1. Electric shock, Arc flash, Arc blast 2. Falls | 1a. Wear arc flash and shock PPE that is identified for the task per the electrical risk assessment.  1b. Remove any conductive material from the top and sides of the electrical panel before opening the electrical panel.  1c. Use insulated tools to remove bolts and screws from panel cover.  2a. Keep work area cleared of debris and other tripping hazards.  2b. Use two people to remove large panel covers.  3. Use safe ladder practices, including: Always inspect ladder before each shift. Ensure all four legs are stable before climbing ladder. Use three points of contact when ascending or descending. No metal ladders. (see Ladders AHA) |
| 1. Verify zero voltage at electrical equipment | 1. Electric shock, Arc flash, Arc blast 2. False readings | 1. Wear arc flash and shock PPE that is identified for the task per the electrical risk assessment.  2a. Use volt meter that meet the requirements of IEC standard 61010-1.  2b. Test voltage on known live circuit before and after zero voltage verification at panel. |
| 1. Replace contents of electrical equipment (i.e., retrofit panel, replace MDP breaker, make tie-in, etc.) | 1. Human error and Electrical failure | 1a. Install equipment according to NEC and manufacturer instructions.  1b. Leave no loose/spare parts inside or on top of electrical panel.  1c. Report any unforeseen unsafe conditions before re-energizing electrical panel. |
| 1. Close electrical equipment | 1. Trips, cuts, bruises, strains 2. Falls 3. Arc flash, Arc blast | 1a. Keep work area cleared of debris and other tripping hazards.  1b. Use two people to install large panel covers.  2. Use safe ladder practices, including: Always inspect ladder before each shift. Ensure all four legs are stable before climbing ladder. Use three points of contact when ascending or descending. No metal ladders. (see Ladders AHA)  3. Ensure that panel cover is securely in place before re-energizing panel. |
| 1. Remove LOTO and Re-energize electrical equipment by closing circuit | 1. Electric shock, Arc flash, Arc blast | 1a. Verify that all energized circuit parts are entirely enclosed within equipment (i.e., no openings, loose doors, panels, etc.).  1b. Verify that equipment is operating under normal operating conditions. If it is not, then barricade the work area per step 3, and wear arc flash and shock PPE that is identified for the task per the electrical risk assessment.  1c. Stand to the side when operating breaker. |