PURPOSE:

This Best Practice provides guidance for understanding the process and material required to properly barricade utility equipment, electrical equipment, excavations, and other hazards to maintain safety for our employees, our customers, and the general public.

Our workers barricade to minimize the hazards of:
1) Electrical Potential, 2) Line of Fire, and 3) Slips, Trips, and Falls (STF)

Electrical Potential – Our workers are exposed to Step and Touch Potential hazards while working adjacent to utility and electrical equipment that could become electrically energized. Step Potential occurs when the surface on which the employee stands becomes energized and an electrical potential exists between the worker's feet. Touch Potential occurs when the worker touches two surfaces of different electrical potential. This contact can happen hand-to-hand or hand-to-foot (vice versa). A properly placed and observed barricade minimizes Step and Touch Potential hazards by separating the worker from the energized condition.

Step Potential

Touch Potential

Line of Fire – Many Line of Fire hazards occur in a workspace including falling objects, pinch points, and being struck by an object. The specific hazard the barricade is intended to minimize is falling objects inside the drop zone. Maintaining clearance from the barricaded drop zone minimizes the worker exposure to the hazard.

Barricaded Drop Zone Transmission Lines (left) and for Substation (Right)

Slips, Trips, and Falls – STF are the most common workplace injury. Proper barricades minimize worker exposure to STF by warning of the hazard and guarding access to the area. A particular fall hazard exists around large, deep excavations that are susceptible to caving. When combined with proper fall protection, barricading can be an effective method of minimizing worker hazards to STF.

Excavation with Chain Barricading

Excavation with Snow Fence Barricading

DEFINITIONS:
Utility Equipment – includes all vehicles, equipment and tools used to execute the work. Examples: buckets, derricks, pulling equipment, etc.

Electrical Equipment – includes all equipment that is part of the electrical system – temporary or permanent. Examples: transformers, switchgear, handholes, temporary grounding, etc.

SCOPE:

This Best Practice applies to the following work conditions:

Electrical Potential – where workers are exposed to electrical Step or Touch Potential.

- All Utility equipment working on or around energized lines.
- All Utility equipment working on or around conductors that have been previously energized or have the potential to become energized.
- All Utility equipment where induced voltage may be present.
- All Utility equipment and grounds within an equipotential zone (EPZ). (See SUI 2019 Safety, Health and Environmental Program, Chapter 11 for additional information.)
- All Utility boring equipment.
- All electrical equipment that is energized, has previously been energized or has the potential to become energized where workers are/can be exposed to electrical potential.

Line of Fire – where workers are exposed to hazards from gravity, motion or mechanical equipment.

- Workers may be hit by objects in uncontrolled motion through gravity or other energy release – drop zone, suspended loads
- Workers may be exposed to pinch points, mechanical equipment, swing radius, etc.

Slips, Trips and Falls – where workers are exposed to falling hazards

- Open excavations requiring shoring or other mechanical protection.
- Unattended open excavations, pits, manholes, vaults, etc.
- Large diameter drilled holes (> 30” diameter x 6’ deep) must follow the Quanta Best Practice for Drilled Piers.

APPLICATION:

An effective barricade will physically separate the workers and visitors from the hazard. An effective barricade has these characteristics:

- The purpose, application, and location of the barricade must be communicated to all workers.
- The barricade must be visible to workers and visitors – contrasting color from the environment and easily seen.
- A physically stable barricade which provides physical protection from the hazard and is not easily crossed.
- A procedure must be established so that workers will not enter the barricade except when hazards are mitigated.
- Unattended barricades must prevent public access and warn of possible danger.
- An entrance/exit location designated for workers who must enter the barricaded area.

REQUIREMENTS FOR BARRICADING:

Job Task Safety Analysis (JTSA)

An effective JTSA must be conducted when workers are exposed to workplace hazards. The purpose, application and location of barricades used to protect workers from electrical potential, line of fire and slip, trip, fall hazards must be thoroughly discussed during the JTSA.

Personal Protective Equipment (PPE)
All necessary PPE shall be worn when establishing a barricade. At a minimum, hard hat, safety glasses, Hi Viz clothing, work gloves and proper footwear. When mechanical equipment is exposed to traffic, a work zone must, first, be established. Electrical PPE shall be worn when working within the barricaded areas where an electrical potential may be present.

Physical Setup & Location
Barricades shall be placed as a physical barrier between the worker and the identified hazard. Effective barricade guidelines include:

1. The barricade should be installed at a distance *which is the greater* of:
    a. Five (5) feet from the hazard
    b. Minimum Approach Distance based on nominal operating voltage
    c. A distance which will protect the worker from injury.
2. The barricade will include all utility equipment grounds.
3. Where a barricade cannot be effectively setup as outlined above, site specific variances may be allowed providing the variance includes:
    a. A specific hazard control is implemented in location of the barricade.
    b. The variance is documented on the JTSA.
    c. The variance is effectively communicated with all workers. In all circumstances, workers will be protected from the hazard.
    d. A variance cannot be used if any of the bullets in Step 1, above, can be accomplished.
4. Workers will not enter a barricaded area unless the hazard is effectively mitigated.
    a. All necessary PPE shall be worn when entering a barricade.
5. An unattended barricade must prevent public access from the ground to 4 feet above ground.

BARRICADE MATERIALS:

Yellow plastic chain

Yellow Rope (1/4" diameter)

Snow Fence

The barrier material should be placed and attached to road cones or other devices 360 degrees around equipment to ensure a good physical barrier. The material must be installed in a manner high enough from the grade level so not easily crossed or stepped over.

Items such as ribbon, nylon kite string, caution tape, etc., are not acceptable.

PHOTOS:

Barricaded equipment grounded to a temporary driven ground rod.

Barricaded Digger Derrick to the main line neutral.

Barricaded around open pad mount transformer.

Snow Fence Barricade around an excavation or open hole.

All mobile equipment should be barricaded to prevent anyone from touching or leaning against it in the event of energization

Entrance and exit points for barricaded work area