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NWOWS OH&S Book: Part 2: Electrical Safety

Hazards of Electricity:

There are four main types of injuries: electrocution (fatal), electric shock, burns, and falls. These injuries can happen in various ways:

- Direct contact with the electrical energy. When electricity travels through our bodies, it can interfere with the normal electrical signals between the brain and our muscles (e.g., heart may stop beating properly, breathing may stop, or muscles may spasm).
- When the electricity arcs (jumps, or "arcs") through a gas (such as air) to a person who is grounded (that would provide an alternative route to the ground for the electricity).
 - Arc flashes result in intense heat (causing burns), intense light (can cause blindness), or ignition of other materials.
 - Arc blasts cause the same conditions as an arc flash, but are more intense and can also include a strong pressure wave. These pressure waves can damage machinery, throw a person, collapse a lung or rupture ear drums.
- Thermal burns including flash burns from heat generated by an electric arc, and flame burns from materials that catch on fire from heating or ignition by electrical currents. High voltage contact burns can burn internal tissues while leaving only very small injuries on the outside of the skin.
- Muscle contractions, or a startle reaction, can cause a person to fall from a ladder, scaffold or aerial bucket. The fall can cause serious injuries.

To reduce risks and hazards of electricity when drilling or excavating employees are to:

- ensure that all boring locations have locates
- when boring near underground electrical lines be aware of underground debris, trees logs, and such can pull on wires when the augers pull on them. In such terrain ensure that you are no less than 50 feet from buried cables. Should any employee be uncomfortable with the ground conditions- the supervisor is to stop work and contact management- who will ask for a utility consultation.
- that all overhead wires, including their voltage, have been noted and logged in the meeting forms
- **Keep a zap zone of 20' or more from all overhead electrical wires.**
- NEVER lift power lines to gain access to a site - the Supervisor must advise management, who will contact the proper authority to raise or de-energise them.
- walk around the drill rig prior to raising the mast to ensure that no wires are within the zap zone (or trees)
- remember that the wind, and moving objects on the hoist can move the hoist cable towards the power lines - make sure that the rig is positioned far enough away from the wires that this would never allow the cable to come within the zap zone.
- have a signaller watch the mast raise from another perspective, if the mast should come near the zap zone the signaller is to stop the operating from continuing. Reposition the rig at a safer distance.

If there is a contact with power line:

- **if you are on a piece of machinery that is touching a power line stay where you are**

- do not touch anything outside of the electrified equipment
- warn others to stay away (30' minimum)
- have someone call hydro
- have someone call 911
 - ONLY AS A LAST RESORT, if you must get off the equipment due to fire or other hazard, you must do so without touching the equipment at the same time
 - jump about 2 feet away from the equipment, landing with feet together (touching) and shuffle at least 30' away - your heels should never pass your toes

To reduce the hazards of electricity in general, employees are to:

- Inspect tools, power cords, and electrical fittings for damage or wear prior to each use. Repair or replace damaged equipment immediately.
- Always tape cords to walls or floors when necessary. Nails and staples can damage cords causing fire and shock hazards.
- Use cords or equipment that is rated for the level of amperage or wattage that you are using.
- Always use the correct size fuse. Replacing a fuse with one of a larger size can cause excessive currents in the wiring and possibly start a fire.
- Be aware that unusually warm or hot outlets may be a sign that unsafe wiring conditions exists. Unplug any cords to these outlets and do not use until a qualified electrician has checked the wiring.
- Always use ladders made of wood or other non-conductive materials when working with or near electricity or power lines.
- Risk of electric shock is greater in areas that are wet or damp. **Install Ground Fault Circuit Interrupters (GFCIs)** as they will interrupt the electrical circuit before a current sufficient to cause death or serious injury occurs.
- Make sure that exposed receptacle boxes are made of non-conductive materials.
- Know where the breakers and boxes are located in case of an emergency.
- Label all circuit breakers and fuse boxes clearly. Each switch should be positively identified as to which outlet or appliance it is for.
- Do not use outlets or cords that have exposed wiring.
- Do not use power tools with the guards removed.
- Do not block access to circuit breakers or fuse boxes.
- Do not touch a person or electrical apparatus in the event of an electrical accident. Always disconnect the current first.

To reduce the hazards associated with work on water wells:

- lockout the main panel box prior to beginning any work on an electrical power or lighting system, and always keep the key with you.
- all work lights that are placed above work spaces should be enclosed in cages or something similar in order to prevent anything falling on workers below
- ensure that protective enclosures on control panels, fuse boxes, transformers, and similar equipment are secure.
- **only trained, designated** employees may operate electrical equipment, and make final connections to hook up a pumping system