PRESENTER'S GUIDE

"ELECTRICAL SAFETY IN THE LABORATORY"

Part of the Laboratory Safety Series

Quality Safety and Health Products, for Today... and Tomorrow

OUTLINE OF MAJOR PROGRAM POINTS

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The following outline summarizes the major points of information presented in the program. The outline can be used to review the program before conducting a classroom session, as well as in preparing to lead a class discussion about the program.

- **Electricity is literally everywhere in our laboratories.**
  - Without it most of our operations would come to a standstill.
  - So we need to know how to work with it safely.

- **Accidents and equipment malfunctions can cause problems such as:**
  - Electric shock.
  - Ignition of flammable vapors.
  - Explosions.

- **Performing equipment maintenance or making adjustments without proper precautions can result in serious injuries.**
  - We need to know how electricity works inside and out.

- **The force carried by electrical current is measured in "volts."**
  - Most equipment runs on 120 volts.
  - Heavy duty equipment may require 220 volts.

- **"Current" is the flow of electricity.**
  - The "intensity" of the current is measured in "amperes" (amps).

- **The amount of current that an electrical circuit can carry safely will vary.**
  - It depends on the thickness of the wire.
  - Most laboratory electrical lines can safely carry 20 amps.

- **It is the flow of current (amperage), not the voltage, which causes shocks.**
  - Only .06 amps (the amount of electricity needed to light a Christmas tree bulb) can cause a fatal heart attack.

- **Electricity flows when a "circuit" is completed.**
  - A circuit is a loop of uninterrupted electricity going from a power source to equipment and back again.
  - On/off switches regulate this "loop".

- **The flow of electricity in a circuit can also be broken by a fuse or circuit-breaker.**
  - These are activated if wires are carrying more electricity than they can safely handle.

- **"Stray" electricity is always being pulled toward the ground.**
  - This is one of the major causes of shock.

- **"Grounding" provides a safeguard against this situation.**
  - A ground wire will direct "leaking" electricity back through the circuit, not to the person using the equipment.
  - Ground wires are easily visible in three-prong plugs.

- **To be effective, a ground wire must be plugged into an outlet that is also grounded.**
  - These outlets should be tested annually.

- **For added safety, outlets can be fitted with "Ground Fault Circuit Interrupters" (GFCIs).**
  - GFCIs protect you from "current leakage."
  - They sense stray electricity by measuring the continuity of the current.
  - If any deviation exists, a GFCI will quickly shut off the flow of electricity.

- **Following safe work practices is also critical to working around electricity.**
  - Electricity can always be dangerous.

- **There are three very common electrical hazards.**
  - Fires.
  - Shocks.
  - Burns.

- **Many electrical problems involve faulty wiring. So you should:**
  - Check insulation on all equipment wiring before plugging in (look for cracks, etc.).
  - Have faulty wires replaced immediately.
  - Don't overload circuits (this will cause wiring to heat up).
  - Don't use electrical tape to try and "fix" wiring problems.

- **Limit use of extension cords (they can develop cracks, etc.).**
  - Some accreditation groups, such as JCAHO and CAP prohibit their use.

- **Always use caution when selecting electrical equipment.**
  - Whenever possible use double-insulated tools.
  - Ground stray electricity.
  - Check electrical connections for sparking.

- **Be sure to get faulty equipment repaired.**
  - Advise your supervisor about any problems.
  - Don't try to make electrical repairs yourself.

- **If you need to adjust an instrument or piece of equipment, or perform routine maintenance, disconnect all the power sources first.**
  - You should also practice "lock-out/tag-out" techniques.
  - Consult your supervisor if you have questions.

- **In areas where flammable materials are used, equipment selection is doubly important.**
  - — Motor-driven equipment should have non-sparking motors and switches.
  - — Never bring "home appliances" into these areas (most have switches that spark).
  - — Check the equipment that is used by maintenance crews (such as vacuum cleaners, power tools, etc.), as well.

- **You should also prevent water and other liquids from contacting electrical equipment, since it:**
  - — Can damage sensitive electrical circuits.
  - — May cause shock.

- **Guard against any contact with "energized" parts.**
  - — Prevent exposure to limit accidents.

- **If an accident does occur, it is important to be prepared.**
  - — Never touch a person who is in contact with a live wire.
  - — Cut off electrical current at a switch or circuit breaker.
  - — Contact emergency medical personnel immediately.

- **Because of the heat generated by electricity, accidents often result in fires.**
  - — Always know where fire extinguishers are located in your work area.
  - — Remember, electrical fires require Type C extinguishers.
  - — If a fire is too much to handle, evacuate the area and contact the fire department.

- **A working knowledge of first aid can also be helpful in case of electrical accidents.**
  - — Cover minor burns with loose, dry sterile dressing.
  - — Then get medical attention.

- **With more serious electrical accidents, victims may need CPR or treatment for shock. You should:**
  - Learn how to administer CPR.
  - Take other first aid training, if it is available.

*** * * SUMMARY * * ***

- **Electricity is a valuable asset. We need to use it correctly and safely.**
- **Follow proper work practices.**
- **Report unsafe conditions.**
- **Don't attempt repairs unless you are qualified.**
- **Be prepared in case of an emergency.**
- **Electricity makes our labs more efficient. It is up to us to make sure we work with it safely!**