

## **Purpose**

*This document is intended to serve as a reminder of safe work practices and is not a complete presentation of this topic. It should be used by individuals trained and competent in this subject. It is not intended to replace or supersede company procedures, industry standards and/or applicable governmental laws and regulations.*

This document provides assistance in identifying electrical hazards and proper electrical safety related work practice and knowledge. The guidance outlined does not include required training for “qualified persons” working on Generation, Transmission and Distribution installations, use of “**Hot Sticks**”, or working on exposed energized parts > 600 volts (as defined in 29 CFR 1910.269).

## **Definitions**

- A “Qualified Person” for the purpose of this document is defined as those individuals who have been trained in accordance with 29 CFR 1910 parts 331-335 and have received training for avoiding the electrical hazards of working on or near exposed energized electrical parts.
- A “Non-Qualified Person”, for the purpose of this document, is defined as those individuals who have been trained in accordance with 29 CFR 1910 parts 331-335. However, they have not received training for avoiding the electrical hazards of working on or near exposed energized electrical parts and therefore may not do so.

**For example a “non-qualified person” may install/remove de-energized wiring and equipment at a new installation (assuming he/she has been trained in hazard recognition as outline in 29 CFR 1910 parts 331-335). However, only a “qualified person” performs subsequent maintenance and/or repair on those energized systems or equipment. (Deleted “energize those lines and equipment”.)**

## **Applications**

Repair &/or maintenance of electrical circuits	Use of extension cords
Installation and wiring of electrical equipment	Use of electrical power tools
Maintenance/repair of cathodic protection systems	Installation of anode beds

## **Hazards**

- Electrical shock
- Ignition source in flammable atmosphere
- Static electricity
- Fire/explosion

## **General Information**

### **Classified (Hazardous) Areas**

#### **Class 1 locations**

Those in which flammable gases or vapors may be present in quantities sufficient to

produce explosive or ignitable mixtures.

### ***Class 1, Division 1***

Locations (1) in which ignitable concentrations of flammable gases or vapors exist under normal operating conditions, (2) in which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage, or (3) in which breakdown or faulty operations of equipment or processes might release ignitable concentrations of flammable gases or vapors and become a simultaneous ignition source. (Example: Most tank batteries)

### ***Class 1, Division 2***

Locations (1) in which volatile flammable liquids or gases are handled, processed or used but which are normally confined in enclosed containers or systems, (2) in which ignitable concentrations of gases or vapors are normally prevented by ventilation, (3) which are adjacent to Class I Division I locations and not separated by a vapor tight barrier.

### ***Class II & III locations***

These are not anticipated to occur in the oil and gas business.

## **Guidelines**

### ***General***

- Only “qualified persons” are permitted to work on *energized* electrical equipment such as electrical panels, wiring and switches. They should follow all safe practices and procedures for the area and equipment/processes being worked on. Personal Protective Equipment (PPE) such as gloves, safety shoes, hard hats, eye/face protection, insulated fuse pullers, insulated hand tools and non-conductive ropes and hand lines **should** meet industry standards for electrical work as required. All personal jewelry (i.e. rings, earrings, watches, necklaces etc.) should be removed before working on or around energized electrical equipment.
- Safe distances, spacing and other required barriers should be observed.
- At least one **or more** individual per “crew” should be CPR trained.
- All electrical equipment should be considered energized, **until proven otherwise**.
- De-energize all circuits before beginning work on those circuits. Use **Lockout/Tagout** procedures to prevent electrical circuits from inadvertent energization.
- Only “qualified person(s)” should perform “**Hot Stick**” work.
- Use double insulated or grounded electrical tools to protect employees. Use Ground Fault Circuit Interrupters (GFCI’s) in wet or damp environments and/or with extension cords. Do not render electrical interlocks inoperative by removal, modification, or destruction.

### **Guidelines (continued)**

### **General**

- High voltage or areas with exposed live parts must have a sign marked “**Danger - Keep Out**”. Electricians who work on live parts must barricade the area prior to leaving it. (Change to: Exposed *energized* parts must be barricaded prior to leaving them.)
- All disconnects, circuit breakers, and control boxes should be clearly labeled to identify the corresponding equipment they control. All voltage and amp ratings should be clearly identified as specified by the **National Electric Code (NEC)**.
- Use **non-conductive ladders** when working near electrical equipment or energized electrical conductors.
- Use protective equipment/devices such as rubber mats and blankets to provide insulation from other electrical energy and/or grounding sources.

### **Extension Cords**

- Extension cords should not be allowed to stand in water or create tripping hazards.
- Extension cords should not be a replacement for permanent wiring.
- Never use defective electrical equipment or extension cords such as plugs that have been altered. Remove from service until repaired by a qualified person(s).

### **Overhead Power Lines**

- Notify the power/utility company and/or field production operator prior to performing any work in the immediate vicinity of overhead power lines.
- All power lines should be considered energized unless proper measures including **Lockout Tagout** have been taken for de-energizing by a “Qualified Person(s)”.
- When work is being performed near energized overhead power lines the maximum height plus ten feet for derricks, cranes, masts, gin poles, or machinery and their attachments should be maintained from the fully extended fall radius of the equipment to the power lines. Attachments may include radio antennas, extensions, objects being lifted, etc. ( The 10 foot ruling is for lines 50 kV or less, above 50 kV requires 10 feet plus 0.4 inches for each 1 kV over 50 kV).

*Work may be performed under de-energized overhead power lines which have been visibly grounded and **Lockout Tagout** procedures implemented or adequate barriers are present to prevent physical contact with the power lines.*

### **Static Electricity**

- Static electricity can be controlled through the following methods:

Bonding	Grounding
Reduced flow rate	Inert gas blankets
Time dissipation	Minimized agitation
Equipment design	

- Explosives used in well servicing operations can be affected by static electricity generated by windy and dry conditions.

### *Static Electricity (continued)*

- Flammable liquids should not be transferred between containers without electrically connecting (bonding) the containers to a common ground.
- Air movers used **during** confined space entry's can create static electricity and should be bonded to the vessel or tank.
- Prior to transferring flammable liquids from a permanent storage tank to a truck mounted transport, both the transport and tank should be bonded **together**.
- Electrical equipment, tanks, towers, vessels, metal buildings, air coolers, and other equipment subject to electrical short circuits, static charge buildup, or lightning should be grounded.

### **References**

API RP 54, 500

NFPA 70 (National Electric Code) , 70E

29 CFR 1910.269, 331-335