



SECTION 4

CHAPTER 3

WORKING WITH ELECTRICAL EQUIPMENT

Purpose

The training requirements of Gravity Oilfield Services' electrical safety program contained in this chapter apply to employees who face a risk of electric shock that is not reduced to a safe level and who are **not qualified persons** shall also be trained in and be familiar with any electrically related safety practices not specifically addressed but which are necessary for their safety. Unqualified employees must maintain a 10' clearance distance.

The training requirements of Gravity Oilfield Services' electrical safety program contained in the chapter **does not apply** to **employees** who are **qualified** to face a risk of electric shock that is not reduced to a safe level. Their training requirements are not covered in this manual and any work requiring that level of training and knowledge shall not be done by Gravity Oilfield Services' employees.

Scope

This procedure applies to all Company personnel working with or near electrical equipment, including those involved with the:

- setting up a safe workplace
- use of:
 - extension cords
 - electrical power tools
 - welding equipment
- equipment grounding and bonding
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- work near overhead power lines

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Setting Up a Safe Workplace

Purpose This document describes information and policies regarding electrical safety in the workplace, including:

- hazards
- signs and labels
- wiring

Hazards The hazards of working with exposed, energized electrical equipment include:

- electrical shock
- static electricity
- electrical short
- ignition in a flammable atmosphere
- fire and explosion

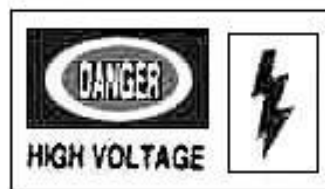
In accordance with OSHA 1910.133(4)(i-ii):

(i) Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

(ii) Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform task near exposed energized parts. Employees may not reach into areas which may contain energized parts.

Signs and labels Designated company employees will post the following signs:

- signs reading “**Danger — High Voltage**” in high-voltage areas
- signs reading “**Danger — Electrical Hazard**” in areas with exposed energized parts.



Checking wiring Make visual inspections to ensure that wires are:

- completely insulated
- not exposed to wash bay or wet areas
- have no signs of overheating or short circuiting
- junction boxes are in place for wiring systems and are covered properly

Using Extension Cords Safely

Purpose This section describes safety guidelines for the use of extension cords.

Location Do **not** locate extension cords where they will:

- stand in water
- create a tripping hazard
- be damaged by equipment or vehicles

Using extension cords Do **not** use:

- extension cords as a replacement for permanent wiring
- multiple connected extension cords
- defective or altered extension cords (e.g. with the ground prong removed, spliced or taped)

Use Ground Fault Circuit Interrupters (GFCIs) with extension cords in the following situations:

- outdoors
- near water
- for tools or equipment being used in a confined space
- near flammable or combustible materials
- during wet installations such as:
 - sinks
 - tanks

Inspect the extension cords for:

- exposed wiring
- bad plugs
- defective prongs
- flattened areas

Take damaged cords out of service and repair them. **IF** the cord has been flattened or the ground prong missing, **THEN** throw it away.

Working with Electrical Equipment

Purpose

Safety-related work practices shall be implemented to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts. When work is performed near or on equipment or circuits which are or may be energized, efforts must be made to de-energize equipment. Policies involved in these work practices include, but not limited to:

- personnel
- tools, protective equipment and training
- procedures for beginning work
- working safely

When efforts to de-energize equipment have been completed, Lock Out/Tag Out procedures must be utilized. If conductors and parts of electrical equipment that have been de-energized, but have not been locked or tagged out, shall be treated as live parts.

For more information see chapter on *Lockout/Tagout*.

Personnel

Only **qualified persons (contractors)** may work on or repair energized or de-energized electrical equipment and systems. A qualified person is one who has completed an apprenticeship and received training covering the:

- topics required by 29 CFR 1910.331-.335 **AND**
- electrical hazards of working on or near exposed, energized parts

No company employees are allowed to perform maintenance or repair on electrical equipment and systems.

During repair or maintenance of electrical equipment or systems by Qualified Persons (Contractors) protective shields, protective barriers or insulating materials must be in place where hazards exist. Employees may not enter spaces containing exposed energized parts until repair and maintenance is completed.

Ladders with nonconductive (fiberglass) side rails must be used in areas where there is a chance that employees might contact exposed energized circuit parts.

Tools, protective equipment and training

Employees shall be trained in and familiar with the safety-related work practices required by their respective job assignments. Assignments include, but not limited to:

- electrical components of vehicles
- powered equipment
- powered hand tools
- electrical panel boxes

Beginning work

Follow this procedure beginning work.

Step	Action
1	Remove the following items from your person: <ul style="list-style-type: none"> ● jewelry, including: <ul style="list-style-type: none"> ○ rings ○ earrings ○ necklaces ○ watches ● keys ● lighters ● similar metallic objects
2	De-energize equipment before beginning work.
3	Follow lockout/tagout procedures to prevent re-energizing.

Working safely

While working, follow these guidelines.

- ensure LO/TO has been performed and equipment is in a “Zero” energy state
- Do **not** remove, bypass, modify LO/TO procedures.
- Consider all equipment energized, unless confirmed otherwise.
- **Never** leave exposed energized parts unattended.
- **Never** work on energized equipment.

Working Near Overhead Power Lines

Purpose This section describes the safety procedures for working near overhead power lines.

Before beginning work Consider all power lines energized unless a qualified person has de-energized them.

Notify the power/utility company and/or field production operator before performing any work near overhead power lines. While working near overhead lines, be extremely careful not to hit the lines or tear them down.

Moving machines in the shop Always use a spotter when moving machines or rigs in the shop to avoid hitting internal power lines.

Minimum clearance for outside lines Observe the minimum distances listed in the following table when operating equipment or machines on rigs (including guylines). No part of the rig, truck or auxiliary equipment may come closer to the power lines than the distance shown.

Rig or Truck Status	Line Voltage, Volts	Minimum Clearance in Feet
Operating rig or truck (raised mast)	ANY	10 (305 cm) plus the height of derrick or mast, plus attachments, e.g., antennas
Rig or truck in transit (lowered mast)	Up to 50,000	10 (305 cm)
Rig or truck in transit (lowered mast)	50,000 to 345,000	10 (305 cm)
Rig or truck in transit (lowered mast)	345,000 to 750,000	16 (487 cm)

Controlling Static Electricity

Purpose This section describes the hazards created by static electricity and methods for reducing the danger.

Hazard Windy and dry conditions can generate static electricity. The sparks generated by static electricity can set off the explosives used in well servicing operations, or hydrocarbon vapors around a well or production facility.

Methods of control Static electricity can be controlled by:

- bonding
- grounding
- reducing flow rate or dissipating energy over time
- minimizing agitation
- using properly designed equipment

Bonding and grounding during operations To bond equipment during operations:

1. attach a cable or 6 foot copper rod that is long enough to touch the ground to the equipment
2. verify that the cable is touching the ground
3. attach a ground cable from rigs to wellhead/flowline

Use these bonding procedures to prevent the release of static electricity.

Before...	ground the equipment by bonding the...
transferring flammable liquids between containers,	containers to a common ground
transferring flammable liquids from a permanent storage tank to a truck-mounted transport or truck to truck,	transport to the tank
beginning pulling rods or tubing	rig to the wellhead or flowline
before pumping flammable liquids to a well with a pump truck	truck frame to the well with a cable and clamp
beginning work with a perforating or logging truck	truck frame to the wellhead