

Explosives Safety Guidelines

1. **Housekeeping.** Clean up immediately following loading operations. Separate regular trash and explosive waste. Remove all explosive waste from well site, including empty explosive packaging materials. **DO NOT MIX EXPLOSIVE WITH ORDINARY TRASH.**
2. **Handling Remnant Explosives.** Locate and identify all residual explosives, such as pieces of det cord, defective charges, etc. Package into proper shipping containers for transportation off of the well site.
3. **Disposition of Trash.** Collect all trash and debris associated with the operation, including empty explosives containers, spent gun tubes, etc. Organize and package in proper shipping containers suitable for transportation off of the well site.

Electric Line Conveyed Operations.

1. **Warning Signs.** Signs such as “DANGER-EXPLOSIVES – TURN OFF RADIO TRANSMITTERS. Or equivalent shall be prominently displayed at the well site at all entrances.
2. **Eliminate Sources of Stray Electrical Energy.** Turn off electrical cathodic protection systems.
3. **Electric Welding.** Discontinue all electric welding operations.
4. **Radio Frequency Energy.** Precautions shall be exercised in explosive operations to prevent radio frequency radiation hazards. Warning signs shall be posted or appropriate measures taken so that radio and radar frequency units will be shut down when within hazardous distances of explosive operations.
5. **Stray Voltages.** Any voltage (ac or dc) in excess of 0.25 volt between the wellhead, rig, perforating unit, generator skid, rig auxiliary power source and barge must be eliminated before proceeding with perforating operations!
6. **Rig Wiring.** Remove or de-energize any rig electrical wiring that might contact the unit, cable or explosive device during rig-up and for the duration of the operation. Top drive systems should be electrically isolated in accordance with the manufacturer's procedures.

Pre-Checks, Units Systems.

1. **Cable Conductor Continuity.** Proper insulation and continuity of cable conductors shall be verified prior to arming.
2. **Checking Gun Circuits.** Only a circuit testing instrument which is designed for and labeled as Blasting Multimeter, Blasting Ohmmeter, or Blasting Galvanometer. The specially designed test circuit used to perform blasting circuit checks shall not exceed 25 milliamperes or 10% of the no-fire rating of the detonator in the circuit, whichever is less.
3. **Checking Detonators.** Blasting caps/detonators or other initiation devices shall be contained in a safety loading tube during circuit testing operations.
4. **Using Unit Power (Check Fire or Hot Check).** When unit power is to be used to check the cablehead/accessory equipment. The cablehead or accessory equipment is to be in clear view of the person applying power. **NO POWER IS TO BE APPLIED WHILE THE GUN IS ARMED, NOR APPLIED THROUGH THE EXPLOSIVE TOOL ASSEMBLY AT ANY TIME WHILE THE GUN IS ON THE SURFACE.**

Unit Preparation for the Explosive Tool Attachment.

5. **Isolate the Cable Circuit.** Disconnect the cable from the unit instrument with a positive disconnect.
6. **Isolate the Control Panel Power.** Turn off ALL instrument power switches.
7. **Isolate the Power Source.** Turn off ALL main circuit breakers in the unit
8. **Activate the Current/Voltages Limiting Circuits.** Ground all the electrical cable conductors to the unit ground through a nominal resistance of 5,000 ohms. Switch Key Switch to “SAFE” mode.
9. **Lock Circuits in SAFE MODE.** Place the cable circuit in Safe mode of the lockout device. Ensure that the switch key to the lockout device remains outside the electric wireline unit until the explosive device is lowered to a depth on less than 200 ft below the ground level or sea floor.

Gun or Device Arming. Before arming the device, check surrounding skies for rain, thunder storms, dust storms etc. Be sure there is sufficient time to arm device and proceed into the well to a safe depth of at least 200 ft before dangerous weather arrives.

- 10 **Stray Voltage Check.** Verify stray voltages between unit, rig and wellhead does not exceed 0.25 volts before proceeding.
- 11 **Personnel.** Clear all unnecessary personnel from the area. Clear the line of fire.
- 12 Connect the cablehead to the unarmed explosive device.
- 13 Double check for stray voltages, maintain the key for the lockout device is outside the electric wireline unit until the explosive device is lowered to a depth of at least 200 ft.
- 14 Verify that NO voltage exists between the connection point where the blasting cap wires attach.
- 15 Remove detonator/ blasting cap from the container and assure that the wires are shunted (shorted together). Insert the detonator/blasting cap into a safety tube and convey to the arming area.
- 16 Connect detonator/blasting cap lead wires, negative lead should be connected first to those of the explosive device. Detonator should be still in the safety tube.
- 17 Remove the detonator from the safety tube and connect to the detonation cord or the device to be fired.
- 18 Finish assembling the explosive device. Taking care not to pinch wires or smash explosive components.

Running The Explosive Device Into The Well.

- 19 **Restoring Power.** When the explosive device has reached a depth of 200 ft the cable safety circuit may be taken out of the “Safe” mode.
- 20 The explosive device should be run in to depth, tie in to depth, activate the fire control panel and fire the device.

Returning to Surface.

- 21 The cable safety circuit should be placed back in the “Safe” mode before the explosive device reached a depth of 200 feet. Never try to disarm any unexploded device in rain, sand storms.
- 22 Power Down by cutting generator or electrical power to electric wireline unit
- 23 Isolate Control Panel Power
- 24 Cut Off all circuit Breakers
- 25 Lock Circuits in Safe Mode
- 26 Remove all unnecessary personnel from the firing line.
- 27 Always be careful when opening any device that has been run into a well. Internal pressure may exist.

These guidelines are for reference only. Read and fully understand all safety procedures as called out in API RP 67.

It is your Life. Protect it!