

## The Lease Pumper's Handbook

### Chapter 7 Electrical Submersible Lift

#### Section B

#### OPERATING ELECTRICAL SUBMERSIBLE LIFT

##### B-1. Well Operation and Automatic Controls.

The amount of fluid being produced from a well may require continuous operation all day or it may only require operation for a part of a day. The volume of fluid that needs to be produced daily from the well and the well capacity will indicate the best operating practices.

A few years ago most of the automated controls looked very much alike. With the tremendous surge in computer technology and miniaturization of automation components, new designs come out every few months so that equipment controls may not be recognized without special instructions.



**Figure 1. A wellhead for an electrical submersible pump with a pressure gauge, check valve, union, ball valve, and a hose for checking production.**

The check valve on the wellhead must hold when operating the electrical submersible pump. If the check valve leaks, the liquid can drain back into the formation. This can cause the pump to turn counterclockwise while the well is shut in. If the power is turned back on while the pump is spinning in the reverse direction, the sudden torque can cause shaft failure. The pump would then have to be pulled, repaired, and replaced to restore service. The wellhead gauge will usually indicate if a problem is developing.

##### B-2. The Electrical Submersible Pump Well.

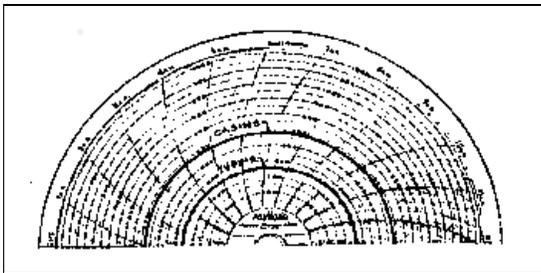
The well installation and controls may be exceedingly simple or more elaborate, depending on well depth, type of equipment, and volumes of fluids produced. Figure 1 shows an electrical submersible pump well that is about as simple as a system can be. It has everything that it needs to operate but, on a marginally producing well, would have a minor impact on the lease income in the event of problems. Higher producing wells will have more elaborate systems to allow the pumper to recognize and analyze production problems quickly and more accurately in order to reduce downtime.

##### B-3. Continuous Operation.

A chart can be installed at the wellhead to indicate pump and well performance. When

the pump is operating continuously, the chart will have two steady lines on it, one indicating the casing pressure while it is running, and the other the tubing pressure in the flow line.

When the well is operating normally, the lease pumper should note the normal reading. When the well has problems, the recording chart will aid in identifying the type of problem that has occurred and when it began. Without this chart, analysis of pump performance is more difficult.

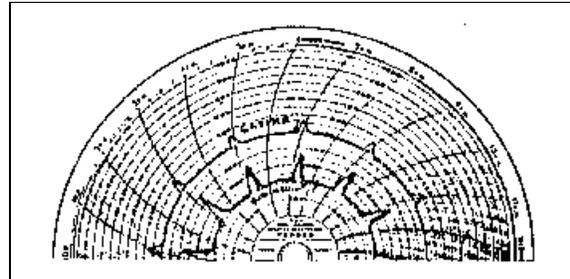


**Figure 2. A chart graph monitoring continuous operation.**  
(courtesy of Reda Pump Company)

#### **B-4. Intermittent Operation.**

When the well is operating intermittently, the casing pressure will increase while the well is at rest, and the tubing pressure will be lower. When the well comes on, the casing pressure will drop as the liquid level in the casing falls, and the line pressure on the tubing will increase. A whole series of diagrams is available for reference to assist

the lease pumper in making logical decisions when the lines on the chart do not follow the normal operating pattern.



**Figure 3. A chart graph monitoring intermittent operation.**  
(courtesy of Reda Pump Company)

#### **B-5. Servicing the Well When Problems Occur.**

Special equipment must be brought to the location when servicing the well. It is also recommended that a special experienced technician be present to make decisions when questions arise and to direct the workover procedure in order to solve problems.

As the tubing is pulled, the cable clamps and bands must be removed and the electric line spooled onto a special trailer that has been brought to the lease for the workover. As it is run back into the hole after the pump has been serviced, the electric line is re-clamped to the outside of the tubing.