

The Lease Pumper's Handbook

CHAPTER 17

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Section A

WELL SERVICING

A-1. Introduction to Well Servicing.

Some wells are plugged and abandoned too early because the people responsible for maintaining the well did not recognize or understand why it stopped producing and did not know how to restore production.

In order to keep wells producing oil and gas, the pumper must understand the problems that can occur and how production can be restored. Any problems that occur downhole must be correctly identified and repaired. This means that rods and tubing must be occasionally pulled.

The pumper must understand what well servicing equipment is available, how it functions, what problems may be occurring in the reservoir, and what must be done to restore production.

A-2. Styles of Well Servicing and Workover Units.

There are three styles of basic well servicing units based on their mast or pole design. All three are manufactured today, although the two smaller models have a limited market. The smaller pole units are available with one or two drums, while the larger mast unit has two drums.

Single-pole units. Single-pole units are used to service shallow wells. Since the well

servicing unit has one pole, the rods and tubing are laid down on a rack. The unit can be operated with only an operator and a floor person, although for most wells it is better to have a third helper.

The unit has as many as eight guy lines, four for the lower section, and four for the upper section to be guyed after extending the upper section. After folding the pole mast up on most single-pole units, the two front load supporting guy lines must be fastened before the upper mast pole can be telescoped up. For safety and when the wind is blowing, it is better to guy all four lower lines before telescoping.

The mast can be telescoped to several different heights, according to what job is planned. Since most rods are 25 feet long, for a rod job only the mast can be lower than for a service job that involves tubing, which can exceed 32 feet. The higher pin level will allow tubing and 30-foot rods to be pulled. When telescoped to maximum height, rods can be pulled in doubles and laid on racks.

These units are still popular with operators who have many shallow wells and do their own service work.

Double-pole units. The double-pole unit is more efficient than the single-pole, because rods can be hung in the derrick in doubles, and the tubing can stand in singles. It still allows the option of laying the rods down in

singles or doubles and the tubing in singles. When pulling rods, the box can break on either side, so the rods must go back into the hole in the same order from which they were broken out.

When pulling tubing, the collar is used to support and lift the string, so the connection must always be broken out of the top of the collar. When possible, the tubing should also be run back in the well in the reverse order of being removed. More thread leaks will be encountered when the joints are jumbled in random order each time they are pulled. Thread lubricant should always be applied when running the pipe back into the hole. Cards are available from rod suppliers to show how tight the rods should be made up.

The double-pole unit support truck is not much larger than the one for the single mast unit. With two poles braced together, however, it can pull medium depth wells, allowing many operators to pull most of their own wells. This unit can also perform light workover duties and can be operated with a three- or a four-person crew.

Mast style units. Figure 1 illustrates a mast style well servicing unit. This unit is capable of pulling standard 25-foot rods in triples and tubing in doubles. Fiberglass rods are 37½ feet long and can be pulled in doubles. Since the rods are racked by a person on the derrick, they can be pulled very rapidly. For deeper wells, the work is almost always performed with the mast style units.

Single- and double-drum well servicing units. A well servicing unit may have one or two drums. If it has a single drum, operators usually just pull rods and tubing or swab, although it can be used both ways by swapping the lines. A double-drum unit contains a swab line for swabbing, cutting scale and paraffin, pulling standing valves,

running impression blocks, setting and removing downhole tools, as well as other functions.

The single- and double-pole units may have one or two drums. The larger standard mast type unit has two.

A-3. Rooding the Well Servicing Unit to the Lease.

Driving the well servicing unit to the lease can present several road hazards. The service rig is heavy and slow moving. It is usually followed by a crew truck pulling a tool security trailer. The drivers should talk about safety and observe good road practices.

The crew truck should trail the servicing rig at a comfortable distance so that vehicles needing to pass will have enough room to pass each the truck and rig separately.

When the road rises, especially on a rough lease road, extra separation must be allowed.

If the driver of the well servicing unit misses a gear or if the engine should die, the well servicing unit may roll backward down the slope. This can present exceptional risk to the crew truck occupants.



Figure 1. A typical telescoping mast type pulling unit.

A-4. Approaching the Well.

When backing the unit up to the well, a person should stand in front of the unit on the driver's side so that signals can be seen easily by the driver. Another person at the back of the rig should watch the pumping unit and the pulling unit and signal instructions to be relayed to the driver by the person in front of the rig. The pumping unit must be turned off with the horse head in a position where it cannot be hit by the pulling unit or poles, and the pumping unit brake should be set. A *sill* or 6" x 8" wood block approximately two feet long should be placed on the ground so that the unit will back up against it and cannot strike the pumping unit or wellhead in event the driver's foot slips off the brake. The unit should be set the correct distance from the wellhead and be square with the anchors and leveled with the leg screws. This allows the blocks to hang directly over the hole.

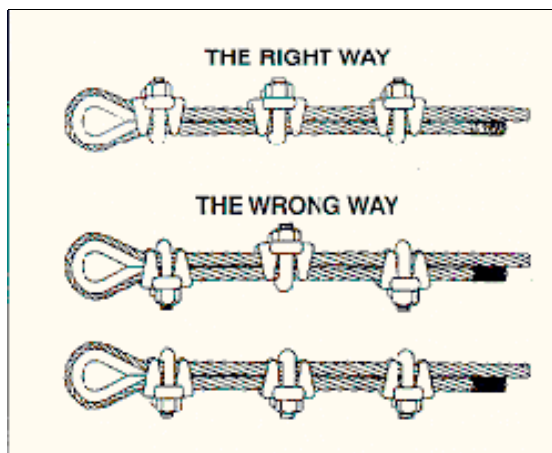


Figure 2. Guying the pulling unit.
(courtesy of Williamsport Wire Rope Works, Inc.)

A-5. Setting Up the Well Servicing Unit.

When setting up the double mast unit, there are usually only six guy lines. Two of

these are pre-set in length and reach from the top front of the lower section to the headache rack that supports the mast when it is folded down. After the lower mast has been set up and these two guys are tight, the upper section is telescoped up and the remaining four guy lines attached to the anchors.

The correct method of guying a pulling unit is shown in Figure 2.

A-6. Well Records.

There are five records or pieces of information that the person in charge of the well servicing operation should have available. These are:

- **Casing information.** This sheet lists the distance from the wellhead to the top of the perforations, the number of perforation shots and arrangement, the distance that they cover, and the cased hole distance from the bottom perforation to the bottom of the open casing.
- **Tubing tally sheet.** This is an itemized listing of the tubing hanger, pup joints, joints of pipe, safety joint, packer, hold-down, seating nipple, perforated joint, mud anchor, and bull plug in exact order and length from the tubing head to the bottom of the string. This sheet will also provide the grade of the tubing, if the joints are measured with the thread off or overall, the average length of the full joints of pipe, and a listing of all other equipment in the hole. Additional information may also be listed.
- **Complete packer or holddown description.** This sheet will list all special equipment such as packers, holddowns, and safety joints in the hole. These should be identified by

manufacturer, year of manufacture, metal content, brand, style, model, description, and instructions on how to release and latch this equipment during workover operations. Enough information about the downhole equipment should be available that all questions on pulling and servicing are answered.

- **Rod tally sheet.** This identifies the size and length of every rod in the hole, including the polished rod, pony rods, sucker rods, safety joint, pump, and gas anchor. Rods should be identified by brand and described with instructions on how to release any safety joint in the

hole. If the well has a tapered string, the number of rods in each size should be included.

- **Complete pump description.** If the pump must be replaced or fished out of the hole, a complete description of it should be on file.

A more complete description of the importance of this information and illustrations of the downhole well records that should be maintained in the field record book are in Chapter 19. The pumper should be familiar with these important records.