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Using a New Artificial-Lift System in Mexican Mature Oil Fields

Roy R. Vann, Vann Pumping; Heron Gachuz-Muro and Luis O. Alcazar-Cancino, Pemex E&P; and Mauricio Guerra-López, Llegar EOR International

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Abstract

Throughout Mexico there are many oil wells in danger of being plugged or abandoned. These mature wells could possibly be made economical again by employing a new oil well pumping system using cable instead of rods. This pumping method is designed as an alternative to conventional “rod and pump jack methods” utilized in oil wells. Instead of rods to convey the up and down stroke of the downhole pump, cable is used. In place of pump jacks, an electronic and hydraulic operated system is employed with no visible moving parts on surface equipment. The pumping method unconventional offers many options and advantages that conventional pumping does not offer.

The system is designed to operate safely and environmentally pleasing with low noise operation capability and a clean wellsite appearance with no oil leakage. In addition, an economic value is recognized when maintenance is required. A special cable unit is brought out to reel up and repair the downhole pumping assembly and return it to bottom; no workover unit is needed.

This method has been developed and tested in Tyler, Texas for approximately seven years. Recent results in Mexico have shown many advantages. This paper presents various aspects (evaluation, development, working principle, etc) of this system and the field test results in Mexican Mature Oil Fields. The versatility of its characteristics has allowed us to maintain oil rates and reduce operational costs. This system discusses its difference with “conventional methods” and impact on production behavior.

Introduction

Objectives

There are three primary objectives of this new pumping method:

- ❖ Reduce lifting cost per barrel
- ❖ Reduce maintenance and workover cost
- ❖ Enhance production

The new system is designed as an alternative to conventional “rod and pump jack methods” utilized in oil well production today. Instead of rods to convey the up and down stroke of the downhole pump, cable is used. Not only is the pumping method (using cable) unconventional, it offers many options and advantages that conventional pumping does not offer.

Increasing run time (reducing failure frequency) will increase a well's profit margin and recover more oil reserves (by lowering the economic limit). A major operating cost associated with sucker-rod pumping is the pulling and repair of the rods, pump, and tubing, as well as the replacement or repair of the surface pumping unit. Frequent repairs may make wells marginally economic. Repairs also decrease production because of well downtime.

Using cable instead of rods to convey the up and down movement has been patented and it offers many advantages such as:

- ❖ Reduce overweight in the pumping system
- ❖ Less in cost per feet of cable compared with cost per feet of rods
- ❖ Reduce labor, maintenance, surveillance and operating costs

Tension and Compression forces in the rods may cause damage to the rods and to the tubing. With the new system the cable is always in tension, which increases the pumping efficiency.