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NEW IDEA FOR PREVENTING WAX DEPOSITION IN PRODUCTION TUBING STRINGS

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Main Body **-** The techniques used in the design of gas lift equipment have faced many challenges over the years. Designs of production wells for lifting oil using low casing pressure lead to cold flow of the extracted fluid. This is because the wells need lower rates of gas lift. It is recommended to use gas lifting pressure in the range of 1120 to 1200 Psi [1]. Producers, who produce lower volumes of oil, require small amounts of gas in order to lift the fluid. They fit gas chokes for controlling the volume of gas lift in gas lift wells. Lower oil production gas volume is small and this leads to a falling in pressure which eventually lowers the temperature of the injected gas that flows down the casing.

The reduction in temperature of the casing surfaces results in the cooling of the temperature of the gases in the casing lower than the deeper depths. The low gas temperatures on the surface casing also cool down the temperature of the lifted oil, sometimes to temperatures below the pour point temperature of the surface. This low temperature of the produced crude oil leads to the formation of wax in the production string. The condition is worse in the winter season when the country experiences extreme weather conditions. The condition may exceedingly limit the flow of oil or even plug the oil tubing entirely [2]. As a remedy to this problem, high pressure gas with the potential of raising the temperature in the well need to be introduced. This can be done through the design of wells whereby the oils are lifted at pressures higher than the pour point pressures to prevent wax formation. Chemical treatment may also be adopted. In the chemical treatment procedure, wax inhibitors are injected down the casing together with gas to keep the tubing clean. Another method that can be used as a remedy is the wire line tools. They are used to break the formed plug along the outlet to improve production when the low production system is adopted according to the reported researches [3].

1.LITERATURE REVIEW

1.1GAS LIFT SYSTEMS

In conventional oil production methods employ the injection of gas continuously or sporadically at specially chosen areas in order to lift the fluids produced in the interior of the earth's surface to the surface of the earth. The hydrostatic load of the tubing is lowered when the gas is added. The process is followed by the lowering of the pressure of the bottom hole. Well fluids are lifted by two processes. In the continuous-continuous injection flow technique, gas is continuously injected into the tubing in order to lower the pressure that opposes the production of the fluid. In the intermittent flow technique, gas is injected at high pressure into the tubes of the fluid. The gas is injected at the right volume and pressure which can help in lifting the fluid through the valve at the highest possible velocity.

The gas lift technology has many advantages some of which are listed in the following paragraphs.

Installing and operating gas lift techniques require little initial and running costs which can be afforded by many firms. The method is highly flexible with the capability of producing at both low rates and high rates. It is possible to produce deep and deviated wells of both high GOR and WOR wells while achieving high effectiveness. Completed wells can be dual purpose with the ability of using wire-line techniques.

However, the gas lift techniques are limited by the sour gas produced, presence of kerosene and the subjectivity of the wet gas produced to freezing.

2.METHODOLOGY:

In order to come up with the optimum oil production, four gas lifts techniques were considered for efficiency and effectiveness. The four categories of gas lift techniques considered include:

- High PI- High BHP continuous
- High PI – Low BHP intermittent
- Low PI – High BHP continuous
- Low PI – Low BHP intermittent

In this case, high BHP means BHP values that are able to support fluids up to a depth of 70%. Low BHP means BHP values that support fluids to a depth of 40% while low PI values are for less than 0.5 BOPD/psi.

3.DESIGN FACTORS

The following design factors are considered in the design of the new model of the gas lift system:

- The depth to which the gas is injected, the gas pressure and its GLR for the specified production path.
- The principles applied in the operation of unloading
- The gradient of the well
- The type of gas lift valves that should be employed
- The spacing considerations of the gas lift valves
- The operating principle, kinetics and mechanics of the valves in the gas lift operation
- Efficiency and effectiveness determination factors of operation of the gas lift system.

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