CORMORANT ENGINEERING

Leaders in Hydraulic Artificial Lift

HYDRAULIC ARTIFICIAL LIFT SYSTEMS

Lifespan Lift Systems

Hydraulic Reciprocating



CORMORANT

Dedicated to development, deployment, and service of the most cost effective artificial lift pumping systems.

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MISSION

Cormorant is dedicated to the development, deployment, and service of the most cost effective artificial lift pumping systems. The needs of artificial lift have changed, as the drilling and completions have evolved. Artificial lift systems are required to reach further, produce more, and do so more efficiently.

We at Cormorant believe that hydraulic lift systems can play a major role in answering the call of industry. By eliminating the effect of deviations and horizontal completions, reducing rig time, and providing a more reliable operating platform, Cormorant is committed to providing the best value to our customers.

> Travis Bolt Vice President of Operations Cormorant Engineering

LIFESPAN LIFT SYSTEMS

ONE COMPLETION

ONE COMPLETION, THREE MODES OF ARTIFICIAL LIFT



VELOCITY STRING TYPE 1 ARTIFICIAL LIFT

A velocity string is a small tube that is placed into the production tubing to increase the flow velocity to the critical velocity needed to lift liquids from the well.



JET PUMP TYPE 2 ARTIFICIAL LIFT

Utilizing the physics of the venture effect, jet pumps can be utilized to lift large volumes of fluid with minimal impact from depth or deviation



RETRIEVER PUMP TYPE 2 ARTIFICIAL LIFT

Hydraulic reciprocating technology that creates a positive displacement pump. Providing maximum drawdown and improved efficiency



Wells over time change, this change will often require different technologies to achieve optimal production. Traditionally the facilitation of different technologies will demand the change in completion. This is costly in capital, deferred production, resources and dependence upon outside services. This problem becomes more acute in unconventional wells, where traditional A/L solutions have a higher service interval. This cost can be reduced or even eliminated with Cormorant Lifespan Lift System.

RETRIEVER HYDRAULIC RECIPROCATING PUMP

Rod-less Rod Pump

Rodless Rod Pump

The retriever pumping system placement pump that is driven by a dual acting cylinder. Same moving down hole parts as a rod pump, minus the mechanical rod connection to the surface. Rather than convey energy through a rod and controlling the reciprocating action from the surface, we provide a pressurized fluid flow(recycled produced fluid) to the down hole pump, which directs it inside the pump to reproduce the reciprocating action of a beam high dogleg severities and horizontal/ deviated wells, with out

The benefits over traditional rod pump are also that the down hole pump is retrievable via hydraulics or wire line. The pump can be serviced without any additional rig time and or any other services if desired. The other benefits is that we have increased gas handling capabilities as well as solids.



Retriever hydraulic pump is Cormorants solution to long term pumping in unconventional and deviated well bores



COMPLETIONS

DOWN HOLE



TYPE 1: High GLR

TYPE 1: Completion

Type one completion is applicable to high Gas Liquid Ratio (GLR) wells. Utilizing a concentric production tubing string, the produced fluids and power fluids are kept inside the production tubing and gas is free to move up the casing.

Application:

High GLR

<200 bbl/d

4 1/4" Casing or larger



TYPE 2: Low GLR



TYPE 2 : Completion

Type two completion is applicable to low GLR wells. Utilizing a packered completion, the produced fluid and power fluid utilize the concentric completion of production tubing and casing. All production is then produced through the pump

Application:

Low GLR

<350 bbl/d

SURFACE EQUIPMENT

INFRASTRUCTURE

SIMPLE, EFFECTIVE, EFFICIENT, AND SAFE

Simple and effective surface equipment provide the valuable uptime that is demanded by economics. A system is only as effective as its weakest link. Cormorant has developed a reliable surface package by utilizing simple equipment in a well engineered manor. By derating surface pumps we can increase the service life while maintaining a high efficiency and effective HPU.

Specs:

Type 1:

20-50 HP

4000 PSI MAX

2000-3000 PSI (Typical Operating)

Variable Speed

Electric drive/NG drive

Type 2:

30-100 HP

4000 PSI MAX

2000-3000 PSI (Typical Operating)

Variable Speed

Electric drive/NG drive



Additional Features: SCADA Integration, Safety switches, Remote Capable

By recycling the produced fluid and utilizing as a power fluid, we reduce the cost and complexity of the surface equipment. The surface equipment can incorporate the operators chemical program and effectively treat the entire completion, at a reduced cost.



SPECS:

COMPLETION SIZES:

TYPE 1:

2-3/8 PRODUCTION TUBING

- 1-3/4" X .120 COILED TUBING INSERT STRING
- 20 30 HP SURFACE EQUIPMENT
- $\geq 4-1/2'' CASING$

2-7/8 PRODUCTION TUBING

- 2" X .120 COILED TUBING INSERT STRING
- 2.0625" FLUSH JOINTED PIPE INSERT STRING (FJT)
- 20- 40 HP SURFACE EQUIPMENT
- $\geq 4-1/2'' CASING$

TYPE 2:

2-3/8 PRODUCTION TUBING

- 25- 50 HP SURFACE EQUIPMENT
- $\geq 4-1/2'' CASING$

2-7/8 PRODUCTION TUBING

- 35-70 HP SURFACE EQUIPMENT
- $\geq 4-1/2'' CASING$





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