



Artificial Lift Services

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**Effective downhole combination dramatically improves production in high GLR and solids well:**

**WhaleShark™ separator, Q2-Flow Insert Guide and Slimhole TAC**

## The Challenge

Devon Energy in New Mexico produces from the prolific Permian Basin formations known for challenging production characterized by high gas to liquid ratios (GLRs) and solids.

The combination of high GLRs and solids cause lower production rates, poor and erratic sucker rod pump fillage and reduced pump run life/reliability – higher operating costs. Under these conditions, Poor-Boy downhole separators have underperformed by inadequately separating gas and solids. Packer-style downhole separators have also underperformed and have increased downhole operational risks with costly workovers due to stuck packers.

## The Objectives

- Increase production
- Improve rod pumping reliability
- Lower downhole operational risks

## The System Solution

Q2ALS Engineers and its partner Oilify maximized production and rod pumping reliability by recommending a system solution that combined:

- WhaleShark™ packerless downhole separator with high-performance gas and solids separation capabilities
- Q2-Flow™ One-Piece Insert Guide uses Tangent Flow technology that has been proven to reduce the pressure drop across the pump's standing and travelling valves

Q2-SlimTAC™ Slimhole type high annular clearance Tubing Anchor Catcher (TAC) to improve the annular flow-by area for gas.

### Whaleshark™

Low operational risk, high performance packerless gas and solids separator

<https://www.q2als.com/products/q2-whaleshark/>



**Q2Flow™ One-Piece Insert Guide** for pump standing and travelling valves  
<https://www.q2als.com/products/q2-flow-1-piece-insert-guided-cage/>



**Q2-SlimTAC™** high annular flow-by Slimhole Tubing Anchor Catcher (TAC)  
<https://www.q2als.com/products/q2-slim-tubing-anchor-catcher/>



## Step 1: WhaleShark™

Replace the existing competitor poor-boy separator with the WhaleShark™ packerless gas and solids separator. The WhaleShark™ offers the highest possible level of gas and solids separation performance at low operational risk (i.e., no packer or seals required). Its simple design uses a large upward facing intake and an engineered separation region that has “no annulus”.

## Step 2: Q2-Flow Insert Guide

Replace the existing pump with a Q2ALS pump equipped with the Q2-Flow Insert Guide which has beneficially proven to prevent damaging ball chatter and to reduce the pressure drop across the standing and travelling valves by up to 40%. These benefits increase downhole pump longevity and reduce pump gas interference. This patented design uses a concave swirl flow fluid profile and increased cross-sectional flow area.

## Step 3: Slimhole Annular Flow-by TAC

Replace the existing annular cross-sectional area limiting Tubing Anchor Catcher (TAC) with a slimhole-type high annular flow-by TAC. The slimhole TAC improves the annular flow-by area, reduces the risk of inconsistent pump fillage caused by high gas velocity flow choking at the TAC. Excessive annular flow-by restriction at a TAC can also lead to lower production and undesirable high annular fluid levels.

## The Results

In 5.5” 17# casing with PSN at 8,400 feet, the total fluid production increased by more than 100% (see Figure 1). The average pump fillage improved from 85% to nearly 100% (see Figures 2 and 3). A 5% to 15% absolute improvement in average pump fillage can translate to significantly more production. Consistent pump fillage stabilizes slug flows and reduces the amount of solids reaching the separator and pump, therefore greatly improves reliability.

Senior Production Engineer, Aaron Aab, from Devon Energy summarizes the results by stating “this system solution has proven to add value to our wells”.

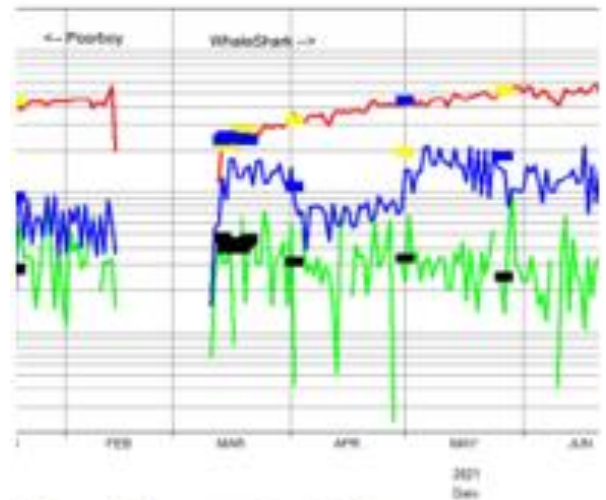


Figure 1. Improved production

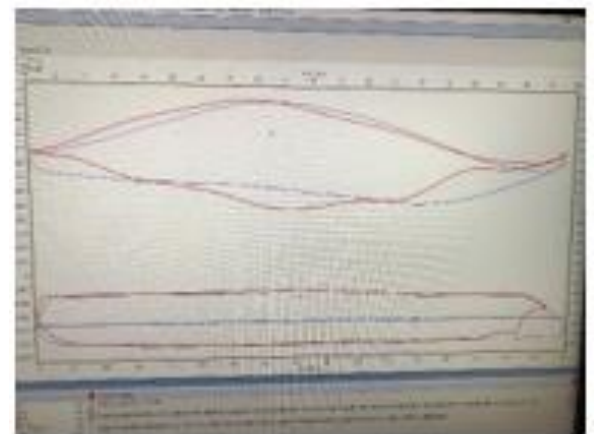


Figure 2. Downhole pump cards before and after (blue pump cards = WhaleShark™; red pump cards = poor boy separator)

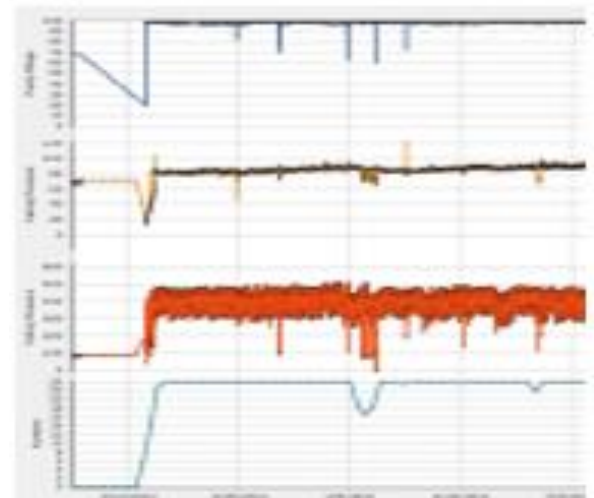


Figure 3. Achieved consistent pump fillage and runtime trends

