

Delaware Basin Operator Records 500 Days and Counting of Continuous Pump Run Time.

Customized BHA with 3D Screen Technology eliminates costly workover activity.

Customer Challenge:

Following a fourth pump failure in four months, a major operator was forced to shut-in its Delaware Basin well. In each instance, the pump was packed off with sand. At the time of the 4th failure, a minimum of 20 non-production days was experienced and at least \$80,000 in workover costs. Sand and other solids increase wear in pumps and production equipment, adversely impacting equipment performance, increasing maintenance costs, and reducing or even shutting down production. Image 1 and Image 2 depict the damage to the pump.

Don-Nan Solution:

Don-Nan's Solutions Team analyzed performance records in our PumpTrak™ system and consulted with the operator. The Solutions Team configured a customized bottom hole assembly (BHA) with 3D screen technology. The BHA comprised of a single 2 3/8-in. stainless steel-wool screen joint, in combination with a pressure activated cone valve assembly and a dip tube. Extending further below the fluid entry point, the dip tube would help keep gas out of the pump. The proposed solution addressed both sand and gas production and its adverse effects on pump performance. Refer to Figure 1 for the BHA Schematic with 3D Screen Technology.

The patented stainless steel-wool screen creates a unique 3D filtration system to keep a wide range of particle sizes from entering the pump. Using highly permeable compressed stainless-steel wool wrapped around a perforated base pipe and protected by a perforated shroud, the screen's non-uniform, angular pores are hard to plug, delivering an open flow area of 40 percent. The pore size diversity ranges from 15 to 600µm. The collection of larger particles around the screen creates an enhanced permeability zone with a higher flow capacity to yield greater productivity. The screens are robust and corrosion-resistant, providing structural strength and stability during deployment and production.

A pressure-activated cone valve was installed below the screens to extend the life of pumps and equipment. As sand bridges the annular space between the casing wall and screen, it chokes fluid flow through the tubing, increasing differential pressure between the tubing and annulus. When this pressure reaches a pre-set limit, the cone valve opens to allow flow to continue through the pump. With fluid once again flowing, the resulting changes in pressure and flow force the buildup of solids to fall away from the screen.



Image 1: Travel valve cage packed off with formation solids.



Image 2: Plunger spray metal grooved from formation solids.



This reestablishes flow through the screens, dropping differential pressure, and closing the cone valve. This cyclic process repeats as needed, with no intervention required.

Customer Success:

The 3D filtration system helped the operator to realize a significant improvement in pump reliability and overall performance. With all gas flowing up the backside, the pump no longer experienced gas-interference problems. By reducing the volume of solids entering the pump, the operator has seen runtime increase beyond its former average of 31 days to more than 500 days of continuous production* with no service interruptions.

* 2/5/2022

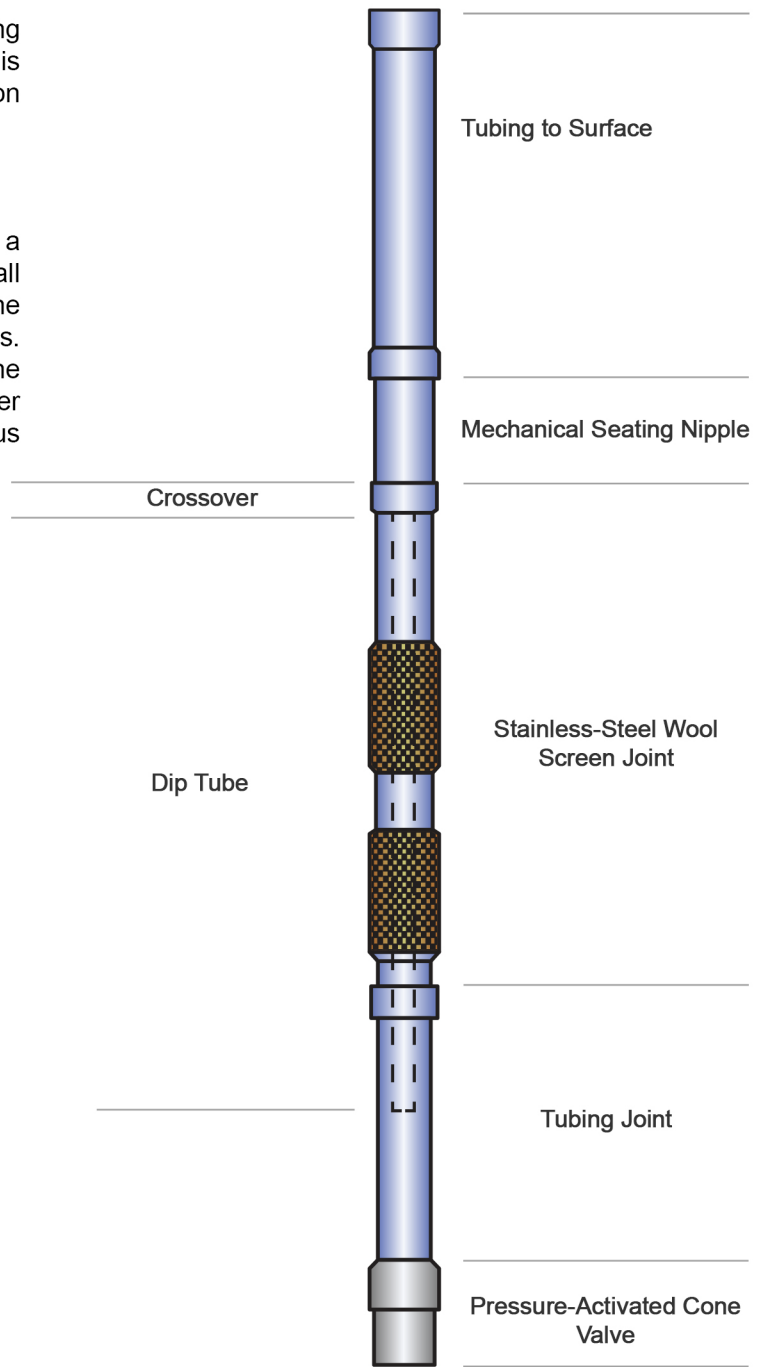


Figure 1: BHA Schematic with 3D Screen Technology.

