

Condensate Offloading Facility

Targa Resources: ROI in 21 days, annual savings of \$436,800 USD and significant reduction in ESG Risk and OPEX

Little Missouri Condensate Truck Rack North Dakota, USA 2018 - 2020

Application

Off-loading Natural gas condensate (C₅H₁₂+), from the 1st stage of natural gas field compression.

Problem

Excessive Filter Costs and Offloading Stoppage.

In May of 2018, Targa Resources identified high levels of Black Powder contamination (iron sulfides, iron oxides, sand) in condensate at the truck offloading rack. Black Powder with the majority particles under 1 μ to below 0.5 μ in size, (Figure 2) and exceeding 100 ppm (100 mg/L) was compromising the conventional filters rated at 0.5 μ with a Beta 5000 media. The contamination was causing extensive costly change outs and shutdowns during the offloading of each truck - 2 to 3 times per truck. The monthly labor and traditional filter change out cost an average of \$48,800.

These are key challenges faced by facility owners employing conventional filtration to remove Black Powder. Filtering to sub-1-micron levels can drive significant costs for replacement of single use filters.



Figure 1. The installed BPS Magnetic Separator



Condensate Sample Particle Count

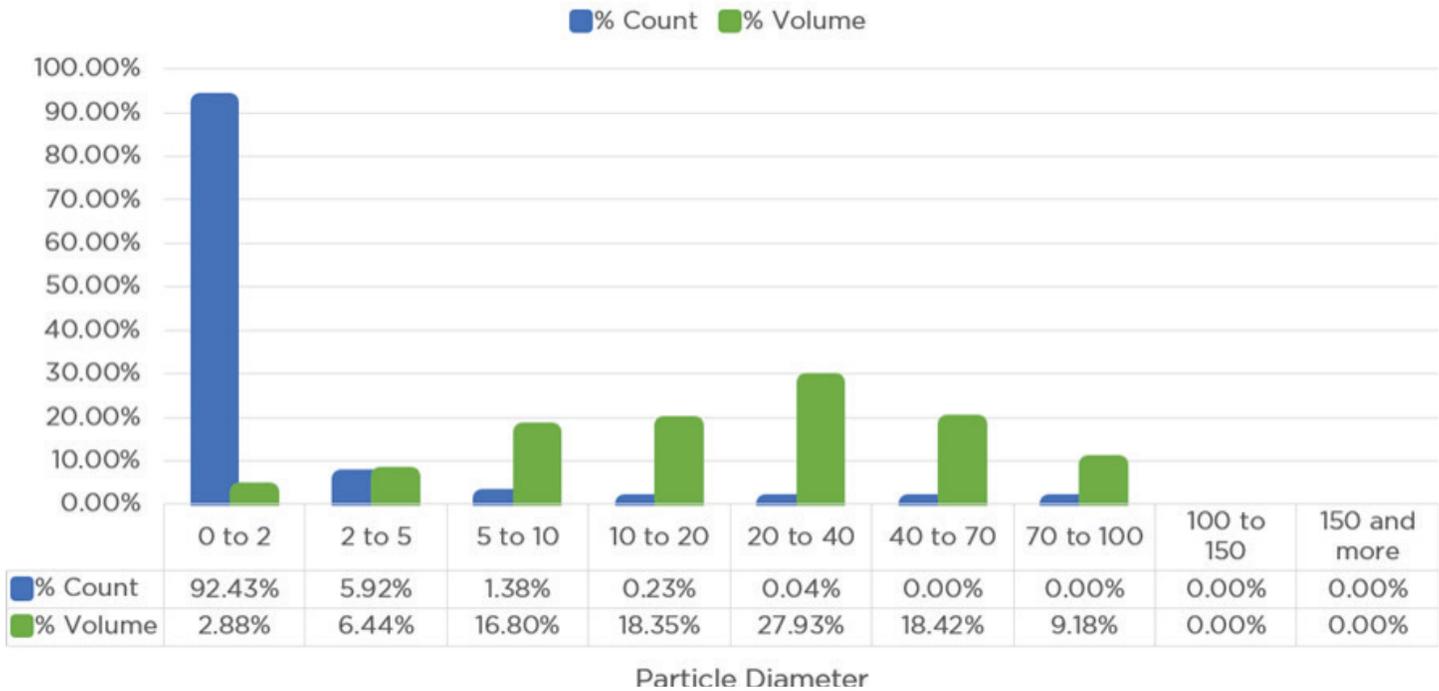


Figure 2. Particle Size in Relation to Particle Count & Particle Volume.

Solution

Targa's objective was to identify and test a new technology to provide a filtration alternative that allows (a) offloading without stoppage, (b) offloading 2 or more trucks before filter change out was required and (c) reduce the costs associated with replacing single use filters.

They purchased a Magnetic Separator (Figure 1) from Black Powder Solutions and installed it upstream of the 1st set of conventional filters. The condensate is offloaded at rates up to 130 gpm to (i) a sand separator, (ii) conventional filter unit, (iii) coalescer unit, (iv) clay adsorbent bed for color removal, (v) final particle filter before being sent out to a 3rd party pipeline.

Client Requirements	
Design Flow Rate	4,500 barrels per day (130 gpm)
Design Pressure	250 psig
Temperature Range	-50° / 150° F
Vessel Size	8 5/8" OD x 52" L
Max Design Pressure Drop (clean / full)	≤ 2 psig / ≤ 20 psig
Cleaning Frequency	> 2 trucks / cleaning (10,000 gallons / truck)
Design Holding Capacity (≥ 2 trucks)	≥ 21 lbs / 10,000 gallons x 2 (≥42 lbs)
BPS Magnetic Separator Parameters	
Magnetic Separator Pressure Drop (clean / full)	≤ 0.5 psig / ≤ 6 psig
Magnetic Separator Holding Capacity	4 magnetic elements x 2" OD x 24" L (≤112 lbs)

Figure 3. Client Requirements and BPS Magnetic Separator Parameters

Results

In December 2020, a customer review identified after 2.5 years of operation the Magnetic Separator has proven its ability to clean the Black Powder down to and below 1μ in size with minimal labor costs. The Magnetic Separator is typically cleaned after every 8 to 10 trucks are unloaded and consumption of the conventional filters and coalescer elements have been reduced by an average of savings of \$37,500 per month. The other important benefits are a higher quality product delivered to the customer and reduced opportunity for injury by reducing contact with the filter change out procedure.

Recommendations

Install Magnetic Separators on all off loading and loading platforms for crude oil and refined products before traditional filters, and or, replace the traditional filters completely and realize (1) reduced touch points and improved safety, (2) improved environmental footprint (3) reduced operational costs, and (4) higher quality product.

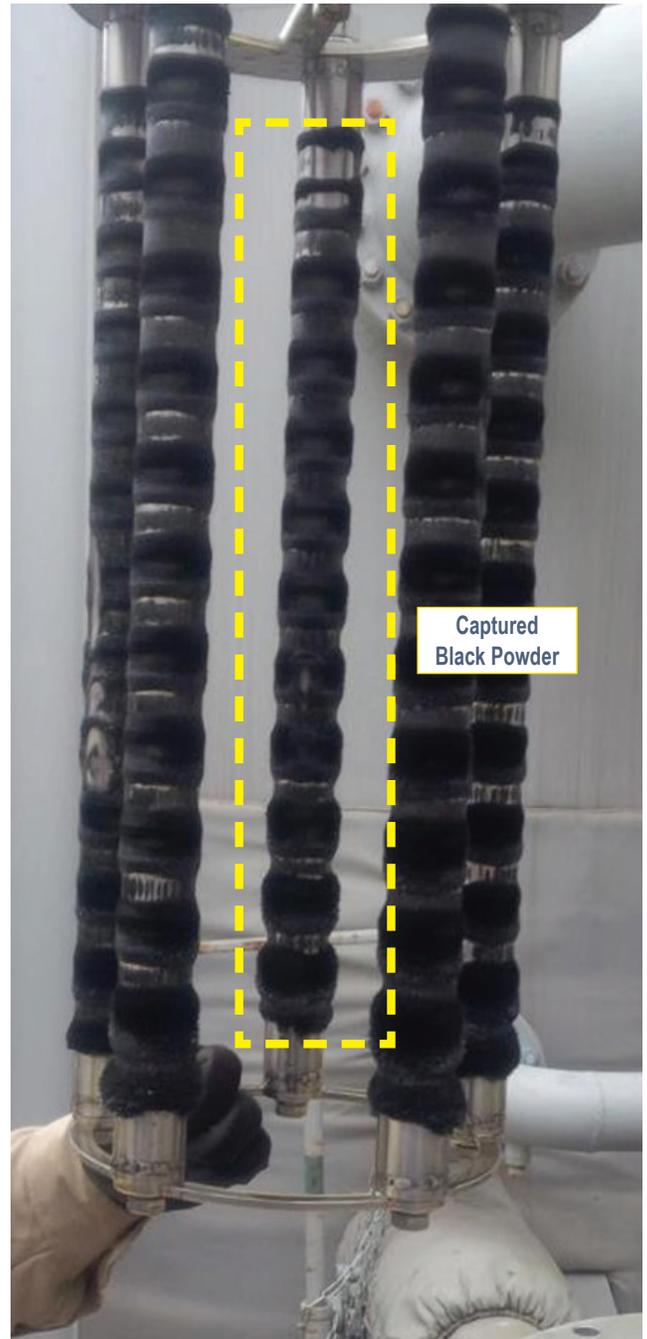


Figure 4. BPS Magnetic Separator array covered with Black Powder contamination.