

Transcend IDEA™ Update – Black Powder Removal

Black powder contamination is endemic in natural gas production and transmission. If the contaminants are not removed, they will foul amine systems, foul glycol systems, plug heat exchangers and destroy valves on compressor trains and damage turbines.

TYPICAL OPERATING ISSUES

Persistent particulate contamination of natural gas streams include acid gas induced corrosion of carbon steel piping, formation contamination such as coal-seam dust, as well as molecular sieve and catalyst dust. A typical example can be seen in Figure 1.



Figure 1. Example of Black Powder

These contaminants are very difficult to remove. Conventional approaches involve the use of horizontal filter separators. These elements are inherently not efficient. They also have limited dirt handling capacity. And once they capture some contaminant, they collapse. Once they collapse, the element doesn't seal within the housing and gas can bypass the separation media, as seen in Figure 2



Figure 2. Example of (a) Collapsed elements (left) and (b) Bypassed elements

When hard particulate contaminant enters a process unit, it can create a multitude of issues. Figure 3, below, shows damaged compressor valve components.



Figure 3. Compressor valve failure showing contaminants in the compressor

If the downstream equipment is a turbine, the hard particulate matter can damage turbine blades. If the downstream equipment is a treating unit, such as an amine or glycol unit, this unit can experience fouling, or foaming. In all cases, maintenance costs go up, and are often dwarfed by the cost of downtime and processing constraints.

KEY INSIGHT

Application of the right media technology to capture the contaminant at a high efficiency, in a high capacity envelope to minimize change out frequency.

ROOT CAUSE APPROACH: SEPARATIONS

Contamination control is the key parameter that defines effective process control, which is essential for an optimized process. Elimination of the critical fouling agents either before they enter the system results in a dramatic impact on operating profitability. We have combined principles of separations and process engineering to develop techniques to:

- ✓ Effectively remove black powder at a high efficiency
- ✓ Use advanced technology to maximize capacity
- ✓ Address element collapse and seal-loss
- ✓ Use existing equipment, by upgrading internals

PRACTICAL IMPACT

- ✓ Improve contamination removal
- ✓ Reduced downtime for compressors, turbines or columns
- ✓ Longer online life for filters
- ✓ Reduced overall costs by 20 – 50%
- ✓ Improved throughput