Cleaning of the sulfur recovery unit is essential to efficiency

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The Sulfur Recovery Unit (SRU) is an extremely important component in many industrial settings including oil refining and gas processing plants. Hydrogen sulfide (H₂S) is a by-product of high-sulfur crude oil and natural gas processing, and is a very toxic gas at high concentrations. Because hydrogen sulfide is defined as both an environmental and industrial pollutant, plants are required to recover between 95 and 99.9 percent of total sulfur that arrives at the SRU. The SRU converts hydrogen sulfide to nontoxic elemental sulfur. Without the SRU, the toxicological and environmental consequences of H₂S would be harsh and severe, including acid rain and ground level sulfur dioxide contamination. Because the stakes are so high for refineries and other plants that must manage SRUs are prone to fouling, so, too, are Sulfur Recovery Units with more moderate fouling resistance as well.

Improving the performance of fouled SRUs requires that the tubes be cleaned periodically. Each time the tube deposits are removed, the tube surfaces are returned almost to bare metal, providing the tube itself a new life cycle.

Methods for cleaning the Sulfur Recovery Unit

Options for cleaning SRUs include:
• TruFit® tube cleaners
• Liquid nitrogen
• HydroDrill™

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TruFit® mechanical tube cleaning

The most frequently chosen and fastest method to address light to moderate SRU fouling is TruFit mechanical tube cleaning. The TruFit system is an offline method in which the mechanical tube cleaner is propelled through the tube with low-pressure water, flushing the debris out of the tube, leaving the tube free and clear of fouling. Fig. 1 shows a mechanical tube cleaner in action. For off-line mechanical cleaning, it is essential to select the appropriate cleaner. The TruFit cleaner manufactured by Conco has proven to be the most effective.

HydroDrill™

Sulfur Recovery Units with more moderate to heavy fouling have been successfully cleaned with the Conco HydroDrill system. The HydroDrill uses a brush or drill bit mounted to the tip of a rotating extension or Kelly Rod, and as the rod rotates, the unit pumps water through the rod to the weep holes, flushing away hardened deposits as they are loosened. Fig. 2 illustrates the action of the HydroDrill.

HydroDrill cleaning is safe for all tube materials. Drill bits are sized to be 0.005 inches below the minimum tube I.D., and they feature long shanks to ensure that the axis of the bit and the axis of the tube are in complete alignment.

Nitrolance™ liquid nitrogen cleaning

When SRU fouling is heavy to severe, and tubes are filled and obstructed with deposition, Nitrolance liquid nitrogen cleaning can be used to restore flow. Using the power of liquid nitrogen, a super-cooled cryogenic jet emerges from the Nitrolance nozzle, filling and expanding the cracks and crevices of the deposit, and causing rapid breakup of all debris within the tube. Fig. 3 demonstrates the mechanics of the Nitrolance nozzle.

Liquid nitrogen cleaning is safe and ideally suited for the most challenging fouling scenarios, yielding quicker turnovers for critical path components. And because liquid nitrogen readily dissipates, only the removed deposit is left behind, saving the plant thousands of dollars in cleanup costs. The residual sulfur deposition can be vacuumed away, leaving the SRU in as-new condition.

Maintenance for life

There has never been a better time to consider maintenance options for the Sulfur Recovery Unit. These units are prone to fouling, but with routine assessments and periodic cleaning interventions, the SRU can maintain its reliability and efficiency for the long-term. There is a cleaning protocol for every fouling scenario, and all are safe and effective.

For more information, visit www.conco.net or contact Tim Meyer at tmeyer@conco.net.