

MRC's Fluidized Catalytic Cracking Unit (FCCU) Slide Valves

Background

- Slide valves are important pieces of equipment that help maintain stable unit operation; however, they are one of numerous layers of protection MRC uses to safely operate the FCCU, which are described below.
 - Maintaining the proper pressure profile between the regenerator vessel, reactor vessel, and main fractionator column using an inert gas such as steam or nitrogen, which prevents the mixing of oxygen and hydrocarbons under standby conditions
 - Instrumentation
 - Procedures
 - Shutdown systems
 - Training
- MRC's three FCCU slide valves are inspected consistent with industry standards.
- During our last three FCCU scheduled turnarounds the valves were inspected and repaired to "as-new" condition.
- Repairs are conducted by the original equipment manufacturer and overseen personally by refinery personnel, who remain at the valve shop for the entire duration of the repair.
- Our current slide valves were repaired to "as-new" condition during the last FCCU turnaround in 2018. Additionally, operational tests were conducted during unplanned outages in 2020 and 2022, and no deficiencies were identified.
- We use the condition and repair history to determine how long the valves can be in service. When we remove the valves for repair, we conduct a thorough assessment of their condition to understand damage rate and areas for potential improvements to our repair strategies.
 - Our last three inspections found the valves in good condition and that the repair strategies we employ are effective at maintaining the integrity of the valves.
- During FCCU operation, MRC proactively uses infrared imaging to identify potential issues with the slide valves.
 - The slide valves were examined using infrared thermography inspection (IR) in 2020 and 2022 and showed no issues. We conducted an additional IR inspection in early May of this year which also showed no issues.
- In addition to IR, MRC conducts daily checks of the slide valves by monitoring the slide valves' output and pressure drop, catalyst circulation flow, stripping

steam flow, sour water flow, catalyst bed density, riser pressure drop, and feed rate/temperature.

- The valves are scheduled for inspection and repair during MRC's first quarter 2025 FCCU turnaround.