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Top Ten Ways to Prepare for a Semi Regenerative Catalytic Reformer Regeneration

By Stu Goldstein

Because semi regenerative catalytic reformers are regenerated so infrequently, it is critical to thoroughly prepare in advance and train personnel responsible for implementing the procedure. Preparation and training increase the probability of optimized unit performance after oil in, and reduce the probability of delays, additional downtime, and incidents that can result in equipment reliability issues.

1. Review documentation and technical / operation logs from the last regeneration and incorporate learnings into the procedure for the upcoming regeneration.
2. Review the list of any mechanical work planned during shutdown for catalyst regeneration (e.g., catalyst management, hydrotesting, chemical cleaning, etc.) and incorporate any required changes in the regeneration procedure to accommodate mechanical work without jeopardizing catalyst performance or unit reliability.
3. Update the unit blind list for regeneration to reflect the current unit configuration.
4. Update the list of low point drains, and include these in hydrocarbon purge and oxide purge procedures in the overall regeneration procedure.
5. Review the updated procedure in scheduled training activity with all technical and operations shift personnel who will support the regeneration.
6. Check the condition of all chemical injection facilities that will be used during regeneration (e.g., chloride, sulfiding, caustic, etc.) for operability well in advance of regeneration.

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Work Highlights

Fired Equipment/Heat Exchangers

- *Witnessed burner tests performed at the supplier's US location for a furnace to be installed at an Italian refinery. Review of the planned test procedure before the tests were done revealed several deficiencies, which were corrected before the testing.*

Mechanical Engineering

- *Provided mechanical and civil engineering design review of design details for a new crude oil storage tank being installed at a refinery in the Far East. Identified numerous areas of the tank and foundation designs that did not meet specification and required changes.*

Process, Operations & Safety

- *Provided FCC unit onsite startup assistance and provided technical recommendations for a Gulf Coast refiner.*

7. Ensure that any critical analyzers such as O₂ are properly calibrated, and all analytical equipment required to confirm specifications in procedure such as portable analyzers, chemical detection tubes, and chemical detection pumps are available. Ensure that at least one new spare detection pump is available as pumps can develop leaks as a result of frequent use during the regeneration.
8. To avoid delays, coordinate required availability of critical contractors that might be required during the shutdown, such as catalyst handling contractor, mechanical contractors for blind swinging, operators of rented air compressors, hydrogen supply, refinery lab support, etc.
9. Adjust recycle gas flow meter correction factor to reflect the higher recycle gas molecular weight during regeneration.
10. If insufficient local expertise is available, consult with the catalyst vendor or other available outside expertise for cold eyes review of procedure / regeneration planning, and if necessary assist with onsite training well in advance of the regeneration.

About the Author

Stu Goldstein has over 35 years experience with ExxonMobil Research & Engineering Company and various ExxonMobil entities worldwide, providing process and design support predominantly for cat reformers, with additional experience in the areas of hydrotreating, hydrogen purification, and FCC. He has extensive experience with onsite unit shutdown / regeneration / turnaround / startup and HAZOP assistance, primarily in the fixed bed reforming and naphtha hydrotreating area. Stu provided process operations support, including troubleshooting, optimization / energy reduction, yield improvement, feed rate maximization, catalyst life management, regeneration optimization, reliability / safety improvement, catalyst selection, mentoring new contact engineers, etc.

Please contact Jerry Lacatena (jlacatena@carmagen.com) if you'd like more information on Carmagen's expertise in this area.

