Catalyst & Technology News

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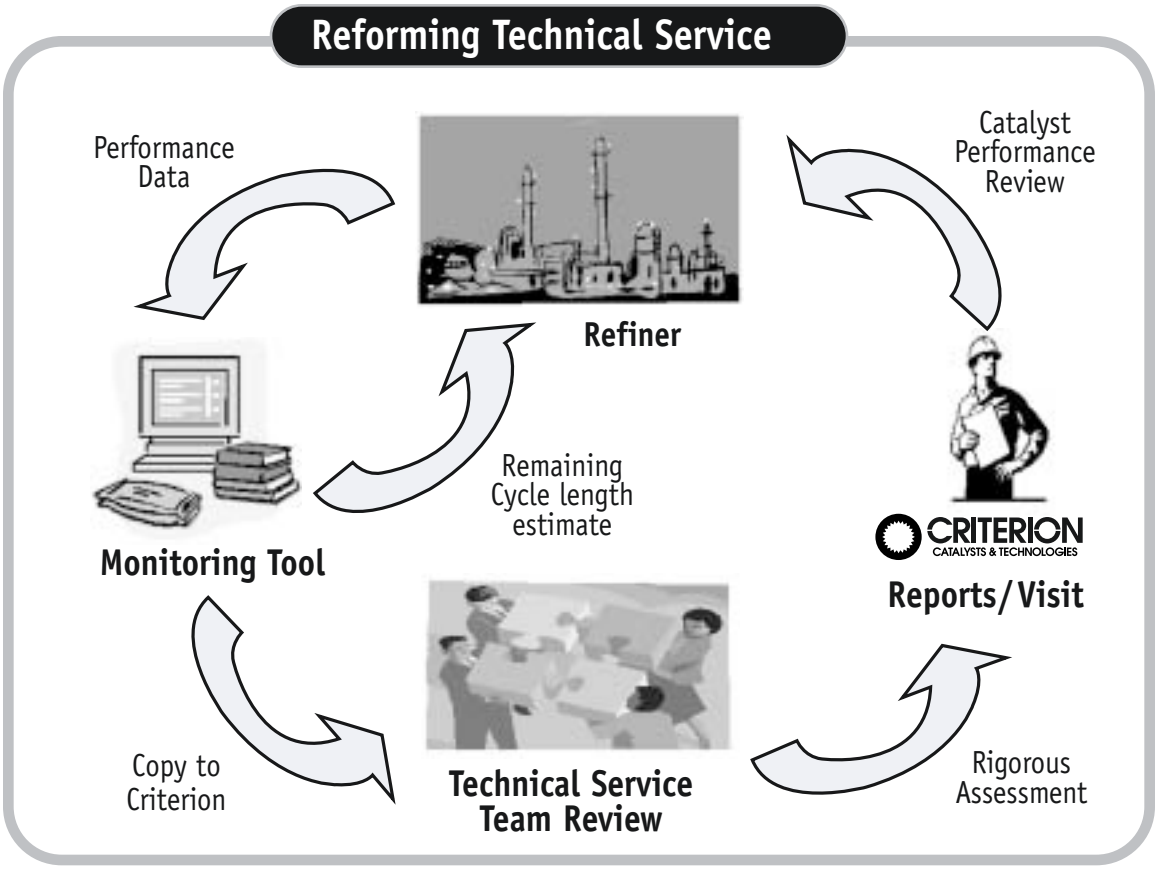
# Criterion's Reforming Technical Service Delivered

When our reformer catalyst is selected we deliver quality technical service to implement the new catalyst. Our customers often choose the catalyst for its outstanding performance in reference commercial units or sometimes, base the decision on evaluations using pilot plants. To deliver the best performance achievable in a customer's unit configuration, we model the operating conditions using a proprietary kinetic model to normalize the unit's data to base, or start-of-run, operating conditions.

Criterion provides a comprehensive list of technical services to customers some of which are summarized in Table 1. This is our assurance policy that we will provide the right level of assistance a customer requires to commission the new charge of catalyst. Additional technical services to operate the catalyst (not listed in the Table) are negotiated and options are developed to deliver these if they are not made available by the unit licensor. This approach puts the customer first and allows the degrees of freedom demanded by today's refiner. A refiner interested in greater return on investment will relentlessly pursue lower cost catalytic options before otherwise engaging solvable processing problems in an expensive unit revamp.

## Technical Service Principles

- Proactive
- Reliable
- Customer Teamwork
- Benchmark/comparison
- Value-added driven
- Optimised Resource use
- Standardized Systems
- Continuous Improvement




*Let's take a look at this in action in two examples:*

**CASE STUDY 1**

## Problem identification results is an Opportunity for Improvement

### Problem Statement:

Over a one year period, this CCR Reforming unit experienced multiple episodes of high end point feed that caused a rapid accumulation of coke, on catalyst, to levels very difficult to control in white-burn mode in the Regenerator. These episodes caused degradation in a portion of the catalyst's spheres from transformation of the gamma alumina phase to the alpha phase. Catalyst pill shrinkage was observed along with a decrease of overall catalyst activity and yields. This occurrence in CCR units is attributable, in most cases, to faulty operating procedures. Other potential causes are improper maintenance, inspection, or installation, of internals and in some extreme cases incorrect design of the regenerator. Careful quality control during the catalyst manufacturing process will detect inherent problems with the catalyst before it is loaded and therefore is seldom the root cause. This is true because the initial manufacturing process simulates the treatment that the catalyst will observe during its normal use.

## Troubleshooting approach:

Identify the root cause of the problem and train how to prevent it. The main steps were:

- Review feedstock cut point control
- Assess laboratory evaluation of key catalyst properties
- Bench scale modeling and simulation to develop solution
- Test process response to proposed solution
- On site demonstration to remove damaged catalyst

After all these steps were completed, the refiner was able to operate the CCR unit, for more than a year, with fewer episodes of high end point feedstock. Operations now are able to better control the regenerator and operate with procedures to safeguard the catalyst in the unit.

CASE STUDY 2

## The Value of Persistence can be Profits

## Problem Statement:

Extend and maximize cycle length on semi-regenerative reformer unit.

## Technical Service Approach:

A multi-step process was initiated with the objective to maximize the unit cycle length:

- Carefully review operating procedures.
- On-site start-up assistance.
- Monitor unit performance via compact disk (EXCEL spreadsheet format)
- Quarterly data review meetings

With the increased attention and awareness at the refinery, plus closer monitoring of unit performance; the cycle length was doubled to a target of two years cycle.

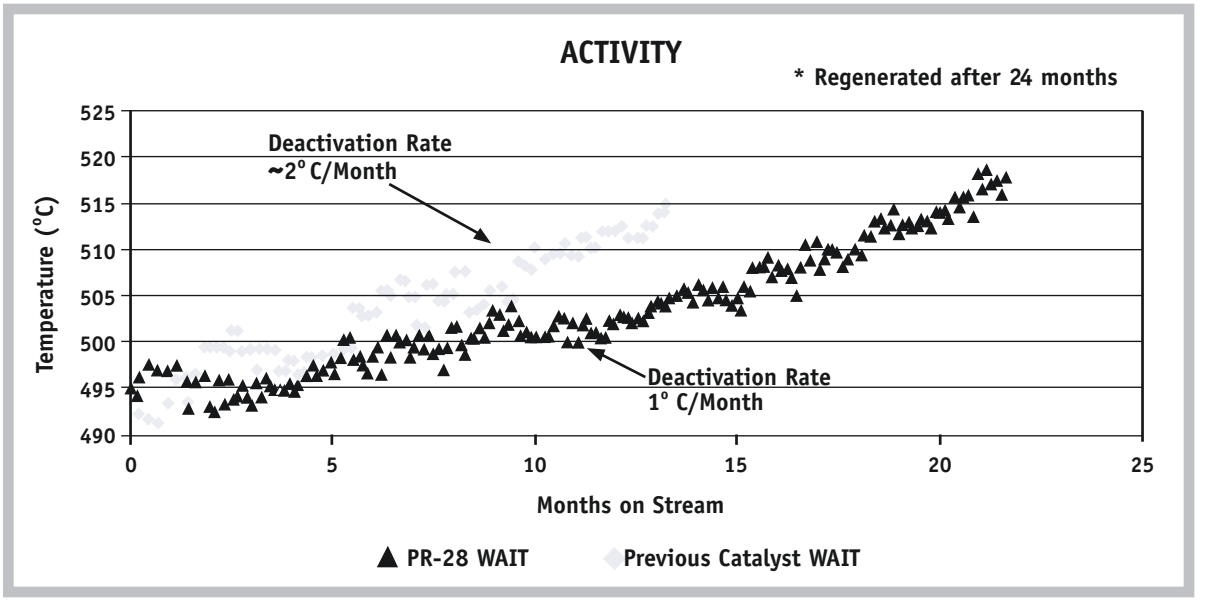


TABLE 1

## Reforming Technical Service Package

### Product Quality

Manufacturing guarantee and product certificate of analysis (COA) to be manufactured to the most stringent specifications in the refining industry.

### Catalyst Selection

- Technical support prior to catalyst selection
- Applicable comparative catalyst studies (pilot plant testing)
- Loading, grading, CCR on-line catalyst change out recommendations
- Technical review of the unit operation
- Unit performance projections (configurations, operating conditions and severity)

### Start-up

- Review of unit start-up (and catalyst regeneration) procedures
- On-site monitoring of catalyst loading and start-up
- On-site data review meetings
- Written start-up report

### Unit monitoring

- Technical support during the catalyst cycle
- Unit monitoring
- Performance evaluation (current and future feedstock case)
- Catalyst activity tracking
- Projection of end-of-run
- Unit operations relative to catalyst performance
- Unit operation relative to industry trends and best practices
- Identification of unit or operating problems
- Assistance in unit troubleshooting
- Recommendations for unit optimization

### Cycle life

- Technical support at the end of catalyst cycle
- Spent catalyst analyses and recommendations for regeneration/disposal
- Review of shut down procedures
- Pre-reclaim regeneration
- Density grading or ex-situ carbon removal and catalyst screening



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