CATALYTIC REFORMING PROCESS TECHNOLOGY

The catalytic reforming process is critical to the overall economic balance of the modern petroleum refinery. This program has been developed by Refining Process Services to provide an in-depth, yet practical review of the current technology available in the processing areas of catalytic reforming and naphtha pretreating. The speakers will cover topics ranging from the basic process chemistry through commercial unit operations. The interactions between feedstock types, yields, product quality, catalysts, cycle length, and operating process variables will be explained. In addition, unit monitoring, troubleshooting, catalyst regeneration, and process evaluation methods will be discussed. A thorough understanding of these principles and techniques is necessary to optimize the performance of the catalytic reformer and, ultimately, to maximize the profitability of the unit.

Refining Process Services has assembled a very knowledgeable group of industry professionals to present the program. The speakers are Mr. Dean Edgar of Criterion Catalysts & Technologies, Mr. Michael Windham of UOP, and Mr. Robert Campagna of Refining Process Services. The presenters have a wealth of experience covering all aspects of catalytic reforming process technology.

This program has been designed for refinery staff involved in catalytic reforming unit operation, process engineering, and unit monitoring. The program will also benefit process R & D personnel, as well as sales and technical service engineers from catalyst suppliers. Personnel from design and construction companies, process control vendors, and refining equipment suppliers will also find the program beneficial. Participants are invited to bring questions and any non-proprietary operating experiences for discussion during the program and the open forum sessions which are scheduled at the end of each day.

PROGRAM OUTLINE

DAY 1

1. INTRODUCTION TO CATALYTIC REFORMING
   - Process History
   - Position in Refining Process
   - Unit Designs
   - Reactor Designs
   - Review of Licensed Processes

2. CHEMISTRY OF REFORMING
   - Reaction Chemistry
   - Metal/Acid Functions

3. REFORMING PROCESS VARIABLES
   - Operating Variables: Severity, Pressure, \( \text{H}_2/\text{HC} \) Ratio,
     Feed Properties, Catalyst Type
   - Effect of Variables on Yields, Catalyst Activity,
     Catalyst Stability and Product Quality
4. REFORMER OPERATING SCHEMES
   - Unit Optimization
   - Aromatics Production
   - Revamp Options
   - Continuous Reforming
   - Reformulated Gasoline Options
   - Energy Conservation

5. REFORMING CATALYSTS
   - Catalyst Composition and Types
   - Commercial Catalysts
   - Evaluation of Catalyst Changeout
   - Role of Sulfur in Reforming

6. REFORMING CATALYST PROCEDURES
   - Unit Start-Up
   - Catalyst Regeneration

7. REFORMER MONITORING
   - Feed/Catalyst Sampling and Analyses
   - Data Normalization
   - Catalyst Samplers

8. CONTINUOUS CATALYTIC REGENERATION
   - CCR Unit Operation
   - Advantages/Disadvantages

9. REFORMER TROUBLESHOOTING
   - Performance Evaluation
   - Operating Variable Effects
   - Water/Chloride Balance
   - Feed Contaminants
   - Catalyst Problems

DAY 3
10. NAPHTHA HYDROTREATING
    - Naphtha Sources
    - Hydrotreating Reactions
    - Catalyst Compositions and Selection
    - Rationale
    - Process Variables
    - Recombination Reaction
    - Troubleshooting

PROGRAM SPEAKERS

Robert J. Campagna is the Director of Technical Services and one of the principals of Refining Process Services. He is currently involved in catalyst evaluation studies, refining industry technical service, and training program presentations for the company. Bob was previously employed by Filtrol Corporation where he provided technical and marketing support for Filtrol's fluid catalytic cracking catalysts. He also spent 10 years with the Gulf Oil Corporation where he made significant contributions in the areas of hydrotreating, catalytic reforming, and fluid catalytic cracking technical service. Bob is a leading independent consultant in the field of fluid catalytic cracking and has presented numerous technical seminars throughout the world. He holds B.S. and M.S. degrees in Chemical Engineering from the University of Pittsburgh.
Dean Edgar, an independent consultant, was Technical Service Coordinator-Reforming and Naphtha Hydrotreating for Criterion Catalysts & Technologies L.P. Prior to joining Criterion, Dean had experience in fluid catalytic cracking and reforming process development with Sinclair and ARCO. Dean has also provided technical service on FCC, hydrotreater and reformer units while with Davison Chemical and American Cyanamid. He has authored several articles and a section of a book, entitled "Applied Industrial Catalysis." Dean holds a Professional Degree in Chemical and Petroleum Refining from the Colorado School of Mines.

Michael Windham is a Senior Technical & Sales Support Specialist for reforming and isomerization for UOP in its Houston office. Before joining UOP, he was employed with Gulf Oil / Chevron in refinery operations. For 8 years he was Area Supervisor at Chevron's Port Arthur refinery, overseeing a CCR unit, 2 fixed bed reformers and a C5/C6 zeolytic isomerization unit. In his last 11 years with Chevron he was Chevron's Best Practice Team Leader for Reforming and Isomerization. Michael holds a B.S. degree in Chemical Engineering from Louisiana Tech and an M.S. degree in Engineering Science from Lamar University.