Fluid Catalytic Cracking Operation
Optimization & Troubleshooting

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<th>5 days</th>
<th>FCC-EN-P</th>
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**LEVEL**
Skilled

**PURPOSE**
This course provides a comprehensive understanding of operating, monitoring and optimizing the catalytic section of the FCC process.

**LEARNING OBJECTIVES**
Upon completion of the course, the participants will be able to:
- understand the exact role and process of an FCC unit,
- analyze the importance and impact of operating parameters on product quality,
- know about main potential incidents, their origin, consequences on safety, health and the environment,
- apply the most common preventive measures.

**WAYS AND MEANS**
The content of this course can be adapted to the customer's needs. The pedagogy is focused on the units concerned, under cover of a secrecy agreement if necessary.
Case studies handled in groups, based on typical situations of the sections studied.
Possible contribution of experienced staff reporting his industrial experience of the operation on a daily basis.

**LEARNING ASSESSMENT**
Quiz.

**PREREQUISITES**
The trainee is required to fulfill at least one of the following criteria:
- to have at least 1 year of proven experience in a technical position in a refinery,
- or to be in the process of being moved to a position in operation,
- or to have followed a training course orientated to introduction to the refining.

**Agenda**

**OVERVIEW OF THE FCC PROCESS**
Aim of the fluid catalytic cracking unit and its place in the refining scheme.
Characteristics of the feeds, impact on the process; incentive for conversion of heavy cuts.
Mass balance, characteristics of the products and related treatments.

**PLANT TYPICAL BALANCES**
Interpretation of the operating parameters:
Heat balance and catalyst flow rate.
Cracking conditions: thermal and catalytic severity, impact on operation and products.
Pressure balance, fluidization and catalyst circulation; #P of slide valve and safety.
Energy balance: heat recovery in the flue gas line and in the bottom pump-around.

FCC OPERATING PARAMETERS IN REACTION SECTION
The following parameters:
Different modes of changing the catalyst circulation.
Control of the cracking temperature.
Effect of the feed temperature, flowrate and chemical composition.
Impact of acceleration or stripping steam.
Pressure monitoring.
are investigated, as well as their effect on balances, #coke, regenerator temperature and yields.

CATALYST MONITORING
Catalytic cracking reactions and resulting products.
Catalyst structure and catalyst mode of action.
Catalyst additives: CO promoter, metals scavengers, sulfur trap.

OPERATION & OPTIMIZATION
Different operating situations are analyzed to illustrate: optimization of LCO production; maximization of heavy feed processing under constraint of air flow rate limitation.
Modification of the process for maximization of C₃ & C₄ olefins production, or maximization of gasoline.

INCIDENTS & TROUBLESHOOTING
Incidents of heat balance: coke build up, afterburning, lack of coke, etc.
Incidents of pressure balance: low pressure drop, reverse flow, failure of the wet gas compressor.
Incidents on the energy recovery circuits: loss of boiler level, loss of circulation in the bottom pump-around, etc.
Main interlock configurations.