



# UOP Catalyst Regeneration Control System (CRCS)

## Equipment and Systems

### Background

The CCR Platforming™ process involves transferring spent catalyst from the hydrogen atmosphere in the reactors to the oxygen atmosphere in the CCR regenerator. Isolation of the two atmospheres under normal or abnormal conditions is of paramount importance in order to prevent their mixing in the presence of heat. Also required is the monitoring of catalyst regeneration in the CCR regenerator to ensure optimum catalyst conditions, as well as logic to shut down the CCR regenerator if abnormal process conditions occur. The UOP catalyst regeneration control system (CRCS) performs these key functions.

### UOP design advantages

The key to the regeneration capability and reliability of the CRCS is UOP's expertise in the functional requirements of the CCR Platforming process. The UOP CRCS design provides for:

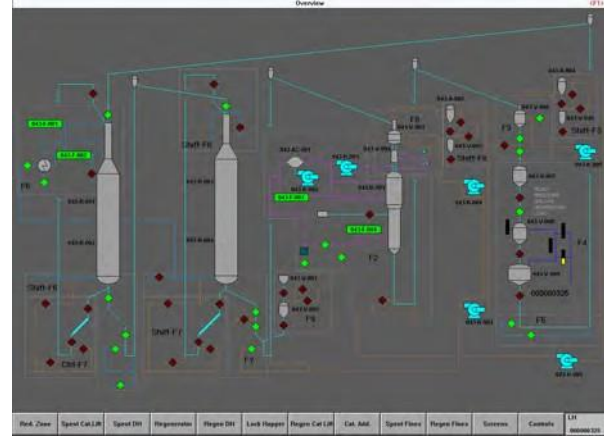
- A dedicated highly available control system
- Catalyst and equipment protection features
- A logic system conforming to UOP engineering specifications
- Tailoring for each individual project
- Faster start-up
- Continuing support

### System configuration

Employing the experience gained from designing and manufacturing more than 200 proprietary control systems, UOP designed the CRCS with an architecture containing a programmable electronic system (PES) that includes both protection and control functions. This design includes both the catalyst and equipment protection functions. The CCR system overview is illustrated in Figure 1.

The protection function monitors field inputs such as valve limit switches, flow, pressure, level, and differential pressures around the regenerator. The PES initiates a shutdown sequence when abnormal conditions are detected.

Figure 1 ■ CCR CRCS Overview



The control function regulates the rate of catalyst flow through the regenerator. It also has the ability to “learn” new parameters. This allows the control system to tailor the control performance to different operating conditions as well as store learned values for use during each set of steady-state operating conditions.

### Customer interface

The CRCS also provides the interface for two-way communication with the distributed control system (DCS). This allows operators to monitor and control the process from the DCS operator console(s). A local interface device (HMI) is included to provide direct operation of the CRCS from the cabinet location. It also provides the facility for storing and retrieving data for various operating parameters, system diagnostic, and process and controller troubleshooting information.

A typical CRCS cabinet is shown in Figure 2.

Since the UOP CRCS design maintains control of the CCR regenerator at all times, there will be no interruption of operation even in the event of a DCS failure.

### Project services

UOP manufactures and provides full support for the CRCS, starting with the initial project orientation meeting and continuing after start-up. UOP works closely with the customer as the control system is fabricated to

**Figure 2 ■ Typical CRCS Cabinet Layout**



ensure that there is a full understanding of the control system design and associated documentation. UOP provides full technical support during installation (by others), commissioning supervision, and is a resource for the refiner after start-up. The customer can be confident of continued long-term support of the CRCS by UOP should the need arise for parts or service.

### Quality assurance

All UOP control systems are built with the highest quality standards. After manufacturing, each system is given a complete series of logic inspections and operational tests using a specially designed process unit simulator. Each CRCS is configured and tested at our facilities. Before shipping, the customer's representatives are invited to perform a detailed physical and operational inspection of the CRCS. Afterward, they can receive in-depth, hands-on familiarization with the operation, troubleshooting, and maintenance of the actual equipment. The end result is an extensive checkout, which helps assure that when the CRCS is delivered and installed it will function correctly upon power-up and be ready for a smooth, on time start-up.

### For more information

For more information, contact your local UOP representative or our Des Plaines sales office:

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