



TOTAL AUTOMATION SOLUTIONS

*DCO 2000 Delayed Coker Operations
Optimization and Risk Management Solution*



TOTAL AUTOMATION SOLUTIONS

TOTAL AUTOMATION SOLUTIONS
("TAS") Is a Supplier of Integrated
Automation and Control Technology,
Products, and Services.

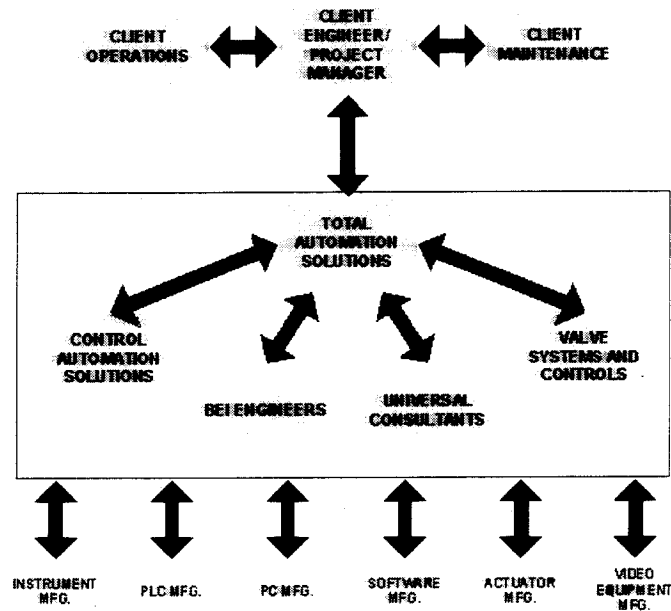


TOTAL AUTOMATION SOLUTIONS

A DIVISION OF VALVE SYSTEMS & CONTROLS

- Houston Based
- 25 Year Old Value Add Distributor.
- Average Annual Sales \$30 to \$40 Mil.

The Total Automation Solutions Allianced Enterprise



Continual corporate consolidation, acquisitions, down sizing and the fact that everyone is doing more with less precipitated the creation of Total Automation Solutions. Many project engineers and project managers are faced with an overwhelming number of projects with unrealistic delivery expectations and have limited internal resources to draw on making it very difficult to achieve their objectives. Recognizing this fact, the Total Automation Solutions Allianced Enterprise model was created. In this business model, the client project engineer is allowed to focus on the project goals, objectives, and project milestones, while the Total Automation Solutions Team manages the project execution plan. TAS provides the client with a single point of contact, who coordinates the flow of project information and provides project status updates on a routine basis. The Allianced Enterprise combines the clients knowledge of their process and operations with Total Automation Solutions quality products, technology, application knowledge, industry knowledge, development methodologies, and project management processes to define and deliver quality automation solutions.



The Total Automation Solutions Team

Total Automation Solutions - 22 years experience providing the application and integration of valve automation and control technology

Control Automation Solutions - 17 years experience providing the application and integration of control and communications technology

BEI Engineers - 14 years experience providing engineering, design, and construction services

Universal Consulting, Inc. - over 30 years of delayed Coker and other related refining application experience

The Total Automation Solutions team assembled for providing Coker automation solutions consist of:

- Total Automation Solutions: 22 years experience providing the application and integration of valve automation and control technology. TAS provides the project management, contract administration and primary responsibility for the teams performance;
- Control Automation Solutions: control systems integrator with 17 years experience in PLC systems integration and HMI development;
- BEI Engineers: multi-disciplined engineering firm with over 14 years experience;
- Universal Consulting, Inc.: over 30 years of Coker and Coker related application experience;

Integrating the core competencies of the TAS team and those of the client creates a strong automation solutions team.



“ASIPS”

Application Specific Integrated Products and Services

- Pre-designed Configurable Solutions
- Reduce Re-occurring Engineering
- Amortize Development Cost

In addition to custom systems integration services, TAS has developed “ASIPS”. ASIPS are **Application Specific Integrated Products and Services**. ASIPS was developed to help reduce the repetitive engineering, design, and development effort. Through ASIPS, TAS can provide customers with pre-designed configurable solutions that can be tailored to meet their specific needs.



TAS ASIPS Benefits

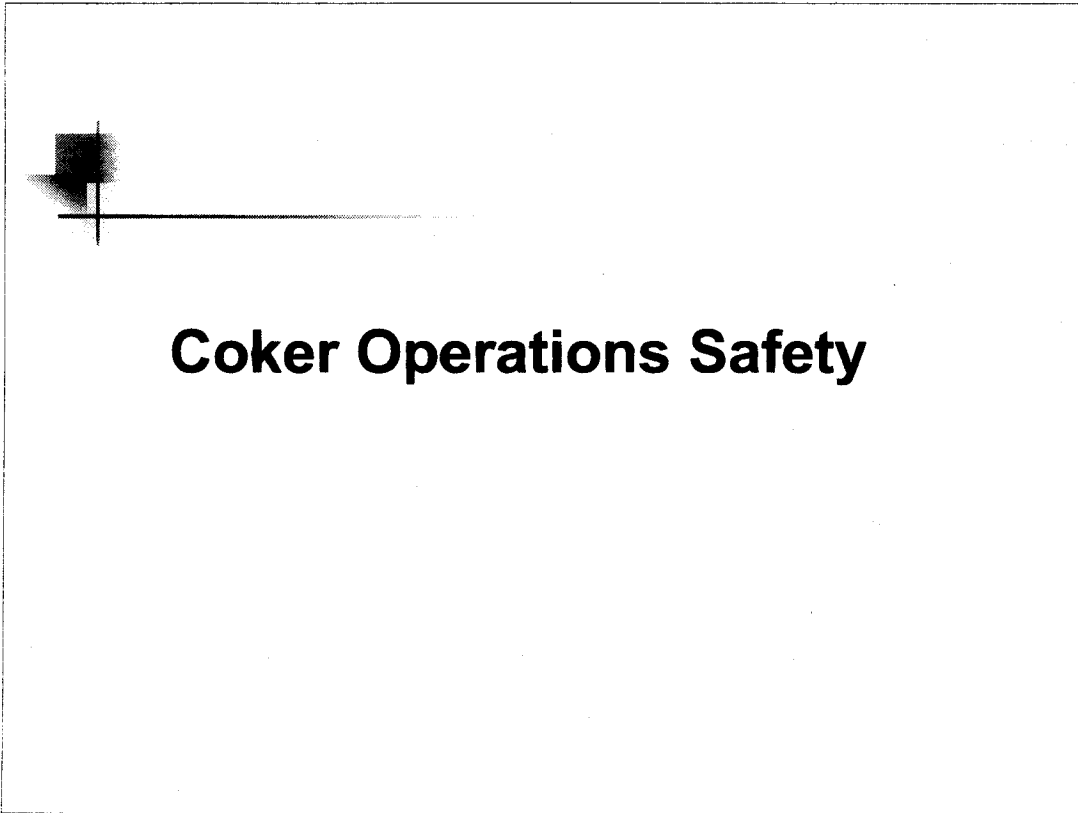
ASIPS reduce the development time and expense associated with your Coker automation project;

ASIPS maximize the quality and efficiency of your Coker automation project by providing the core competencies required for the project;

ASIPS provide configurable and scalable solutions to meet customer product preferences and automation objectives;

ASIPS provide single source responsibility and accountability for your project;

ASIPS reduce the time and expense associated with the design and development of a system. ASIPS maximize the quality and efficiency by providing the resources that do what they know best. ASIPS provide configurable solutions that allow us to tailor the resources and features of a system to the meet the customer's needs. ASIPS provide single source responsibility and accountability for your project.



We recognized that most refining companies with Coker operations share similar operating issues prompting our research on Coker safety.

Coker Operations Process Safety Studies

- Major Refining Company Coker Process Safety Study
- Study Identified “Top Coker Safety Risk”
- Issued Recommendations to Improve Coker Safety
- EPA/OSHA
 - Jointly issued “Chemical Safety Alert: Technical Information Bulletin”

A major refining company conducted a Coker process safety study which included:

- 8 delayed Coker units (23 drums)
- 8 different organization structures
- 210 delayed Coker operating years
- 4 different licensors
- 40 years of start-ups and revamps

The study identified the top Coker safety risks and issued recommendations for reducing those risks. Late in 2002, the EPA and OSHA conducted their own studies and issued a document that identified many of the same risks and provided recommendations. These studies along with input from the marketplace formed the basis for the design and development of the *DCO 2000* Coker Operations Optimization and Risk Management Solutions.

DCO 2000

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ASIPS

*Delayed Coker Operations Optimization and
Risk Management Solution*



DCO 2000

ASIPS

DCO 2000 is a Total Managed Solution

- Preliminary Engineering & Site Evaluation
- Project Management
- Control Systems Engineering & Design
- Instrument & Electrical Engineering, Design, & Construction
- Supply & Install Control System Hardware & Software
- Supply, Install or Retrofit Valve Automation Solutions
- Start-Up & Commissioning
- Training and Operations Simulation

DCO 2000 is a Total Managed Solution that encompasses:

- Preliminary Engineering and Site Evaluations – evaluation of the existing operations practice, existing documentation, the power and control infrastructure, and assist with defining the project goals and objectives.
- Project Management – Development of project execution and management plans.
- Control Systems Engineering and Design.
- Instrument & Electrical Engineering, Design, and Construction.
- Supply and Installation of Control System Hardware and Software.
- Supply, Installation and/or Retrofitting of Valve Automation Solutions.
- Start-Up and Commissioning.
- Training and Operations Simulation.

Primary *DCO 2000* Design Objectives

- Significantly reduce the presence of operating personnel on the structure;
- Significantly reduce the likelihood for user error during the Coking process;
- Provide explicit interactive operating procedures;
- Provide explicit systems & controls for modifying procedures and communicating information;
- Provide predictive maintenance and troubleshooting capabilities;
- Provide an information database and the tools to facilitate a continual improvement process;
- Provide a configurable system with a migration path;
- Provide a reliable high performance system;

The primary design objectives for the *DCO 2000* include:

- Minimizing personnel presence on the Coking structure.
- Reduce user error during the Coking operation.
- Provide interactive operating procedures and systems to control procedure changes.
- Provide a system with predictive maintenance and troubleshooting tools.
- Provide the means to analyze operating data to provide a continual improvement process.
- Provide a configurable system with a migration path from a totally manual system, to a totally automated system.
- Provide a reliable high performance system.



Summary *DCO 2000* Features

Coker Batch Procedures Editor;
Coker Batch Procedure Control;
PLC Data Acquisition and Control;
Process & Device Interlocks and Permissives;
Interactive Graphical User Interface;
Valve Automation and Control;
Video Monitoring of the Structure;
Coker Operations Training Simulator;

Some of the features included in *DCO 2000* include:

Coker Batch Procedures Editor;
Coker Batch Procedure Control;
PLC Data Acquisition and Control;
Process & Device Interlocks and Permissives;
Interactive Graphical User Interface;
Valve Automation and Control;
Video Monitoring of the Structure;
Coker Operations Training Simulator;



***DCO 2000 Integrated
Products & Technology***



DCO 2000 Product Pre-Qualifications

- Command a strong position in the market;
- Demonstrate reasonable product life cycles;
- Provide forward migration for their products;
- Strong track records for supporting their products;
- Readily available from several sources;

To provide the features in *DCO 2000*, TAS has integrated quality products and technology. The product manufacturers included in *DCO 2000* have all demonstrated a strong position in the marketplace, that their products have respectable product life cycles with forward migration. These manufacturers all have good track records for supporting their products and the products are readily available from more than one source. *DCO 2000* is not limited to the standard products that have been previously specified. *DCO 2000* has the flexibility to allow other manufacturers products to be incorporated.



Development Methodologies

***DCO 2000* features unique process and device modeling technology.**

- Consistent
- Predictable
- Repeatable
- Simplified Troubleshooting
- Simplified Documentation
- Reduced Development Time
- Reduced Start-Up and Commissioning Time

DCO 2000 features unique process and device modeling technology. PLC and Graphic models have been developed for processes and devices utilized in the Coking process. Each of these models defines the device or process operating logic, characteristics, alarms and graphic presentation. Once a model has been defined, it is thoroughly tested. Within our process a device list is developed where each device is assigned a model number. The device list is then imported into a utility that generates and compiles the PLC logic and generates the database for the graphical user interface. This process assures consistent, predictable and repeatable performance of the system devices and simplifies troubleshooting and documentation. With proven models, the development and start-up time are significantly diminished by reducing the possibility of human error in the programming process.



HMI Application Software

***DCO 2000* features Wonderware application software as a standard.**

- Worlds leading Windows based HMI
- More than 150,000 installations worldwide
- More than 26 percent market share





Operating System

***DCO 2000* features Windows 2000**

High Performance and Productivity

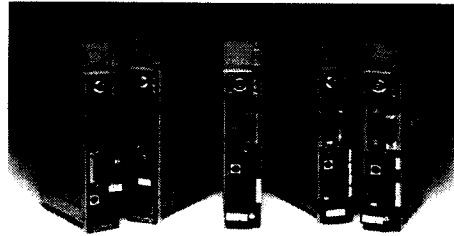
Stability and Security

Easy to Use

Control & Data Acquisition Solutions

***DCO 2000* features Allen-Bradley® PLC-5® data acquisition and control solutions as a standard**

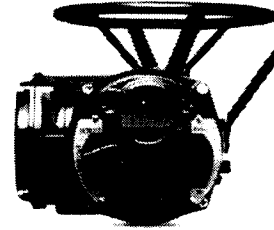
- 60% US Market Share
- Flexible
- Reliable
- Communications Capabilities
- Product Support
- Connectivity



Valve Control Solutions

DCO 2000 features Limitorque electric valve actuators

- Reliable:
- Longevity:
- Product Support:
- Advanced actuator diagnostics:
- Torque trending:



DCO 2000 features Limitorque electric valve actuators due to their reliability, longevity and superior product support.

In addition, Limitorque's advanced actuator diagnostics and new torque trending capabilities make it a nice fit.

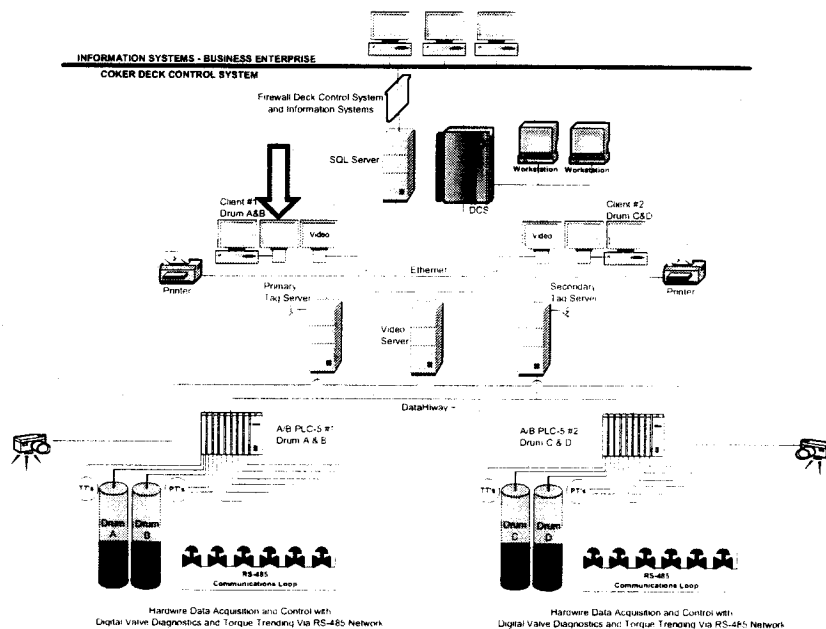
DCO 2000 also integrates existing manual, electric, pneumatic, and hydraulic valve automation and control technologies into the system.

DCO 2000

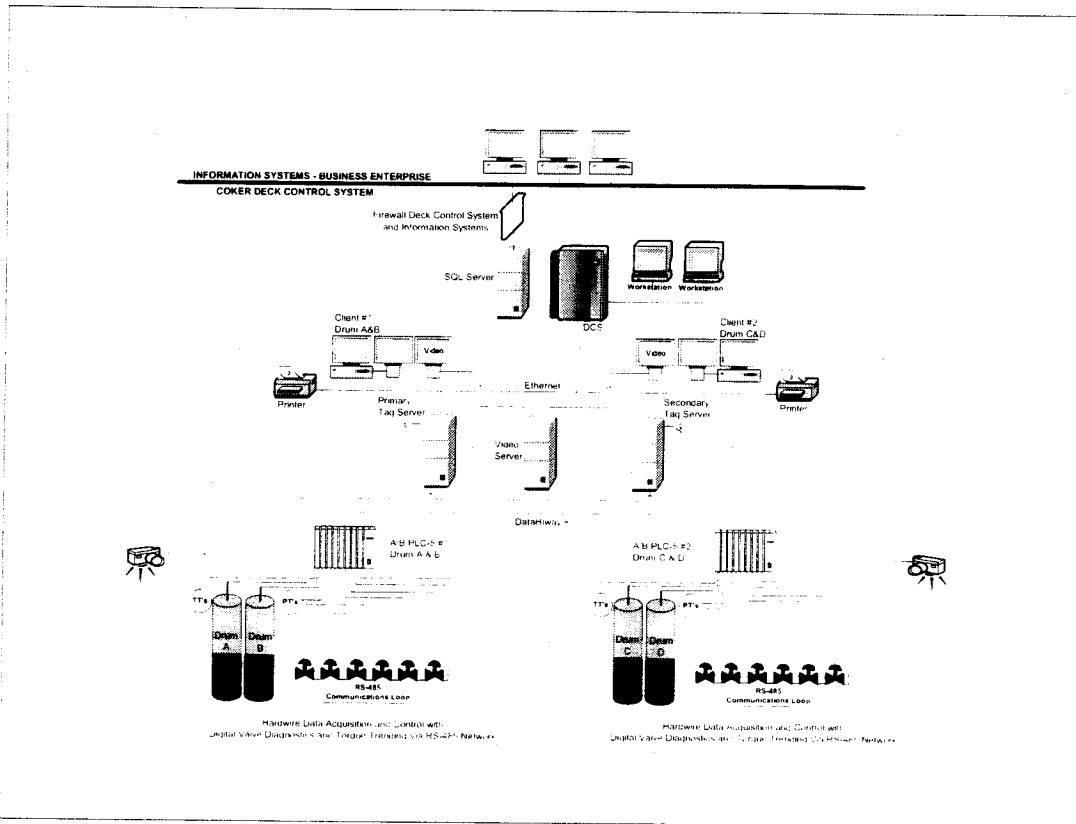
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Control System Architecture

DCO 2000 Total Enterprise Architecture



DCO 2000 provides a Total Enterprise Architecture. In the field, we have distributed Allen Bradley PLC 5s on a high speed Data Highway Plus network. There is one PLC for each pair of drums to insure maximum performance and maintain all the interlock logic between the drums in the same PLC. The electric actuators and field instrumentation are hardwired to the PLC for maximum reliability. Two wire digital communications are utilized to collect actuator diagnostics data from each of the actuators. The system employs a client/server architecture which includes redundant tag servers. One is a primary tag server and the other is a secondary or back up tag server. Both tag servers poll the PLCs on the data highway to collect and maintain complete databases of all the field data in the system. If the primary server fails, the secondary server will provide the clients with the field data from the PLCs. The system includes a client machine for each pair of drums. The clients are networked to each other and the redundant tag servers via an ethernet connection. Each client is labeled and configured to provide the user a graphical interface to one pair of drums. The user can only navigate between screens and view data associated with the assigned pair of drums. This configuration reduces the likelihood of an user performing a task on the wrong drum or being distracted by activity and data from several drums. If one of the client machines fails, the other client machines provide back-up



configurations to control all the drums, which are accessible by users with the appropriate security access to continue operations. A SQL server is linked to the tag servers by an ethernet connection. The SQL server provides data archiving and provides the business enterprise access to the data without compromising the integrity of the control system. The client machines can access the historical data in the SQL server for analyzing data and generating reports. A serial connection is furnished to the DCS to provide a means of sharing data if required. These connections may vary from configuration to configuration depending on the DCS manufacturer and/or hardware configurations. As an option, a stand alone video server is furnished that provides video from cameras strategically placed on each of the structures to a monitor dedicated to monitoring the structure. The client machines can be configured to provide a view of the drum P&ID status and control on one monitor, the drum operating procedures on the second monitor, and video of the structure on the third.

DCO 2000

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Application Software Features

DCO 2000 SECURITY

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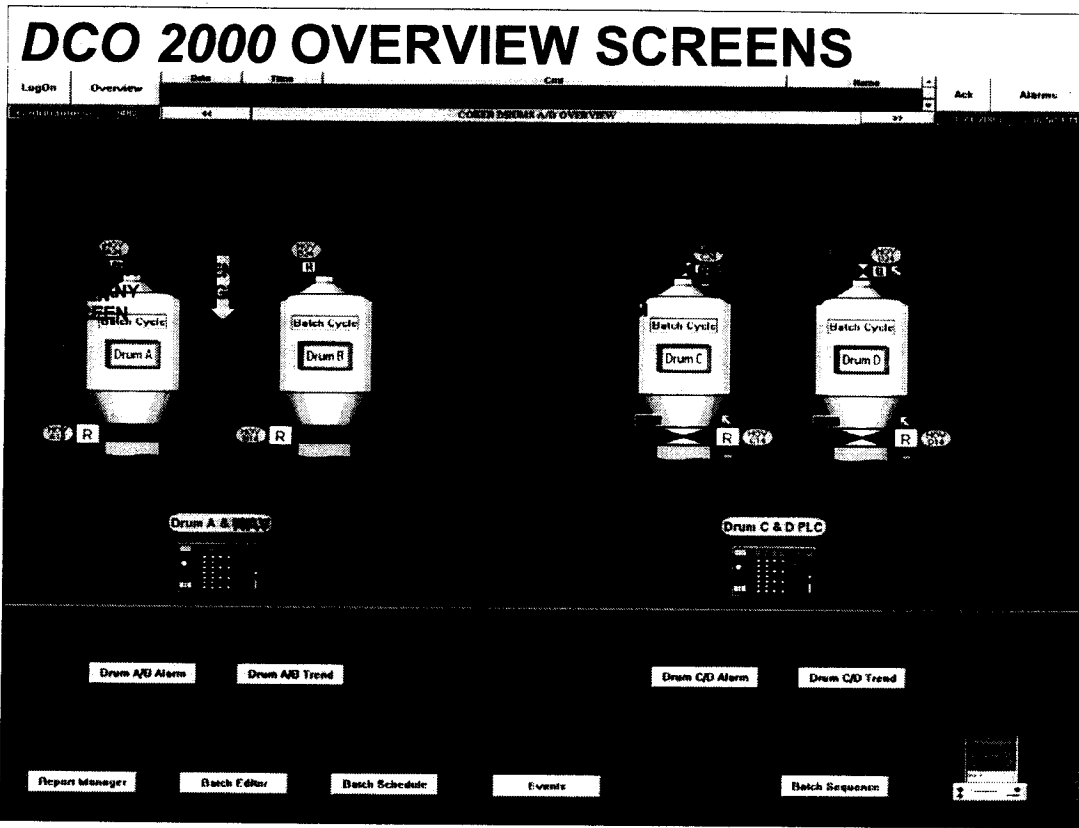


DCO 2000

Coker Operation Optimization & Risk Management Solutions

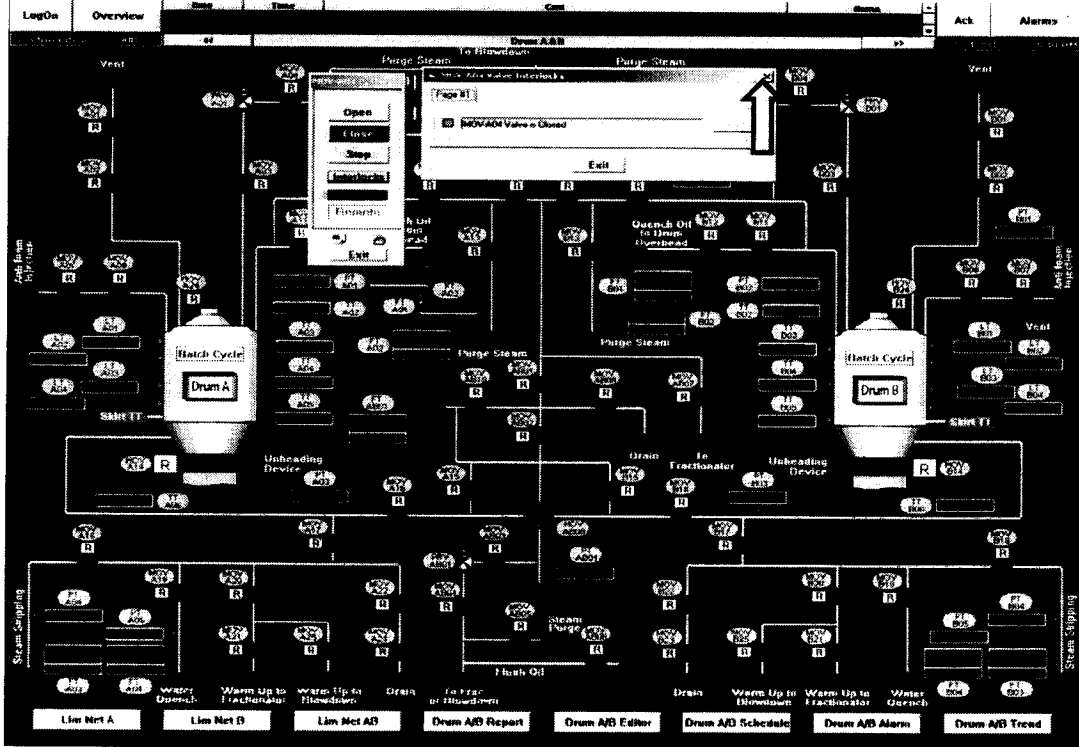
(Click Here to Log on)

DCO 2000 provides configurable security options. Each user is assigned a user name, password and security access level. The system administrator can add users, define security access levels and change passwords in the system. The security access levels determine the users access and control capabilities in the system. These access levels are pre-defined but can be modified to suit the customers requirements.



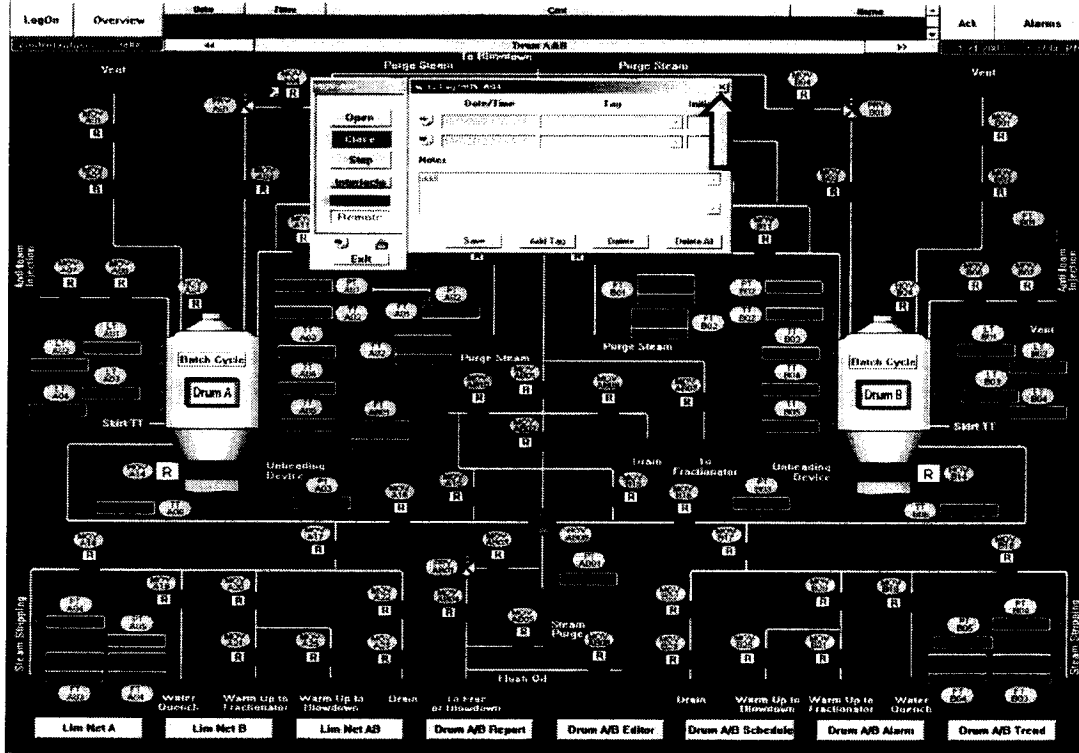
Each system includes an overview screen. The overview screen typically provides navigation to logical areas in the facility and access to global information. Each screen in the system will display the same alarm banner and provide navigation to global information and other screens in the system. Anytime the mouse cursor is moved over an object that is active a raised bracket will appear around the object. Clicking the mouse on the drum A/B area navigates the user to the Drum AB P&ID Status and Control screen.

DCO 2000 STATUS & CONTROL P&ID

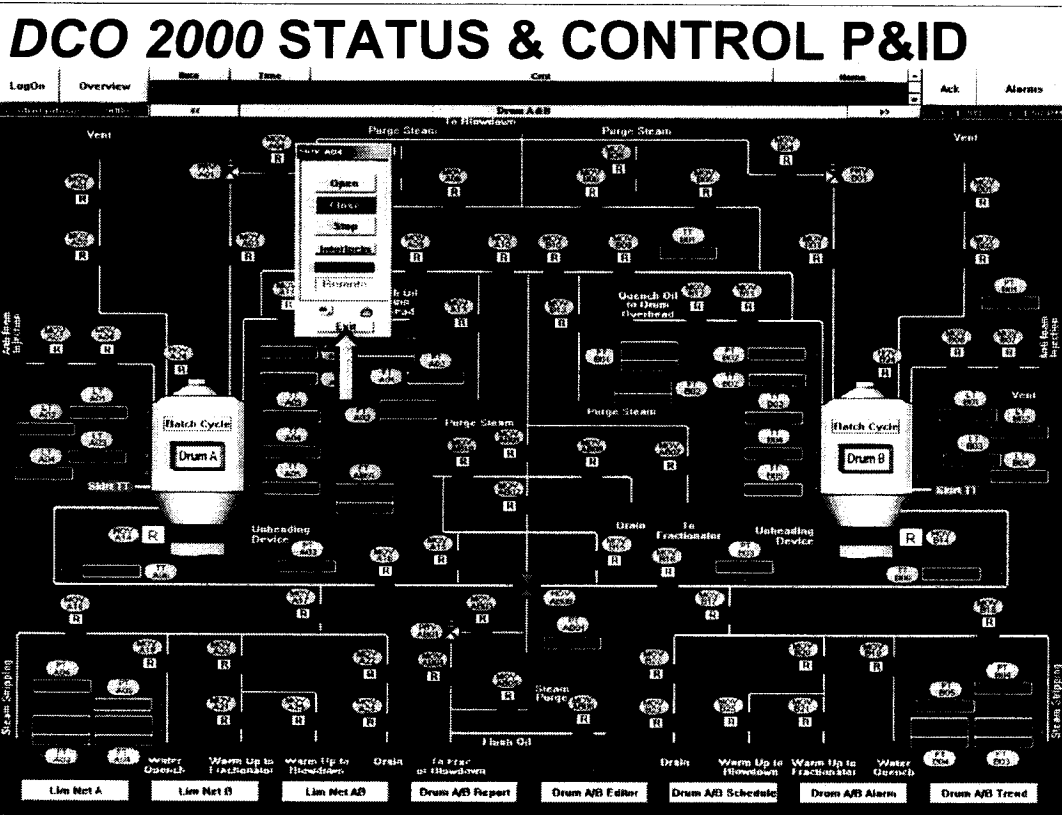


This screen provides the user with a real-time view of the piping and instruments in the system. The user can view process data and device status as well as control devices in the system. Clicking on a device will pop-up the device control panel. Each of these panels are models associated with the device model. In this model the user has access to the open, stop, close and go-to commands that allows the user to place the valve at a desired position by typing the position as a percentage in this field. The panel also provides position indication of the selector switch on the actuator and a button to view an interlock truth table associated with that device. If the interlocks are true, everything will display green for go. If not the interlock that is false will let the user know what action needs to be taken. When the valve is in travel, the icon will blink the color of the desired state and indicate valve position as a percentage of open or close.

DCO 2000 STATUS & CONTROL P&ID

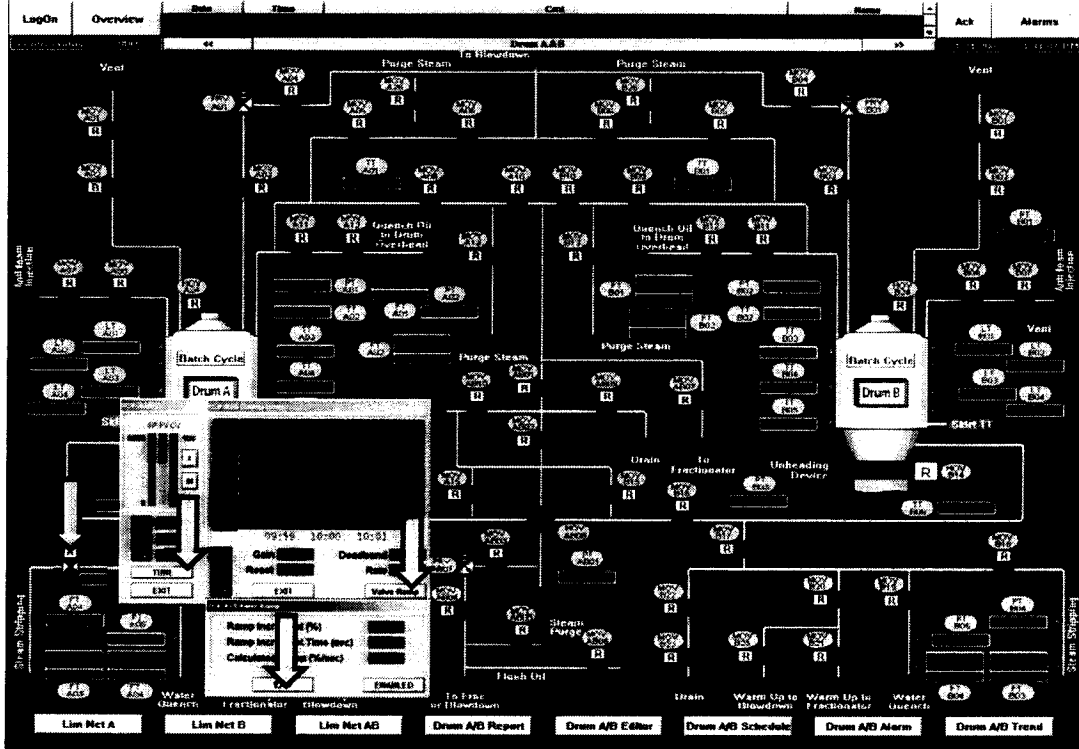


This panel also provides a feature we call EZ Tag. By moving the cursor over the notepad icon on the panel, a pop-up box appears where the user can create a note that can be used to communicate data relative to the device to other users of the system. A note icon is placed next to the device on the screen to advise the users a note exists after the pop-up is closed.



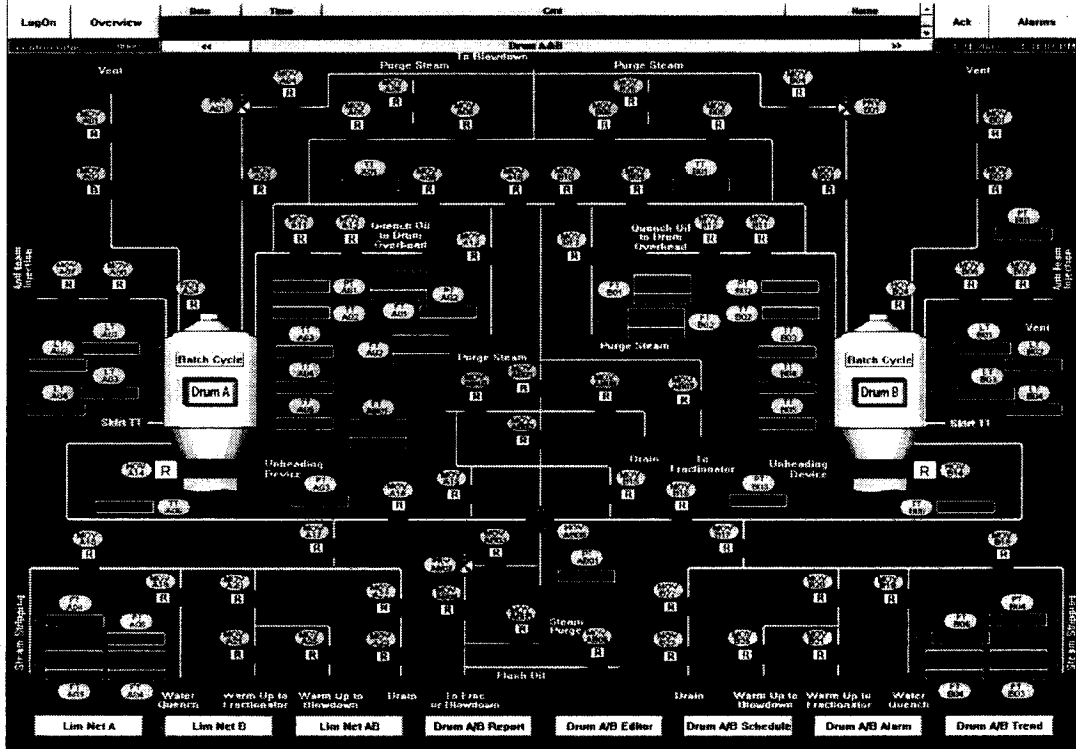
In addition to EZ Tag, this panel also provides a feature called EZ Lockout. By moving the cursor over the lock icon on the panel, a pop-up box appears allowing the user to place a lockout on the device to prohibit operation of that device by another user on the system and leave a note describing what purpose the lockout serves. The lockout can only be removed by the user who initially placed the lockout or by a supervisor with proper security access. A lock icon is placed next to the device on the screen to advise the users a lockout exists after the pop-up is closed.

DCO 2000 STATUS & CONTROL P&ID



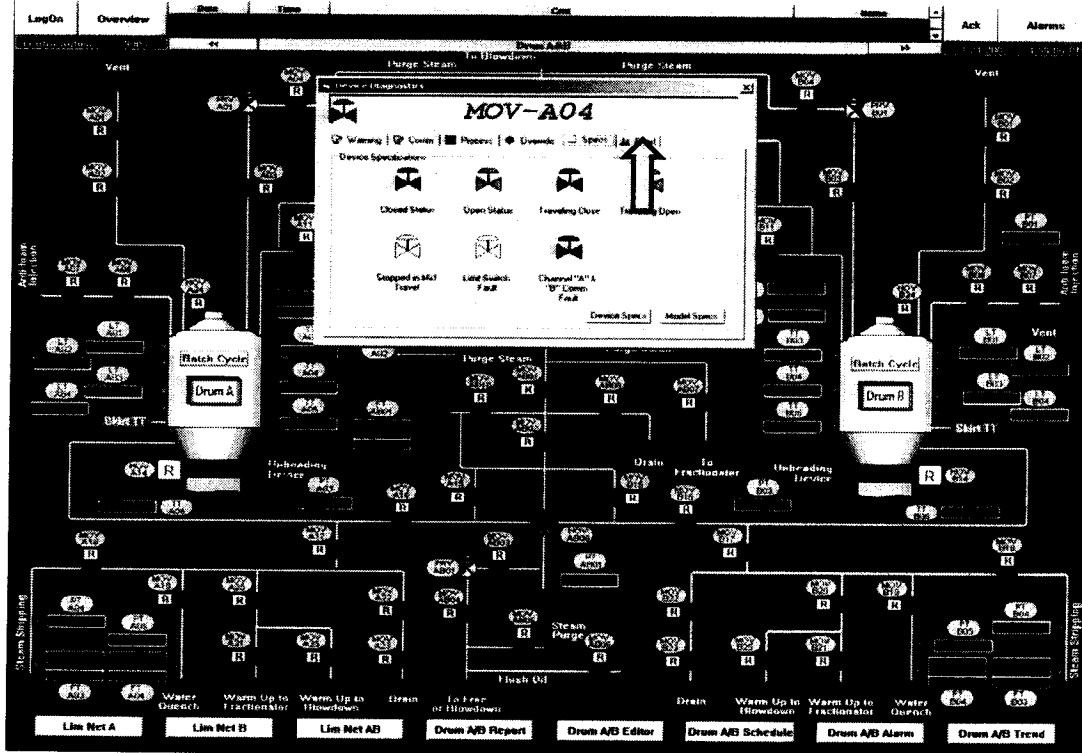
DCO 2000 provides PID control features to provide fully automated antifoam injection, quench water control, overhead quench oil control and other strategic processes. By clicking on the control valve, the user can control, view and tune the PID loop.

DCO 2000 STATUS & CONTROL P&ID

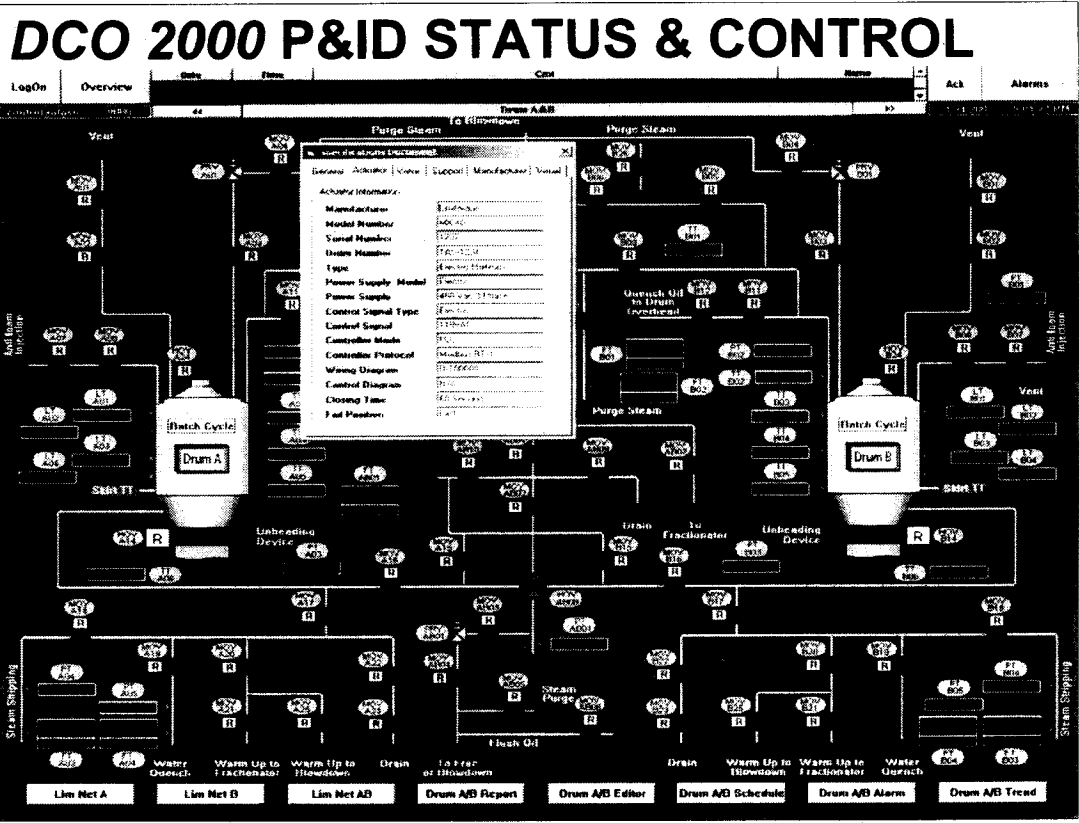


Throughout the system, diagnostic help can be accessed by pressing the F1 key and moving the cursor over a device and clicking the mouse button.

DCO 2000 P&ID STATUS & CONTROL



The device diagnostics help provide the user with operating configurations and characteristics of the device. The user can also enable and disable alarms and interlocks with appropriate security access as well as manage the device setpoints. This chart illustrates the baseline breakout torque, the actual breakout torque and the maximum torque setpoint associated with the open cycle of this valve. The system also provides trending of the running and seating torque for both open and closed cycles.



By clicking on the device specs button, the user can access specifications for the hardware configuration, supporting maintenance and operations documentation, wiring diagrams and other related information.

DCO 2000 P&ID STATUS & CONTROL

The screenshot displays the DCO 2000 P&ID STATUS & CONTROL interface. The main area is a process flow diagram with various equipment and piping. Overlaid windows include a 'Maintenance' window, an 'Installation and Operation' window, and a 'Drum A' window. The bottom of the screen features a row of buttons for 'Lim Net A' through 'Lim Net H', 'Drum A#1 Report', 'Drum A#1 Editor', 'Drum A#1 Schedule', 'Drum A#1 Alarm', and 'Drum A#1 Trend'. The top navigation bar includes 'LogOn', 'Overview', 'Data', 'Event', 'Control', 'Name', 'Ack', and 'Alarm' buttons.

By clicking on the Lim Net buttons at the bottom of the screen, the user can access the actuator diagnostics.

DCO 2000 BATCH EDITOR

LogOn Overview Date Time Cost Name Ack Alarms

Batch Editor - Online Data

Batch Procedure Connection Correction Editor Ctrl Matrix Reports Logon

Procedure | A Vent Press | A Purge Press | A Inlet Pre | A Strippin Press | A Water Press | A OH Alter Temp | A OH Before

Group ID: Drum A & B

Batch ID: 15

Batch Cycle: Preheat

Drum ID: Drum-A

Batch Desc: Lean Drum Procedure - 150°C & 50%

Procedure: Open drum vent valves A01 and A02 to atmosphere

Instructions: Coke Drum Purging

Step Time: 0

Step Alarm:

Confirmation Req:

Result Note Prompt:

Result Note

Reading Device Database Step # 1 2/7/2003 3:17 PM Logon: paul

1 km Net A 1 km Net B 1 km Net AP Drum AP1 Report Drum AP1 Editor Drum AP1 Schedule Drum AP1 Alarm Drum AP1 Trend

By clicking on the batch editor button at the bottom of the page, an authorized user can access the batch editor. The batch editor provides explicit systems and controls for developing and maintaining Coker operations procedures. The authorized user can define and/or modify one or more sets of procedures for each set of drums. The authorized user defines the group I.D., the batch I.D., the batch cycle, the drum I.D., a comment that identifies the procedures, any other related special instructions or protocols and a time or duration interlock to this step that will prohibit the advancement to the next step before the timer expires. The user can then enter the specific step in the procedure. The system can be configured so that when the timer expires, an alarm will notify the user to insure the operation has been completed. In addition to time interlocks, the user can define process interlocks that will not allow the advancement to the next step until certain process conditions exist. There is a dialog box tab setup for each instrument associated with each set of drums in the system. The user can define the process parameters and setpoints for each condition related to the current step.

DCO 2000 BATCH EDITOR

LogOn
Overview
Batch
Flow
Control
Name
Ack
Alarms

44
Drum A/B
45

Verst
Purge Streams
In Blowerdown
Purge Streams
Verst

Batch Editor - Online Data

Batch Procedure Connection Correction Editor Ctrl Matrix Reports Logon

Procedure | A Vent Press | A Purge Press | A Inlet Press | Stoppin Press | A Water Press | A OH After Temp | A OH Before

File Field View Log File Help

Device Group	Device Function	Control Type	Pulse Width	Word Index	Bit Index	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12	Step 13	Step 14
HDV-A14	Close	Set	0	02	07	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A14	Interlock	Set	0	02	06	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A14	Open	Set	0	02	08	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A24	Close	Set	0	04	05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A24	Interlock	Set	0	04	06	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A24	Open	Set	0	04	07	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-B14	Close	Set	0	07	05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-B14	Interlock	Set	0	07	06	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-B14	Open	Set	0	07	07	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-B24	Close	Set	0	09	03	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-B24	Interlock	Set	0	09	04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-B24	Open	Set	0	09	05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A01	Close	Set	0	00	00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A01	Interlock	Set	0	00	01	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A01	Open	Set	0	00	02	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A02	Close	Set	0	00	03	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A02	Interlock	Set	0	00	04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A02	Open	Set	0	00	05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A03	Close	Set	0	00	06	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HDV-A03	Interlock	Set	0	00	07	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lim Mat A
Lim Mat B
Lim Mat A/B
Drum A/B Report
Drum A/B Editor
Drum A/B Schedule
Drum A/B Alarm
Drum A/B Trend

By moving the cursor over the control matrix field on the banner of the pop-up, the authorized user can access the matrix control pop-up. This pop-up is where the step interlocks are defined for the discrete devices in the system such as valves. By selecting the desired state and the interlock, the user can define the required state of each device for advancement to the next step. If the interlock field is checked, a bit is set in the PLC that will insure the status of that device does not change without changing the desired state on the matrix at some later step in the process. This feature allows the authorized user to easily modify the interlock logic. The PLC performs a CRC calculation to confirm the logic configuration prior to executing the logic and provides the supervisory system with feedback once the conditions are satisfied.

DCO 2000 BATCH SCHEDULER

LogOn Overview
Date Time
Ctrl Name
Home
Ack
Alarms

Drum A&B

Charge Steam
To Blowdown
Purge Steam

Vent

Online Data
Reports Sort Logon

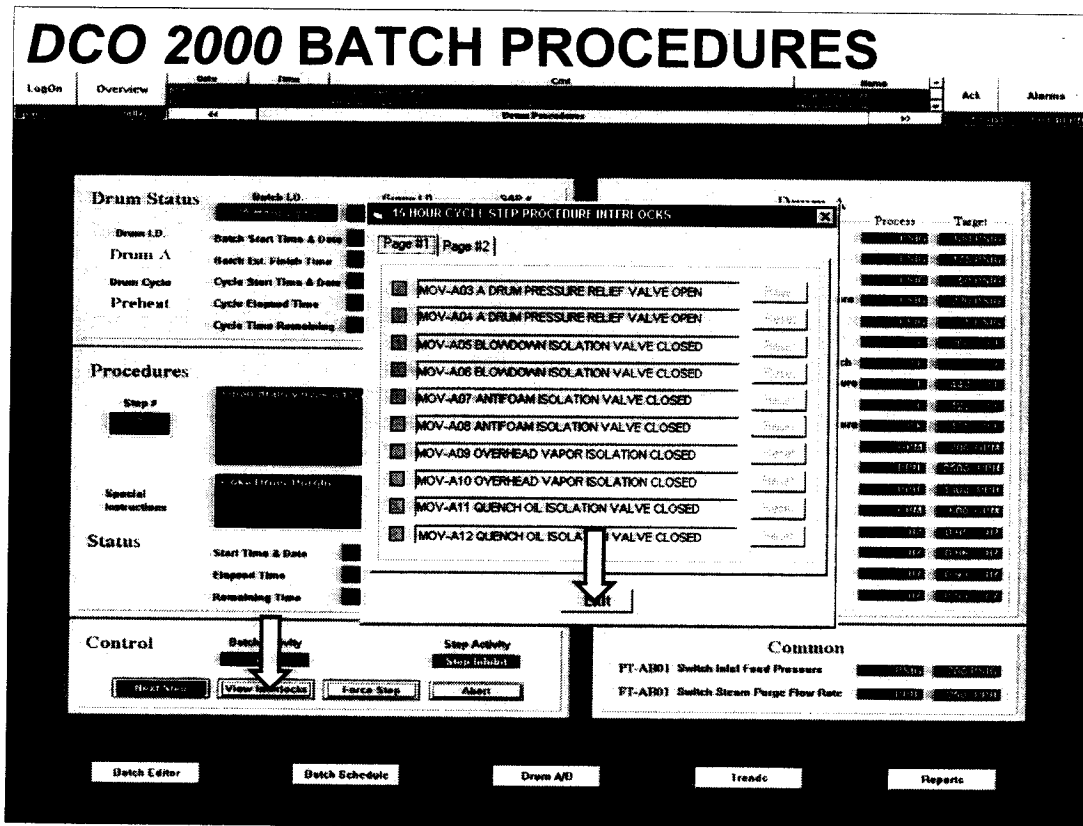
Drum ID	Active	Schedule	SAP	Batch ID	Batch Desc	Priority	Schedule Time	Est Finish Time
* (Empty table content)								

Changes Saved
2/12/2003
7:05 PM
Logon i paul

Steam Striping
Steam Striping

Lim Mat A
Lim Mat B
Lim Mat AH
Drum API Report
Drum API Editor
Drum API Schedule
Drum API Alarm
Drum API Trend

By clicking on the drum scheduler button, the authorized user can schedule a drum batch cycle by priority or by scheduled time. If the drum is scheduled by priority, it will automatically arm the step procedures for the drum batch cycle as soon as the previous batch cycle is complete. If scheduled by time, the scheduler will arm the step procedures for the drum batch cycle at the desired time and date.



By moving the cursor over the drum icons on the P&ID status and control screen, the user can access the batch procedures runtime screen. This screen presents explicit drum batch procedures to the user step by step. The Drum Status section of the screen provides drum batch and cycle data. In this example, this step is related to Drum A and we are in the preheat cycle. The elapsed time is indicated on the right. The Procedures section displays the step procedures and special instructions. If a timer is associated with this step, the start time, elapsed time and remaining time will be displayed here. The Control section provides step control. If all the interlocks are satisfied and the step status is green for go, the user can advance to the next step by clicking on the next step button. If the the step inhibit is red, the user can click on the interlock button to view the valve interlock truth table to determine which valve is not in its correct position prior to advancing to the next step. In the event that one of the conditions can not be met, for example a valve will not close all the way and shows as 98% closed, an authorized user can force a step at which time they will be required to validate their decision. The Drum section, on the right, provides the user with a view of actual process data and any process interlocks or targets required prior to advancing to the next step.

DCO 2000 BATCH PROCEDURES

The screenshot displays the DCO 2000 BATCH PROCEDURES software interface. At the top, there is a navigation bar with buttons for LogOn, Overview, Batch, Flow, Control, Alarm, and Ack. Below this, the interface is organized into several functional areas:

- Drum Status:** A table showing Batch I.D., Group I.D., and SAP # for Drum A. It includes fields for Batch Start Time & Date, Batch End, Finish Time, Cycle Start Time & Date, Cycle Elapsed Time, and Cycle Time Remaining.
- Procedures:** A section for Step # and Special Instructions.
- Status:** A section for Start Time & Date, Elapsed Time, and Remaining Time.
- Control:** A section with Batch Activity and Step Activity (Step Inhibit) buttons, along with Next Step, View Interlocks, Force Step, and Abort buttons.
- Drum A:** A detailed view of Drum A, showing a high alarm for Drum-AB (PT-AD1_HI_Alm). It includes a Date/Time, Tag, and Initials field, a Notes section with a User Logon dialog box, and a list of variables: FT-AD4 (Drumch Water Flow Rate), LT-AD1 (Drum Level #1), LT-AD2 (Drum Level #2), LT-AD3 (Drum Level #3), and LT-AD4 (Drum Level #4).
- Common:** A section for FT-AB01 (Switch Inlet Feed Pressure) and FT-AB01 (Switch Steam Purge Flow Rate).

At the bottom of the interface, there are buttons for Batch Editor, Batch Schedule, Drum A/D, Trends, and Reports. A white arrow points from the Abort button in the Control panel to the Drum A panel.

If there are upset conditions that prohibit continuing the batch, an authorized user can abort the batch by clicking on the abort button. This function will also require validation of their decision. At this point all interlocks are removed and the user must manually operate the Coker. Batch procedure reports can be utilized to follow the step procedures once the upset is overcome.

DCO 2000 DRUM A&B ALARMS

LogOn Overview Data Alarm Ack Alarms

AS - Drum A/B

Drum A/B Pressures			Drum A/B Flow Rates			Drum A/B Temperature		
A/B Switch Inlet Feed Pressure: PT-A001	0	PSIG	A/B Switch Steam Purge Flow Rate: FT-A001	0	SPH	A Drum Overhead Temp After Quench: TT-A01	0	SP
A Drum Vent Pressure: PT-A01	0	PSIG	A Drum Quench Injection Oil Flow Rate: FT-A01	0	SPH	A Drum Overhead Temp Before Quench: TT-A02	0	SP
A Drum Purge Steam Pressure: PT-A02	0	PSIG	A Drum Purge Steam Flow Rate: FT-A02	0	SPH	A Drum Stan Temp 1: TT-A03	0	SP
A Drum Inlet Pressure: PT-A03	0	PSIG	A Drum Stripping Steam Flow Rate: FT-A03	0	SPH	A Drum Stan Temp 2: TT-A04	0	SP
A Drum Stripping Steam Pressure: PT-A04	0	PSIG	A Drum Quench Water Flow Rate: FT-A04	0	SPH	A Drum Stan Temp 3: TT-A05	0	SP
A Drum Quench Water Pressure: PT-A05	0	PSIG	E Drum Quench Injection Oil Flow Rate: FT-B01	0	SPH	A Drum Inlet Temp: TT-A06	0	SP
B Drum Vent Pressure: PT-B01	0	PSIG	B Drum Purge Steam Flow Rate: FT-B02	0	SPH	B Drum Overhead Temp After Quench: TT-B01	0	SP
B Drum Purge Steam Pressure: PT-B02	0	PSIG	B Drum Stripping Steam Flow Rate: FT-B03	0	SPH	B Drum Overhead Temp Before Quench: TT-B02	0	SP
B Drum Inlet Pressure: PT-B03	0	PSIG	B Drum Quench Water Flow Rate: FT-B04	0	SPH	B Drum Stan Temp 1: TT-B03	0	SP
B Drum Stripping Steam Pressure: PT-B04	0	PSIG				B Drum Stan Temp 2: TT-B04	0	SP
B Drum Quench Water Pressure: PT-B05	0	PSIG				B Drum Stan Temp 3: TT-B05	0	SP
						B Drum Inlet Temp: TT-B06	0	SP

Alarm History Alarm Summary

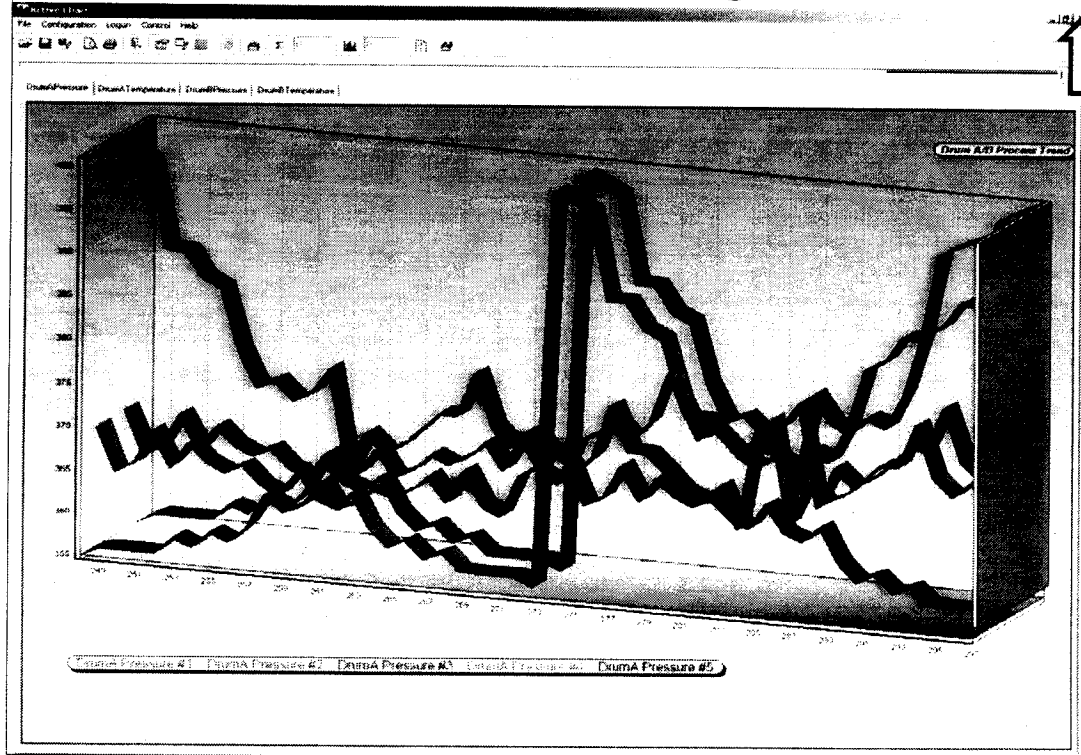
Date	Time	State	Class	Type	Open	Ref	Unit	Name	Val
[Empty Alarm History Table]									

Display Category Shutdown Warning Current Alarm Ack Selected Ack All

Exit

This screen presents another view of all the process conditions, real-time alarms and historical alarms associated with the pair of drums on the P&ID screen.

DCO 2000 TREND SCREENS



This screen provides real-time and historical process trends for every pressure, temperature, flow and level transmitter in the system. Pre-configured trends provide the user with scaled units of measure vs. time charts with device tag names for each transmitter on the system. The user can easily toggle between real-time and historical charts via pushbuttons on the trend screen. The trends provide easy access to historical data through simple manipulation of the trend by sliding the mouse to pan through historical data. The user can view the data between selectable time frames.

DCO 2000 GLOBAL ALARMS

Global Alarms

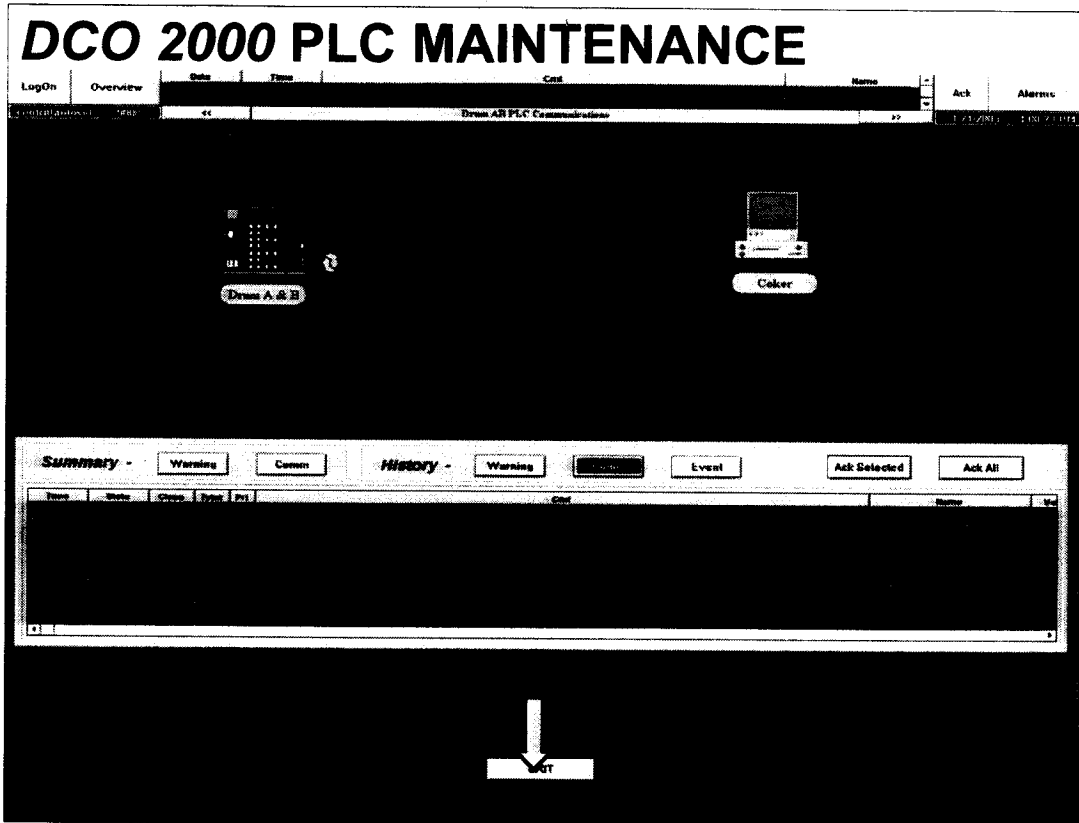
Alarm History | Alarm Summary

Date	Time	State	Class	Pri	Cmt	Name	Val
06/01/00	02:52:23	UNACK	DSC	761	12-1 MHD on MOV21 Phase error	MOV 4002 Phase Error	OH
06/01/00	02:51:46	UNACK	DSC	761	12-1 MHD on MOV21 is Jammed	MOV 4000 Jammed	OH
<p>•BLINKING CYAN ON BLACK – COMMUNICATION ALARM</p> <p>•BLINKING YELLOW ON BLACK – WARNING ALARM</p> <p>•SOLID WHITE – ACKNOWLEDGED ALARMS</p>							
05/31/00	17:16:16	UNACK	DSC	250	PSI 5 Pipeline High Pressure	PSI 5 PI Hi Pressure	OH
05/31/00	17:16:16	UNACK	DSC	250	PSI 6 Pipeline Low Pressure	PSI 6 PI Low Pressur	OH
05/31/00	17:16:16	UNACK	DSC	250	PSI 7 Pipeline Low Pressure	PSI 7 PI Low Pressur	OH
05/31/00	17:16:16	UNACK	DSC	250	LSH 2 Sump High Level	LSH 2 Sump Hi Level	OH
05/31/00	17:16:16	UNACK	DSC	250	LSH 1 Sump Leak	LSH 1 SumpLeak	OH
05/31/00	17:16:15	UNACK	DSC	761	MOV 3060 Combined FF	MOV 3060 Combined FF	OH
05/31/00	17:16:15	UNACK	DSC	761	MOV 3060 Combined FF	MOV 3060 Combined FF	OH
05/31/00	17:16:15	UNACK	DSC	761	MOV 3060 Combined FF	MOV 3060 Combined FF	OH
05/31/00	17:16:15	UNACK	DSC	761	MOV 3060 Combined FF	MOV 3060 Combined FF	OH
05/31/00	17:16:15	UNACK	DSC	761	MOV 3060 Combined FF	MOV 3060 Combined FF	OH

Display Category: Shutdown | Warning | Comm | All

Ack Selected | Ack All

This screen provides a global view of all the alarms in the system. Alarms are displayed on a first in/first out basis. The newest alarm in the system is displayed at the top of the alarm banner and on each alarm panel in the system. The user can toggle between real-time and historical views of alarms in the system. Alarm priority levels and classes are defined to further manage the alarms in the system. Each alarm class is color coded to simplify the user's analysis of the alarms in the system.



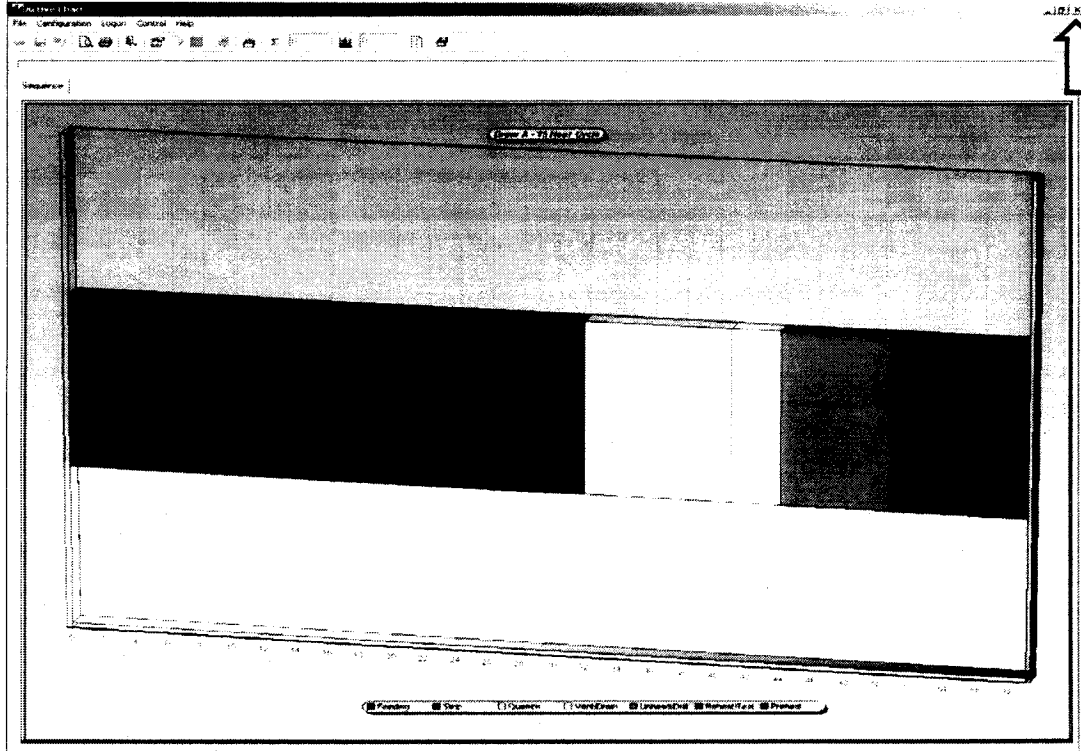
DCO 2000 provides a maintenance screen for each Programmable Logic Controller (PLC) in the system. This PLC maintenance screen displays the communications network between the tag servers in the system and each PLC. The user has the capability to access the front panel pop-up of the PLC on the network to view PLC diagnostics without dispatching personnel to the PLC panel. The front panel pop-up of the PLC mimics the status lights on the PLC in the field. An alarm/event banner displays filtered alarms from the PLC's status registers to simplify and expedite trouble-shooting communications in the system.

DCO 2000 EVENT LOG

Date	Time	User	Priority	Description
02/12/98	11:00:00	ADMIN	000	System startup
02/12/98	11:00:01	ADMIN	000	System initialization
02/12/98	11:00:02	ADMIN	000	System ready
02/12/98	11:00:03	ADMIN	000	System ready
02/12/98	11:00:04	ADMIN	000	System ready
02/12/98	11:00:05	ADMIN	000	System ready
02/12/98	11:00:06	ADMIN	000	System ready
02/12/98	11:00:07	ADMIN	000	System ready
02/12/98	11:00:08	ADMIN	000	System ready
02/12/98	11:00:09	ADMIN	000	System ready
02/12/98	11:00:10	ADMIN	000	System ready
02/12/98	11:00:11	ADMIN	000	System ready
02/12/98	11:00:12	ADMIN	000	System ready
02/12/98	11:00:13	ADMIN	000	System ready
02/12/98	11:00:14	ADMIN	000	System ready
02/12/98	11:00:15	ADMIN	000	System ready
02/12/98	11:00:16	ADMIN	000	System ready
02/12/98	11:00:17	ADMIN	000	System ready
02/12/98	11:00:18	ADMIN	000	System ready
02/12/98	11:00:19	ADMIN	000	System ready
02/12/98	11:00:20	ADMIN	000	System ready
02/12/98	11:00:21	ADMIN	000	System ready
02/12/98	11:00:22	ADMIN	000	System ready
02/12/98	11:00:23	ADMIN	000	System ready
02/12/98	11:00:24	ADMIN	000	System ready
02/12/98	11:00:25	ADMIN	000	System ready
02/12/98	11:00:26	ADMIN	000	System ready
02/12/98	11:00:27	ADMIN	000	System ready
02/12/98	11:00:28	ADMIN	000	System ready
02/12/98	11:00:29	ADMIN	000	System ready
02/12/98	11:00:30	ADMIN	000	System ready
02/12/98	11:00:31	ADMIN	000	System ready
02/12/98	11:00:32	ADMIN	000	System ready
02/12/98	11:00:33	ADMIN	000	System ready
02/12/98	11:00:34	ADMIN	000	System ready
02/12/98	11:00:35	ADMIN	000	System ready
02/12/98	11:00:36	ADMIN	000	System ready
02/12/98	11:00:37	ADMIN	000	System ready
02/12/98	11:00:38	ADMIN	000	System ready
02/12/98	11:00:39	ADMIN	000	System ready
02/12/98	11:00:40	ADMIN	000	System ready
02/12/98	11:00:41	ADMIN	000	System ready
02/12/98	11:00:42	ADMIN	000	System ready
02/12/98	11:00:43	ADMIN	000	System ready
02/12/98	11:00:44	ADMIN	000	System ready
02/12/98	11:00:45	ADMIN	000	System ready
02/12/98	11:00:46	ADMIN	000	System ready
02/12/98	11:00:47	ADMIN	000	System ready
02/12/98	11:00:48	ADMIN	000	System ready
02/12/98	11:00:49	ADMIN	000	System ready
02/12/98	11:00:50	ADMIN	000	System ready
02/12/98	11:00:51	ADMIN	000	System ready
02/12/98	11:00:52	ADMIN	000	System ready
02/12/98	11:00:53	ADMIN	000	System ready
02/12/98	11:00:54	ADMIN	000	System ready
02/12/98	11:00:55	ADMIN	000	System ready
02/12/98	11:00:56	ADMIN	000	System ready
02/12/98	11:00:57	ADMIN	000	System ready
02/12/98	11:00:58	ADMIN	000	System ready
02/12/98	11:00:59	ADMIN	000	System ready
02/12/98	11:01:00	ADMIN	000	System ready

DCO 2000 logs each event in the system. Each event is time and date stamped. The log identifies the user logged on the system at the time of the event, the event priority, the event description and the event value. Each event is logged to the event historian and is easily accessible by viewing the system event log or accessing and manipulating the data to create custom reports via the SQL server and SQL tools. The events can be sorted with standard Microsoft tools by time frame and/or related user, device, batch procedure, drum cycle, drum batch number and/or event type.

DCO 2000 BATCH SEQUENCE STATUS



DCO 2000 features historical and real-time drum cycle charts for each batch I.D. in the system. The drum cycle charts present a baseline cycle duration for each cycle in the Coker batch and provide a real-time comparison to the baseline for quick batch status indication and future analysis. Authorized users can access the DCO 2000 chart design utility for the purpose of creating custom views and performing historical analysis of batch cycles in the system.

DCO 2000 SYSTEM INFORMATION

LogOn
Overview
Date
Time
Ctrl
Name
Act
Alarms

SYSTEM INFORMATION

System Information

Station Environment

Report

Type	Item	Value	Unit	Time Stamp
01	Microsoft Version Control	1.00.0		12/14/2002 9:23:10 AM
02	Control	13.48	1.10.0	10/02/2002 2:16:47 PM
03	Device Control	2.00.0	2.00.0	1/24/2003 1:56:22 AM
04	Device Version	5.00.0	5.00.0	10/05/2002 4:26:30 AM
05	Color	1.4.0.0	1.4.0.0	10/12/2002 8:30:02 AM
06	Input	1.1.0.0	1.1.0.0	1/28/2002 9:28:57 AM
07	Equipment	1.00.0	1.00.0	10/02/02 12:10:51 AM
08	Estimate	2.00.0	2.00.0	10/01/2002 1:57:30 PM
09	PLC	2.00.0	2.00.0	10/13/2002 1:17:30 PM
10	OnAppRun	2.1.0.0	2.1.0.0	12/14/2002 12:18:00 AM
11	Color	3.1.0.0	3.1.0.0	04/20/02 9:34:42 AM
12	MV Valve	5.00.0	5.00.0	12/14/2002 9:40:02 AM
13	MV Valve Backup	1.0.0.0	1.0.0.0	10/05/2002 4:26:41 AM
14	PLC Version	5.00.0	5.00.0	10/05/2002 4:26:41 AM
15	Regulator	3.1.0.0	3.1.0.0	02/12/2002 7:35:46 PM
16	Resolving	1.1.0.0	1.1.0.0	12/02/2002 4:04:00 PM
17	System	1.4.0.0	1.4.0.0	04/25/02 1:10:14 AM
18	Software	1.4.0.0	1.4.0.0	04/25/02 1:10:14 AM
19	Valve Day	3.1.0.0	3.1.0.0	11/15/2002 2:50:07 PM
20	Valve Day	2.00.0	2.00.0	12/14/2002 9:45:45 PM
21	Valve	7.1.0.0	7.1.0.0	02/22/2001 9:51:52 PM
22	Type: Wandersware Version Control			
23	Color			1/11/02 12:00:00 AM

Play Sound
Version Ctrl
Re-Initialize
Shutdown
Logout
Exit

DCO 2000 integrates system change management into the control system. DCO 2000 provides this system information screen that details the graphical user interface and PLC system configuration data. In addition, the system information screen provides server status information and system shutdown control. DCO 2000 Version Control identifies program changes to the system and provides a configuration audit trail that identifies when, where and what was changed in every file in the system.

DCO 2000 REPORT MANAGER

Coker Production Report

SAP ID: 12345 Batch ID: 15 Hour Cycle Drum ID: Drum-4

Time	Step No	A Vent Press PS	A Purge Press PS	A Inlet Press PS	A Stripping Press PS	A Water Press PS	A OH After Temp PS	A OH Before Temp PS	A Skin Temp PS	A Inlet Temp	
		A Skid Temp PS	A Inj Oil Flow PS	A Purge Flow PS	A Stripping Flow PS	A Water Flow PS	A Level 1 PS	A Level 2 PS	A Level 3 PS	A Level 4 PS	
		B Vent Press PS	B Purge Press PS	B Inlet Press PS	B Stripping Press PS	B Water Press PS	B OH After Temp PS	B OH Before Temp PS	B Skin Temp PS	B Inlet Temp	
		B Inj Oil Flow PS	B Purge Flow PS	B Stripping Flow PS	B Water Flow PS	B Level 1 PS	B Level 2 PS	B Level 3 PS	B Level 4 PS	AB Skid Inlet Press PS	AB Skid Purge Flow PS

Alarm History

Time	Alarm Name	Alarm Msg	Status
10/26/03 11:55:55	High	High	Stop
10/26/03 11:55:55	High	High	Stop
10/26/03 11:55:55	High	High	Stop

ExComment

Message	Date	Index
10/26/03 11:55:55	10/26/03 11:55:55	1
10/26/03 11:55:55	10/26/03 11:55:55	2

DCO 2000 Batch Historian provides all the key elements required to easily log, archive, view and analyze your Coker operations data. Historical data is archived in a SQL database format for easy access and manipulation. The data can be exported and manipulated in Microsoft® Word, Microsoft® Excel, Microsoft® Access and other Microsoft® tools, lending itself to unlimited reporting capability. The process data, system alarms, system events and process trends can be accessed on a batch basis. Data can be easily read into third party packages using standard ODBC interface. A suite of standard reports for each batch is provided complete with all user comments and verification. Batch Duration Report, Cycle Duration Report, Procedure Duration Report, Batch Alarm Report, Cycle Alarm Report, Procedure Alarm Reports and MOV Performance are standard reports. DCO 2000 Report Manager also allows easy generation of custom reports to suit the customer's specific reporting requirements.

DCO 2000

AS

Benefits



***DCO 2000* Benefits**

DCO 2000 reduces the risk of human error during Coker operations by providing detail step procedures reducing the possibility of performing task out of sequence;

DCO 2000 reduces the risk of opening or closing the wrong valve at the wrong time by providing device, process, and step interlocks;

DCO 2000 reduces the risk of injury to operating personnel by significantly reducing the time they are required on the structure;

DCO 2000 provides explicit systems & controls for modifying procedures and communicating information;



DCO 2000 Benefits

DCO 2000 provides an operations simulator for personnel training and scenario generation;

DCO 2000 reduces design and development time associated with your automation project;

DCO 2000 reduces the design and development cost associated with your Coker automation project;

DCO 2000 maximizes the quality and efficiency of your automation project by providing the key core competencies required to develop the the project;

DCO 2000 provides configurable and scalable solutions tailored to meet customer preferences and automation objectives;



DCO 2000 Benefits

DCO 2000 provides single source responsibility and accountability for your project.



Total Automation Solutions Contacts

When planning your next Coker automation project contact Total Automation Solutions and let us demonstrate our capabilities.

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- Phone (713) 742-1042
- FAX (713) 742-1009
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Thank You For Your Time and Interest !