DeltaV™ System Installation Pays for Itself at Conoco Canada Natural Gas Plant

RESULTS

- No down time or lost production
- Reduced upsets,unplanned shutdowns
- Process swings virtually eliminated
- 50% reduced flaring costs, greenhouse emissions
- Increased throughput, revenue
- Reduced field inspection costs
- Reduced configuration costs

APPLICATION

The 70-million cu. ft. per day (cfd) capacity Peco gas plant processes the Peco field's naturally sweet gas and refines accompanying natural gas liquids into condensate and fraction fluids.

CUSTOMER

Conoco Canada Ltd., Edson, Alberta, Canada

CHALLENGE

Until recently, control had been by panel boards and single-loop controllers. The plant was too small to justify conventional DCS (distributed control systems).

Efficiency problems drove Conoco's upgrade decision. Process swings from gas liquids slugging at the plant inlet were a continual issue with the former controls, because control components weren't integrated. The various vessels in a process train couldn't sense what others were doing, so steady-state conditions were difficult to achieve.

Significant revenues in recovery of high-value liquids were lost because processes could not be run at the edge of tolerance windows at the high end of capacity. Excessive flaring, though within regulatory limits, still reduced revenues up to $40,000 per year—again because of process swings.

Unexpected shutdowns from major upsets, wide variations between day and night temperatures during times when the plant was unmanned, control failures, and other meddlesome variables, cut revenue a minimum of $300 per lost hour.

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Conoco also wanted to make resource reductions. An example of excess was time spent driving to wells—the farthest of which is 1-1/2 hours away--because a rudimentary SCADA system could not provide remote compressor starts, among other deficiencies.

SOLUTION

Conoco Canada Ltd. turned to Emerson Process Management's DeltaV digital automation system from communicating to remote SCADA systems using OPC (OLE—object linking and embedding—for process control).

Conoco viewed the DeltaV system installation as paying for itself as soon as it took over control. Because the automation's I/O modules and channels could be added while the controller is live, cutover was accomplished over a 20-hour period without taking the plant off-line. A 20-hour outage, which would have been necessary with a conventional DCS, would have cost $150,000 in lost revenue—an amount greater than the cost of the new system.

The solution Conoco Canada and Emerson assembled consisted of: a single DeltaV controller fitted with 15 I/O modules, three PCs running the DeltaV system's workstation software, IEEE 803.2 Ethernet network linking the above components, two-way SCADA radio, and Emerson remote operating controllers as intelligent RTUs (remote terminal units) at the well sites.

A second controller is being added to the network to concentrate in one device the serial communications for the plant ESS PLC, a gas chromatograph to fine-tune fractionating towers, and several other instruments. A microwave link under construction will permit the new automation system to tie into the Conoco intranet.

Of the three PCs, one is configured as an operator station, another as an engineering workstation (used also as a second operator station), and the third as a DeltaV RTU-to-OPC integration station for the SCADA system.

The new automation allowed Conoco to configure using IEC 1131 graphical methods rather than forms-based data entry. Graphical configuration has proved a big timesaver. Also, because the configurations are basically graphically generated, documenting them is just a simple matter of printing out the configuration worksheets.

Both the device and cabling were diagnosed simultaneously. The "drag and drop" feature also allowed the technicians to assign all transmitters automatically to the DeltaV system, without the need for time-consuming programming or configuration.

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Also with the increased information and easily-implemented control the DeltaV system delivered, production of high-value fluids has been maximized, and the relative volumes of the different fluid types can be better adjusted to suit market conditions. The new online gas chromatograph incorporated into the automation system will further fine-tune and automate the fraction towers with updates every few seconds. The improved SCADA system has made well sites as automated and easy to monitor and control as in-plant processes.

The remote location of well sites is transparent to the operators in plant stations. The sites are presented as just another set of real-time graphics, and the sites are alarmed and adjusted the same as in-plant equipment. Driving to wells has been reduced to maintenance efforts only.

Conoco Canada was a pioneer in the application of OPC in the SCADA system to permit data passing to and from the ROC RTUs to readily flow in and out of the DeltaV system, as well as in and out of Microsoft Excel and Microsoft Access packages loaded into the PCs for recordkeeping, calculations, and reporting.

OPC enables the radio-linked RTUs to appear and act as seamless extensions of the in-plant portion of the system. In the near future, worldwide users on the Conoco intranet will be able to access Peco Field well-site data in real-time by accessing the Windows packages.

Because of its scalability, the DeltaV system will grow with the plant and well sites, providing only as much control—and consuming only as much investment—as required at the moment. And with the easy integration of Windows, the OPC standard, and Microsoft business packages, the DeltaV system will continue to improve Conoco Canada's operations—from remote well sites, to the plant, to the business office.

With the DeltaV system's quick response and increased control information, process swings and discontinuities have been largely eliminated. Shutdowns are rare. Flaring costs and greenhouse emissions have been cut in half. And the plant is operating closer to full capacity, so output is up.

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