



## *OpenVMS and Alpha Technology Fuel Profits at Sunoco*

### **Compaq breaks the *speed and profit* barriers**

In the highly-competitive oil and gas industry, success depends on predicting market demands — then adjusting production to yield transportation fuels reaping the highest prices. At Sunoco's Sarnia refinery, a computerized process control system provides the real-time optimization capabilities needed to quickly align production with market activity. Sunoco credits its OpenVMS cluster from Compaq Computer Corporation as a critical component of a \$17 million payback and with garnering industry recognition: a recent survey named the Sarnia refinery the "Best in the World in Hydrocracker Control and Optimization."

"For us, speed equals bigger profits," explains Cliff Pedersen, Project Manager, Process Control, Sunoco Inc. "The faster we can calculate the required adjustments, the more high-value fuel products we can produce. Our new systems, based on Compaq technology, are extremely reliable and allow us to perform quick calculations, thereby maximizing profits."

Sunoco, Inc., based in Toronto, is a division of Suncor Energy Inc., one of Canada's major integrated oil and gas companies. Suncor Energy is the seventh top producing oil company in Canada, with 50 years of reserves, and is sixth in refining and marketing. The Sunoco Refinery in Sarnia, Ontario, produces transportation fuels, petrochemicals, and heating fuels under the Sunoco and Sunchem brand names.

Utilizing highly scalable VAX and AlphaServer systems running software from The Dynamic Matrix Control Corporation, Sunoco developed two complex sets of automated processes to support refinery operations: Closed Loop Real Time Optimization (CLRTO) and Dynamic Blend Optimization (DBO). The CLRTO application directs ten Dynamic Matrix Control (DMC) controllers which continuously monitor hundreds of flows, pressures, temperatures and compositions, and manipulate more than 50 control valves in the refinery's hydrocracker process.

The CLRTO system allows Sunoco to quickly change formulas to produce the fuels yielding the highest prices at the time. "In our industry, one way of increasing productivity and profitability comes through the automation of highly complex processes," emphasizes Pedersen. "We needed a highly-scalable computing platform for the CLRTO project. We started with VAX 6300s and 6500s and then moved to AlphaServer 1200 systems, all running the OpenVMS operating system.

"Before implementing CLRTO, it took us three hours to solve the equations to adjust the process operating conditions," Pedersen continues. "We cut that to 90 minutes with the VAX 6500s and then down to only 20 minutes with the AlphaServer. As Compaq comes out with faster solutions, we can easily port our systems to improve our processes even further."

***"The Compaq cluster's speed and reliability allows us to quickly and accurately optimize refinery processes to maximize profits and respond to ever-fluctuating market forces."***

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*Cliff Pedersen  
Project Manager, Process Control  
Sunoco, Inc.*



While a reduction from three hours to 20 minutes is quite an improvement, Pedersen isn't resting on his laurels just yet. His job is to continually push the speed envelope in the quest for higher profits and greater competitive advantage. "I told Compaq at a recent executive get-together that I want to cut the time down to one second if possible," recalls Pedersen. "They rolled out their whole line of Alpha chips planned for the next five years. I was very happy with what I saw."

### Compaq demonstrates proof-of-concept

Sunoco and Pedersen have been impressed with the continued experience and expertise from Compaq with real-time process control and its OpenVMS operating system. "It takes 72,000 mathematical equations to calculate the correct set of adjustments to make the hydrocracker," explains Pedersen. "Compaq is the expert in scientific computing. And OpenVMS is the most stable, secure operating system on the market. It has the highest functionality and reliability of any OS in the industry. With OpenVMS we can interconnect systems of all sizes and capacities to achieve an easy-to-manage, virtual system."

Sunoco also relies on a custom 45 gigabyte Compaq StorageWorks RAID Array subsystem for high availability and flexibility. Built on the concept of massively-parallel I/O, StorageWorks subsystems can be physically centralized in the data center or distributed across multiple LANS and departmental servers. "We chose Compaq because we wanted a stable company that provided the flexibility we need and had proven itself to be successful over the long term," says Pedersen.

### Compaq backbone supports increased profits

After seven years of design and development, the CLRTO system became operational in 1994 and has been a stellar performer ever since. Sunoco's metrics reveal an increase in profits of \$4,000 to \$6,000 per day for the DMC controllers and \$1,500 to \$6,000 per day for the CLRTO system. "The CLRTO implementation rates are outstanding, well above the industry norm for this type of system," emphasizes Pedersen. "Together, the DMC and CLRTO applications have earned us a payback of more than \$17 million."

A complex system such as CLRTO requires expert service and support. That's why Sunoco relies on Compaq Services. "We use Compaq consulting services whenever we make a hardware or software change to the cluster," Pedersen says. "In our experience, Compaq personnel have always been highly competent and committed to helping us achieve our objectives."

Sunoco's advanced CLRTO solution is not only the first to be applied to hydrocracker refinery processes, but is also ranked "Best in the World in Hydrocracker Control and Optimization" by Solomon Associates, in a survey of more than 100 refineries worldwide. Pedersen credits Compaq for helping his firm achieve this type of recognition and success. "Compaq is a true innovator and technical leader for scientific and industrial computing," he concludes. "Our two companies cross-pollinate well — Compaq develops leading-edge computing technologies and we push the application envelope with new systems and ideas. It is a very beneficial relationship."



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