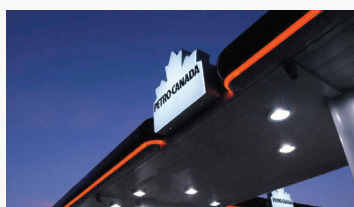




## Using Simulation Models to Improve Plant Performance and Reliability

### Profile

Petro-Canada is one of Canada's largest integrated oil and gas companies. It is involved in operations that span both the upstream and downstream sectors of the industry. The company was formed in 1975 and subsequently grew through a series of acquisitions of existing oil companies in Canada, including Pacific 66, BP, Gulf and PetroFina. Its most recent acquisition includes the international assets from Veba Oil & Gas in 2003. In 2004, Petro-Canada achieved revenues of \$14 billion and employed more than 5000 people.



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**Doug Evans**  
Director, Process Technology and Reliability  
Petro-Canada

### Business Challenge

One of the biggest challenges for Petro-Canada is achieving top quartile performance, driven by its objective of being a highly-principled organization with a focused approach to strategy execution. This objective complements Petro-Canada's primary goal of becoming the number one integrated oil and gas company in Canada. Within Petro-Canada, the Refining & Supply team has established a goal to become 'Canada's Best Hydrocarbon Supplier.'

In its efforts to achieve pace-setter performance, Petro-Canada began to focus on business challenges including:

- Utilizing simulation tools to support real-time decision making and maximize profitability
- Leveraging current supplier relationships to maximize value creation

Petro-Canada believes that its core business processes reside within its supply chain, spanning everything from feedstock selection to the different product mixes produced at each of its sites. To enable its supply chain processes, Petro-Canada deals with many vendors who supply products and services to its manufacturing facilities. "Petro-Canada believes that one of our keys to success is leveraging our supplier relationships. We consider our suppliers to be one of the conduits to help us understand industry best practices, where we can leverage the technologies that we have in place, and where we can leverage our assets while creating value for both parties," said Doug Evans, Director, Process Technology and Reliability, Petro-Canada.

### Solution

Petro-Canada has standardized on several engineering applications from AspenTech. The first is Aspen HYSYS®, an

application of the aspenONE™ Simulation & Optimization for Petroleum solution. The solution is commonly used across Petro-Canada's refining and upstream businesses for process flowsheeting to maximize profitability of new designs and improve existing process operations. "We selected Aspen HYSYS for its open architecture and ease of use, which allows any user to utilize any reactor model within a flowsheet design. We truly believe that refiners will require this kind of flexibility and user friendliness in the future," Evans said. In addition, Petro-Canada is utilizing Aspen Icarus™ and Aspen Kbase™ as part of the aspenONE Economic Evaluation for Petroleum solution, for cost estimation in capital project work.

Petro-Canada has integrated its simulation models with real-time data to verify and guide operations of its units per expectations. The models enable Petro-Canada to make real-time decisions that solve their most challenging business issues. "Our simulation models are integral to our operation because they monitor and optimize the performance of our operating units so that we can minimize energy consumption and maximize throughputs and yields. The end result is that bottom line profitability of our refineries improves," Evans said.

### Business Benefits

Petro-Canada continues to see significant improvement in its refining and supply operations relative to its goal of becoming 'Canada's Best Hydrocarbon Supplier' "Indications regarding our performance relative to the competition show that Petro-Canada is positioning itself very well. However, it's not a finite race, which means that we cannot rest on our laurels," Evans said. "Petro-Canada believes that one of the keys to our success is leveraging relationships like we have AspenTech to help us figure out how we are going to stay ahead of the pack."

Benefits of implementing AspenTech solutions have included:

- **Improving plant performance and reliability**
- **Implementing industry best practices in leveraging assets across Petro-Canada**
- **Determining an optimum set of operating conditions**
- **Minimizing energy consumption and maximizing throughput and yields**

Doug Evans notes that the ability to make decisions in real-time has positively affected Petro-Canada's bottom line: "If AspenTech simulation models were not available to us, there would be a significant delay between the time when we want to make a decision and when we can actually make a decision. And that's losing money and opportunity," he said.

Petro-Canada believes that AspenTech has demonstrated ability to implement best practices in the company's refining and supply organization. "We believe that AspenTech's expertise, breadth of technology and development path will allow us to leverage the use of the tools more in our organization. At Petro-Canada, we believe that AspenTech has best practices on its mind," Evans said. Subsequent work with benchmarking firms has validated the best practices strategies implemented by AspenTech.

## Vision

Petro-Canada envisions a continuing emphasis on establishing a model-centric approach using AspenTech products. "Model centricity provides an opportunity to ensure that we are leveraging the maximum value from our simulation tools," Evans said. "As an example, when we originally design a unit, the EPC contractor provides us with a detailed simulation model of the unit. That is an ideal starting point to take that model and leverage it all the way through the project detailed engineering, procurement and construction implementation process, as well as through the commissioning, startup, and ongoing optimization and monitoring of the units to ensure safe and reliable operations. In addition, this approach provides efficient tools to update our linear programs with timely and accurate data so that we are making the right feed stock choices for our refineries on an ongoing basis.

These are examples of steps along the model-centric journey that result in leveraging the use of the model beyond just process or equipment simulation," he said. Petro-Canada is also focusing on maximizing value from its use of Aspen Retail™, an application of aspenONE Fuels Marketing for Petroleum. Aspen Retail has been deployed across Petro-Canada's secondary distribution to ensure that the right high quality product is being shipped in a cost effective manner to the right customers at the right time while simultaneously minimizing run-outs.

Aspen Technology, Inc.  
Ten Canal Park  
Cambridge, MA 02141-2201 USA

p: 1 617 949 1000  
f: 1 617 949 1030  
e: [info@aspentech.com](mailto:info@aspentech.com)

## About AspenTech

Aspen Technology, Inc. provides industry-leading software and professional services that help process companies improve efficiency and profitability by enabling them to model, manage and control their operations. The new generation of integrated aspenONE™ solutions are aligned with the key industry business processes, providing manufacturers the capabilities they need to optimize operational performance, make real-time decisions and synchronize the plant and supply chain. Over 1,500 leading companies already rely on AspenTech's software, including Bayer, BASF, BP, ChevronTexaco, DuPont, ExxonMobil, Fluor, GlaxoSmithKline, Sanofi-Aventis, Shell, and Total. For more information, visit [www.aspentech.com](http://www.aspentech.com).