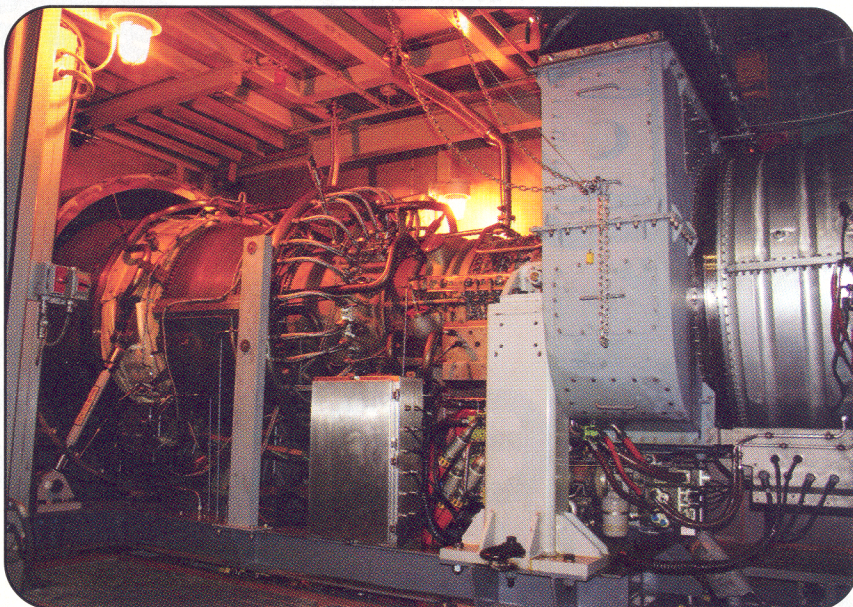


## Test Cell Employs Quick Change-out Capability

by Mike Mercer



*The new quick change-out cold end test cell opened by TransCanada Turbine is designed to test GE LM6000 PA and PC industrial aeroderivative gas turbines. The facility is located at the Cavalier power station near Strathmore in Alberta, Canada.*

TransCanada Turbines Ltd. (TCT), part of the Gas Turbine Services business of John Wood Group PLC (Wood Group), recently constructed and opened a quick change-out, cold end drive test facility for General Electric LM6000 PA and PC industrial aeroderivative gas turbines. The new test facility, which cost approximately US\$3.7 million, is located at the Cavalier power station near Strathmore in Alberta, Canada.

The Cavalier power station is owned and operated by EnCana, an independent oil and gas company created from the integration of Alberta Energy Co. Ltd. and PanCanadian Energy Corp. The power station is a 115 MW natural gas-fired, combined-cycle plant located 16 km southeast of Strathmore. The test facility allows TCT to test turbines against a live power grid, while utilizing a real package with systems and controls identical to actual customer conditions.

"We are extremely excited about our new testing design," said Pete Watson, president of TCT. "The system is set up such that what our customers witness during testing of their turbines, either in person or via the Internet, should be what they will receive at their plant. What it boils down to is that cold end drive testing on the grid duplicates the engine's actual operation on-site. Hot end drive testing is not how the LM6000 typically operates. The successful com-

pletion of this project, which gives LM6000 operators worldwide an independent testing alternative, would not have been possible without the entrepreneurial engineering of Wood Group Power Solutions and Fern Engineering, or EnCana's valued cooperation."

Under an agreement signed in September of 2002 with EnCana, TCT has access to the test facility during off-peak power periods — these typically occur on weekends. The limited testing time presents some hurdles. To overcome the time constraints associated with testing during weekends only, TCT modified an existing LM6000 PC package into a quick change-out test cell, and adapted it to accommodate PA engines also. This quick change-out design means that TCT has reduced the time required to remove, reinstall and align an engine from 36 to 12 hours.

To modify the existing operating GE S&S LM6000 PC package into a quick change-out test cell. A subskid was designed to provide a mounting stand for the engine to facilitate quick alignment and to support the quick disconnect interface connections. In order to accommodate the shorter PA engine, a transition piece was designed to adapt to the existing PC collector diffuser. In addition, the majority of the fluid and

electrical lines were modified to quick disconnect configuration as well as the inlet, exhaust and variable bleed valve duct connections. The valves open during acceleration to bleed off excess air from the low pressure compressor. The air gets exhausted out through the duct. This connection to the engine had numerous bolts and was modified to a clamping style connection to make it less time consuming.

Additional key features of the new test cell are its control and data acquisition systems. The original GE Mark VI control system was replaced by a Woodward MicroNet control system. This system was chosen for its capability of operating all versions of the LM6000.

In addition to the new control system, TCT added extra instrumentation for turbine engine troubleshooting and performance calculation. Using the new human interface screens and a new data acquisition system, TCT can produce immediate test results and make a comparison to an average new engine.

The new data acquisition system is based on Yanos Aerospace's Engine Test Log Sheet (ETLS) software. It performs all data archiving, performance calculation, log sheet reports, trending and diagnostics functions. TCT also added Yanos' Remote Client software.



The power station where the test facility was built is operated by EnCana, an independent oil and gas company.

This software enables the company to provide online calibrations and calculation of performance numbers, and also provides remote dial in access via the internet for customers to witness testing in progress while not having to physically be there — this saves time and money.

Using a Microsoft SQL server, complex database queries are easily developed to create views of data that cross the boundaries of TCT's systems. Systems can quickly gather test data, details of new/repaired parts and even labor hours from the shop to produce final reports to customers. In terms of troubleshooting, this system can quickly create plots versus other selected engines in TCT's historical database.

TCT can also relate performance to build data, create cost benefit analysis and optimize work scopes which will lead to improved test cell pass rates and reduced overhaul costs for TCT's customers.

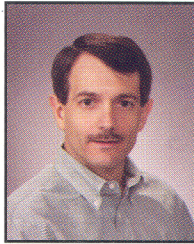
It should be noted that this system is also being implemented concurrently with TCT's test cell in Calgary, Alberta, Canada, for the Avon, RB211, Spey and LM2500 engine types.

This project was completed with a team consisting of people from TransCanada Turbines, Wood Group Power Solutions for project management services; Fern Engineering for design engineering; and Yanos Aerospace for the data acquisition software.

TCT's first test of an LM6000 PA engine was completed in January 2004. The company successfully completed its first LM6000 PC test in 2003.

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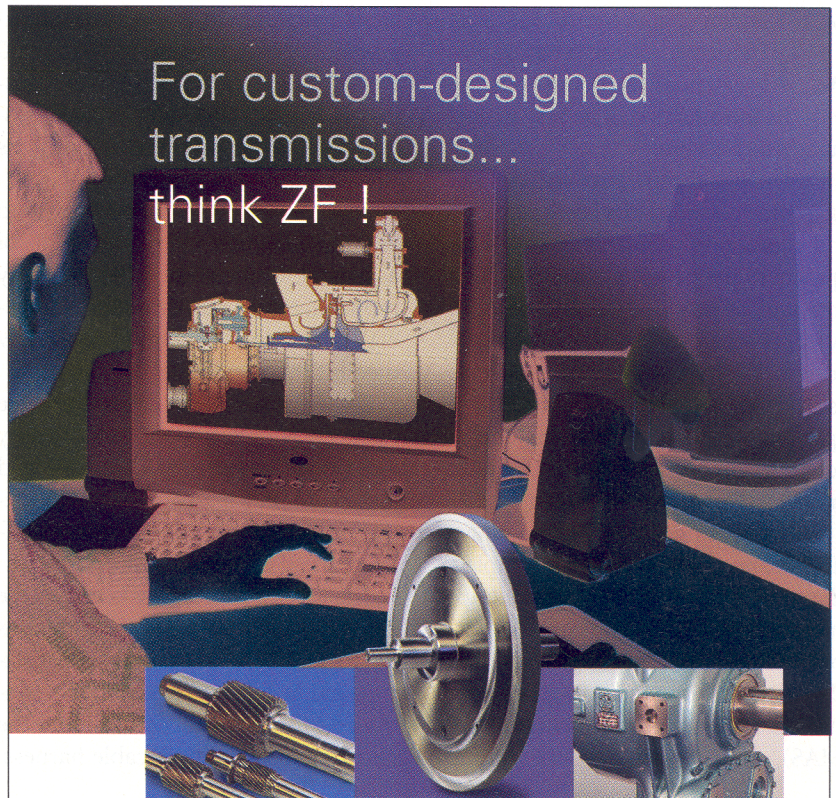
N. Deter

**Nick Deter** — to west coast sales manager for power generation of Miratech Corporation. Also at Miratech: **Steve Rethmeyer** to gulf coast sales manager for gas



S. Rethmeyer

compression at Miratech Corporation. Deter will have an office in Los Angeles, California, U.S.A. while Rethmeyer will make his office in Houston.



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