

# CASE STUDY

## PETROCHEMICAL INDUSTRY

### SOLUTIONS

- Solution provider:  
Rockwell Automation®
- Variable Frequency AC Drive
  - PowerFlex® 7000 500 hp  
4160 V variable frequency  
drive with PWM rectifier and  
synchronous transfer

### RESULTS

- Operations impact
  - The VFD high reliability means less shutdown time contributing to lower total cost of ownership.
- Financial impact
  - Installation completed in 12 weeks, saving valuable shutdown time
  - PWM rectifier does not require an isolation transformer, so less space and less hardware is used
  - Variable speed control reduces energy consumption and therefore operating costs
  - The VFD high reliability means less shutdown time, contributing to lower total cost of ownership.

## PowerFlex 7000 medium voltage drives reduce energy consumption and operating costs on oil pipeline

HISTORY, KNOWLEDGE, SERVICE AND PRODUCT CAPABILITY MEET DEMANDS OF PIPELINE EXPANSION.



*Rockwell Automation's PowerFlex 7000 AC variable frequency drive (above, left) was used to control the new, larger pumps installed in an Alberta oil pipeline expansion.*

### BACKGROUND

With the increase in world oil prices, an Alberta oil company decided to expand the capacity of its pipeline, allowing transportation of its own production volumes at a reduced operating cost. The 57 km extension gave it the capability

to transport up to 57,000 barrels of oil per day to its processing facilities.

### THE CHALLENGE

The challenge to increase oil volumes in the pipeline included larger pumps and therefore the installation of higher horsepower

drives, all to be completed in a bare minimum shutdown time.

While the expansion is estimated to save the customer \$5 million (Cdn) annually in transportation expenses, the cost of shutting down the pipeline was approximately \$750,000 (Cdn) per day at full capacity. An efficient and economic installation required leading edge technology and experience, while keeping the pipeline in production.

## THE SOLUTION

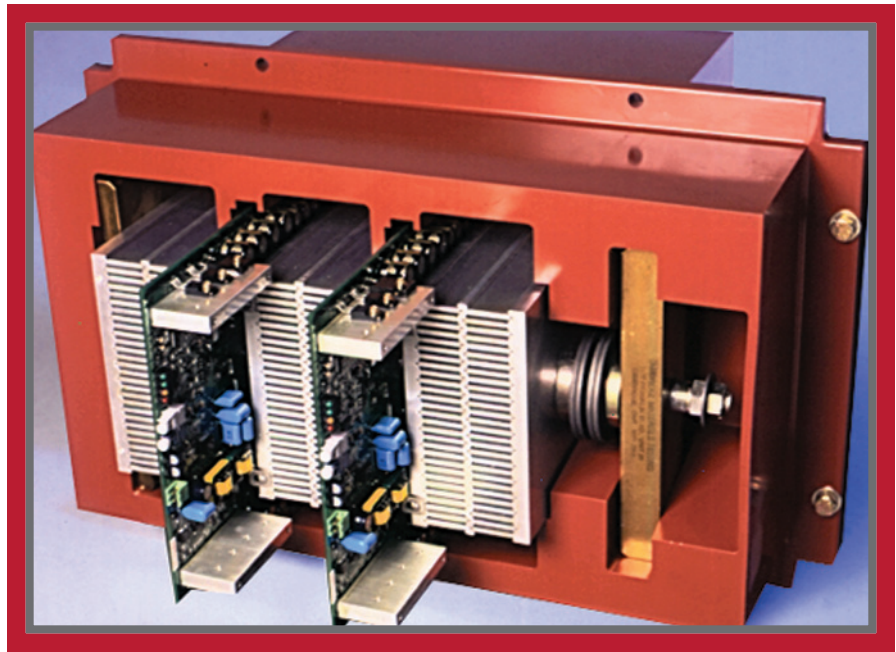
To meet these tight demands, the oil company chose a provider with a proven track record. A 20-year relationship with Rockwell Automation had provided them outstanding delivery, service and support on Allen-Bradley and Reliance products.

With the large quantity of Allen-Bradley equipment already in the pipeline operation, it made sense to use compatible products. Using Rockwell Automation as the sole-source supplier also meant faster delivery and single-source responsibility.

Rockwell Automation Account Manager Ronald Lehmann worked with the Global Manufacturing Solutions (GMS) group to provide a complete automation solution, including medium voltage and low voltage variable frequency drives, switchgear, starters, motors and programmable logic controllers.

## PRODUCTS SAVE TIME AND MONEY

The need to improve production and up-time was facilitated using one of the latest in advanced technology Allen-Bradley products, the PowerFlex® 7000 medium voltage variable frequency drive with a pulse-width modulation (PWM) rectifier.



*The PowerFlex 7000 PowerCage™.*

An integral part of the installation, the 500 hp, 4160V air-cooled single drive with three-motor synchronous transfer keeps the motor for the pumps at the correct RPM for the process. The decision to install the PowerFlex 7000 drive with PWM rectifier achieved direct advantages in both the installation process and the reduction in total cost of ownership.

"We went with the PWM rectifier because no isolation transformer is required, so less space and less hardware are used. The unit is more efficient, which in the end, saves the customer money," said Lehmann.

Reduced downtime and fewer spare parts to stock also contribute to a lower cost of ownership. The advanced 6.5-kV P.I.V. rated symmetrical gate commutated thyristor (SGCT) power semiconductors with an integrated gate drive, further reduce the unit's component count to the lowest of any medium voltage drive.

Future time savings continue with a unique arrangement which allows components to be replaced in less

than five minutes without removing the PowerCage™, and without any special tools. The PowerCage™ houses the power components, using an advanced heatsink design that works in conjunction with a high pressure air flow pattern to ensure high efficiency heat transfer and reduction of thermal stress and gate temperature, the most common mode of failure in power semiconductor technology.

Overall, the PowerFlex 7000 drive contributes to the pipeline's efficiency, cost savings and successful operation. The new drives make operations smoother by controlling the velocity of the line and also make the system more efficient in terms of power consumption. Additional time savings, convenience and safety are addressed with the installation of Allen-Bradley PLC5 series programmable logic controllers at each station and SCADA software, which allows all the units to be controlled from the pipeline control center. The PLC also serves as an emergency shutdown device. In the event of a fire or other emergency,

all the motors, fans and pumps can be shut down remotely from the control center.

## SERVICE BENEFITS

Service benefits included on-site engineers for commissioning of the drives and the use of on-board approval cycles, which brought the customer to the Rockwell Automation head office and manufacturing facility to approve engineering drawings. This reduced the approval cycle from two or three weeks to one day, to facilitate an eight-week order to ship commitment.

Another advantage to the Rockwell Automation solution was the complete co-ordination of Rockwell Automation business with third-party vendors Raffin for Switchgear and Electrotek for Telephone Influence Factor (TIF) filters.

The installation, completed in January 2002 within a 12-week window at four separate sites, was a successful combination of innovative technology, valuable time and cost savings, and unparalleled delivery schedule.

**[www.rockwellautomation.com](http://www.rockwellautomation.com)**

---

### **Power, Control and Information Solutions Headquarters**

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

**Medium Voltage Products**, 135 Dundas Street, Cambridge, ON, N1R 5X1 Canada, Tel: (1) 519.740.4100, Fax: (1) 519.623.8930, [www.ab.com/mvb](http://www.ab.com/mvb)