

Pump Advantage

A photograph of an industrial refinery at night. The scene is filled with complex piping, metal structures, and scaffolding. A tall, slender distillation column with a red and white striped top is prominent on the right. The lighting is a mix of the cool blue of the twilight sky and the warm yellow of industrial lights. A large, white, curved graphic element is in the bottom left corner.

Why Voith's Variable Speed coupling may be the perfect conversion to save you money.

AND WHAT A DIFFERENCE IT MADE!

Sherritt International converted a pump drive from a Steam Turbine to a Voith Variable speed fluid coupling to reap real cost savings.



The total savings of 8,000lbs/hour of steam means ~\$740K saved per year



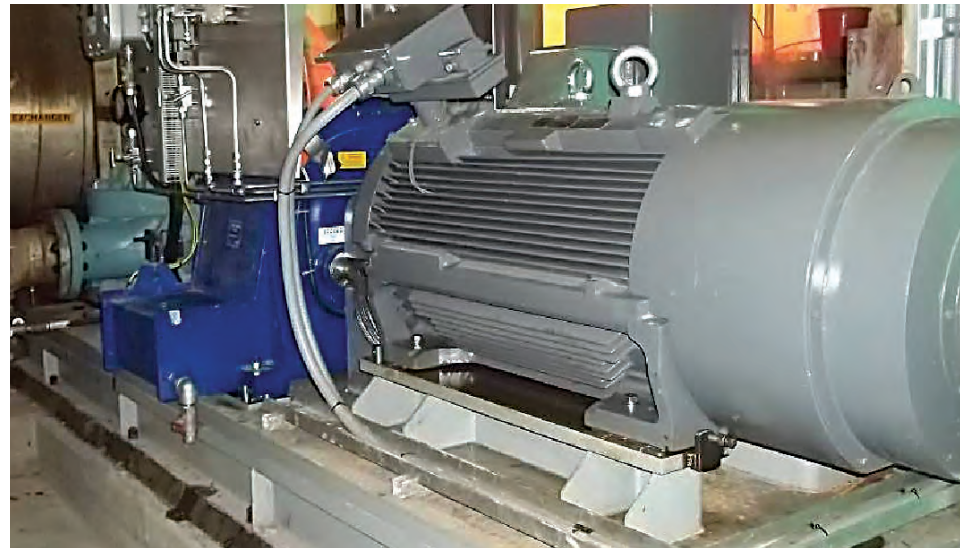
Barry Greenway smiles when asked about his new variable speed drive system for his Amine pump: “it works like a charm since we commissioned it about a year ago.” Barry admits that it had one minor trip that shut it down on a Friday. “The issue was a loose thermal coupler, and the unit’s diagnostics system quickly identified the issue. As it was a Friday we simply ran the steam turbine back-up system as the new Voith had been running steady for about six months at the time and we needed to give the turbine some run time.”

Barry is the Maintenance Coordinator at the Ammonia plant for Sherritt International in Ft. Saskatchewan, Alberta. Barry has been at Sherritt since the early 80’s, and the new Voith system is a result of Barry wanting a better drive system since he saw an on-site technical presentation set up by Nick Agius of Motion Canada. At the time of this meeting, Barry was the Production Supervisor at the Ammonia plant. This particular plant was built in 1954. There are two large Amine pumps and they

were both originally designed with Elliot steam turbines, one as back-up to the other. Back in the 50’s, a steam turbine was a good option for larger HP systems that require variable speed.

These Amine pumps are critical to production as Amine strips the CO₂ out of the natural gas which is the feedstock for this Ammonia plant. Sherritt then cracks the gas and converts it to hydrogen, which gets converted to ammonia fertilizer.

There are two pumps. One is a back-up because production depends on one pump to always be running 24/7/365. There is a cost savings in steam as Barry used to have to use 900lb steam at a rate of 14,000lbs/hour with the old steam turbine system, but now he only uses 2,000lbs/hour. The total savings of 8,000lbs/hour of steam means ~ \$740K saved per year after you add the cost it takes to run the 450HP motor at the load this Amine pump draws year round.



To the left is the old steam turbine coupled to the pump. The picture above shows the after picture, with the electric motor direct coupled via disc couplings to the Voith Turbo variable speed drive which is directly coupled with another spacer disc coupling to the pump.

Barry also takes advantage of the other benefits of the new drive system by the way he manages the steam now. One may need a PhD in steam to follow his management process but it goes like this: Barry used to bring in 900lb steam, then put it through a Let Down Station (LD) to 450lbs, then into the turbine. Now he can put the 450lb steam through another LD to reduce it down to 160lb steam, which is about the minimum he requires to keep the steam "super heated." This is required to keep the water out of the steam.

The installation of this project was engineered in-house by Sherritt engineering with help from an outside engineering firm (Worley Parsons). The whole variable speed drive package, including the Voith unit, the 450HP Teco Westinghouse motor, the spacer disc couplings, even the skid, was supplied by Motion Canada Ft. Saskatchewan with some great support from Voith Canada (Scott McElroy, Megan Cropper and Tom Morin).

Dennis Bergen is the Worley Parsons Engineer who had to make this project fit and work. Dennis said "this project saved Sherritt money by reducing the amount of steam used and the system greatly improves the reliability but fitting it in place was a major challenge."

Nick Agius was involved with this project since day one. When asked, "Why a Voith over a simple VFD which would have made the retrofit easier" he replies, "There were multiple reasons to pick the Voith technology over the VFD option."

- Voith guarantees spare parts for 30 years, compared to VFD manufacturers whose parts become obsolete after 10 years or even sooner
- Voith hydrodynamic variable speed drives have a very small footprint compared to a VFD system; there is no big air conditioned electrical house required.
- Regular maintenance requirements are not complicated. Voith recommends overhauls every 8–10 years
- Voith has successful applications around the world operating in the most extreme and dirty conditions
- Voith systems are self-contained so an additional oil tank or cooling system isn't required

Barry adds that there is another benefit for him as the Voith system gives him 800 to 900 gallon per minute of Amine without any fuss. The old steam turbine system took more effort to get that high

so he usually would have it running at about 600GPM.

Nick Agius from Motion Canada said "the cost of this Voith system over a traditional electrical VFD at 4160 volt was the major driver for this Voith system. The VFD would cost about the same as this whole package, even with the \$20K base plate that we designed and supplied special for this system out of Voith Calgary. Then we would have to find the room to install the VFD box which is not easy in older plants like Sherritt."

Nick adds "this was one of the neatest drive system retrofit projects that I have been involved with and I have seen a lot of innovative drive solution in the past 3 decades. I see more potential for replacing steam turbines with Voith systems at many older industrial plants like Sherritt. It was also a pleasure to work with my friend Dennis Bergen from Worley Parson. Dennis was very patient with us as this job got complicated as we tried to turn a nine month delivery into six months during the summer holidays. Dennis was great to work with on this project. I still don't know how he fit everything in place as this was a tight installation with not a lot of room."