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JOURNEY COMPLETE

L.A. TURBINE COMMISSIONS FIRST ARES AMB TURBOEXPANDER-COMPRESSOR

BY BRENT HAIGHT

L.A. Turbine (LAT) has commissioned its first ARES Active Magnetic Bearing (AMB) Turboexpander-Compressor within a newly established natural gas liquid (NGL) processing plant in the Bakken Shale Play of North Dakota, USA. Designed for a plant flow rate of 200 MMscfd ($8.5 \times 10^6 \text{ m}^3/\text{d}$), the ARES AMB Turboexpander-Compressor machine features a skid-mounted AMB controller and programmable logic control (PLC) design.

"The startup process was trouble-free," said Todd Heninger, senior field service technician at L.A. Turbine. "The AMB turboexpander operated as expected and ran when needed. It responded to the gas plant operating flow fluctuations that are to be expected when bringing a new site online, including quick turndowns and fast startups."

The commissioning process saw cold and wet conditions, with weather changing from rain to drizzle to snow. Heninger estimates the on-skid AMB controller turboexpander configuration commissioned three to four weeks faster than an AMB turboexpander with an off-skid controller and PLC system. "A significant amount of time was saved in the commissioning process due to in-house factory testing when the machine and

control system performance is challenged using air pressure," said Heninger. "This step significantly reduces and, in some cases, eliminates the need for electrical and mechanical tuning as well as cabling installation and testing on site."

ARES AMB is a standardized turboexpander-compressor designed for 60-, 120-, 200-, and 300-MMscfd (1.7×10^6 , 3.4×10^6 , 5.7×10^6 , and $8.5 \times 10^6 \text{ m}^3/\text{d}$) gas plants (see "15 Years Strong," August 2018 *Gas Compression Magazine*, p. 26). The ARES AMB turboexpander-compressor features a skid-mounted AMB control system, made possible by a partnership between LAT and Waukesha Magnetic Bearings. According to Danny Mascari, president of LAT, the advantages of this all-in-one turboexpander solution are cost-effectiveness, ease of installation, remote monitoring and tuning, and decreased maintenance. "With the ARES AMB design, the control system is installed directly on the turboexpander skid, eliminating the need, and associated capital expenses, for installation in a control room. Operators also benefit from the ability to perform remote commissioning, monitoring, and tuning of machine performance due to the digital signal processors and control algorithms of the Zephyr 5-axis controller."



The commissioning process for the first ARES Active Magnetic Bearing Turboexpander-Compressor saw cold and wet conditions.

The AMB turboexpander-compressor is designed for operating temperatures from -40 to 110°F (-40 to 43°C). "Cold climates like the one this unit will be operating in can be restrictive for an oil-bearing machine," said Tadeh Avetian, director of engineering at LAT. "If not restrictive, it at least imposes additional costs for auxiliary components, such as heat tracing, of

which we don't have to worry about with AMB equipped machines. Magnetic bearings generally aren't affected by the ambient temperatures in which they operate. Also, we have replaced mechanical components with electrical components. Startup is easier. Shutdown is easier. While this first unit is in a cold operating climate, there is nothing about the ARES de-

sign that can't be applied anywhere in the world."

From initial design to startup, the journey to bring ARES AMB unit number one to life took two years, beginning in Spring 2017 with the announcement of its new product concept. By Fall of 2017, the turboexpander was in production. The first fully operational machine was complete in second quarter 2018 and began a road show in September 2018, performing live demos in Houston, USA, and Tulsa, Oklahoma, USA. The first customer order arrived shortly after, and in May 2019, LAT delivered the ARES AMB to the end user in North Dakota (see "ARES AMB Goes To Work," June 2019 *Gas Compression Magazine*, p. 34). The official machine startup and gas flow occurred on October 29, 2019.

"This is a milestone moment for L.A. Turbine and for the industry," said Mascari. "In 2016, our founder, John Maskaluk, challenged his engineering team to develop the next generation of turboexpanders using AMB technology. This dream is fulfilled with the commissioning of the first LAT ARES AMB turboexpander in North Dakota." 