



CASE STUDY

NAM GLT, 17 Years and 20 Installations Later... Still Standing Solo

PROJECT OVERVIEW

Groningen, Europe's largest natural gas field, was discovered in 1959. Located in The Netherlands, production began in 1963 and depleted nearly 50% of its reserves by the end of the decade.

NAM (Nederlandse Aardolie Maatschappij), a joint venture between Royal Dutch Shell and ExxonMobil, originated in the mid-1990s. Its goal was to find the most cost-effective way to extract the gas and extend the life of its reserves, ensuring the gas field could continue to supply the region.

The challenging parameters of the project were to provide availability of at least 87% and produce a low total cost of ownership. By following these parameters and upgrading the equipment, including the motors and compressors, the gas field could supply gas to all of The Netherlands, Germany and Belgium for an additional 40 years.

SOLVING THE CHALLENGE

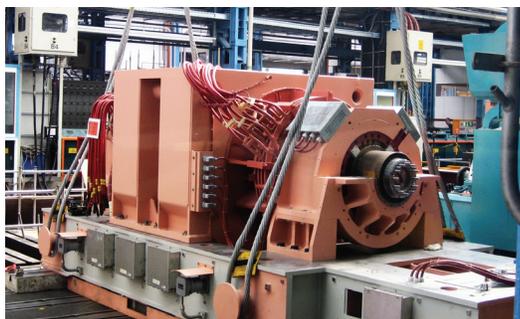
User requirements were for high reliability, high energy efficiency, low maintenance and low investment cost across a wide compressor speed range with minimal vibration and noise.

Waukesha Magnetic Bearings® partnered with Siemens to initially install three radial active magnetic bearings for the motor, two radial magnetic bearings and an active magnetic thrust bearing on the compressor, and a digital controller with analog amplifiers.

There have been a total of 20 installations since the initial installation. Waukesha Magnetic Bearings has produced the bearings for every installation even though the machines have varied significantly in terms of number of stages, hence the dynamics of the rotor. Waukesha Magnetic Bearings was able to adjust for these differences through software in the controllers.

"In the end it is the performance that counts and when I look at the performance, it is amazing."

– Wim de Groot, Retired Rotating Equipment Engineer, NAM GLT



AT A GLANCE

Application:

- Natural gas compression, extracting gas from underground wells utilizing 23 megawatts of electric power

Product Solutions:

- 3 radial active magnetic bearings for the motors
- 2 radial magnetic bearings and 1 thrust magnetic bearing on the compressor
- 1 digital controller with analog amplifiers

Benefits:

- Proven availability exceeds 99.9% over 20 installations
- Life cycle cost is lower, for initial installation and continuing operating costs
- Minimal maintenance costs
- Complete versatility to operate throughout the speed range from very low speed to high speed with good vibration control
- Environmentally friendly – cleaner, more efficient design



PERFORMANCE IS WHAT COUNTS

When Waukesha Magnetic Bearings joined the project, it utilized its latest technology expertise to solve a problem that other industry leaders deemed impossible because of the wide speed range involving several rotor critical speeds. In fact, NAM was told “It can’t be done” by the other manufacturers it approached.

NAM’s original goal was to provide 87% availability with the lowest cost of ownership. Analyzing the results after 17 years confirms that Waukesha Magnetic Bearings has been able to exceed expectations, with over 99.9% availability and an investment cost savings of 35%, all while saving on energy costs. “In the end it is the performance that counts and when I look at the performance, it is amazing,” said Wim de Groot, retired rotating equipment engineer, NAM GLT.

There were many additional benefits to the system as well. Waukesha Magnetic Bearing’s system allows for remote monitoring, diagnostics and frequent fully automated remote startups. It also provides superior investment protection through the use of bushing style auxiliary bearings that have never failed to protect the machine investment and retain the advantage of remote condition observability. Furthermore, by not using traditional fluid film bearings, additional building construction for a separate lubrication oil system for the bearings was not needed. This reduced costs and lessened the environmental footprint by providing a simpler, cleaner, more efficient design.

VERSATILITY WITH MAGNETIC BEARINGS

Magnetic bearing systems are able to accommodate a wide variety of rotating equipment, so a large natural gas field is not needed to reap the benefits of magnetic bearings. Other possible applications for magnetic bearings include steam turbines, turboexpanders and pumps.

