

Full-Load, Full-Pressure Hydrocarbon Test Completed On Gas Compression Package For The Dolphin Gas Project

The project matches the Dresser-Rand DATUM centrifugal compressor and the Rolls-Royce industrial TRENT 60 DLE gas turbine — the first application of the TRENT as a mechanical drive unit.

OLEAN, New York (August 12, 2005) - An industry first occurred recently at Dresser-Rand's world-class manufacturing and test facility in Olean, New York, involving both Rolls-Royce and Dresser-Rand. A full-load, full-pressure performance test for the Dolphin Export Pipeline between Qatar and the United Arab Emirates was completed on a Rolls-Royce TRENT 60 DLE gas turbine and a Dresser-Rand DATUM Model D14 centrifugal compressor -- the first time these units have been paired on a compression train.

The ASME PTC10 Type I performance test is the culmination of efforts by Dresser-Rand and Rolls-Royce to design and produce equipment for six export gas compressor trains as part of Dolphin Energy's Dolphin Gas Project in the Middle East. Six mechanical drive Rolls-Royce industrial TRENT 60 Dry Low Emissions (DLE) gas turbines will be used to drive six Dresser-Rand DATUM centrifugal compressors. The project represents the first application of the aero-derivative industrial TRENT 60 engine as a compressor driver.

The test was conducted in May, and included full-pressure testing at over 140 Bar (2000 psi) and 40,000 KW (53,600 hp) to simulate site conditions.

The Dolphin Gas Project is one of the largest energy-related projects ever undertaken in the Middle East. In addition to the development of upstream facilities to extract wet gas from Qatar's North Gas Field, twin sea lines are being constructed to transport the gas to Ras Laffan, an onshore site also in the northern part of the state. Once there, NGL products and condensate will be stripped and the remaining dry gas will be compressed and transported along over 370 kms of sub-sea pipeline to the United Arab Emirates.

Upon completion in late 2006, the Dolphin Gas Project will deliver two billion cubic feet of natural gas a day to the UAE, and is anticipated to supply natural gas to the region for at least 25 years. Three shareholders jointly own Dolphin Energy Limited: Mubadala Development Company, wholly owned by the Government of Abu Dhabi (51 percent), the French company Total (24.5 percent), and Occidental Petroleum of the US (24.5 percent).

In January 2004, Dolphin Energy Limited contracted with the energy business of Rolls-Royce to provide the TRENT 60 gas turbines for the project. Dresser-Rand was selected to provide the high-efficiency DATUM compressors. The TRENT gas turbines were manufactured in Montreal and packaged at the Rolls-Royce facility in Mount Vernon, Ohio. A completed TRENT turbine package was then shipped to Olean to be matched with the DATUM compressor for testing.

Dresser-Rand's test facility is one of the largest, most advanced facilities in the world. At more than 58,000 square feet, the facility was specifically designed for conducting large string full-load, full-pressure Type I tests exceeding 85 MW (115,000 hp) with hydrocarbon gas.

Many Dresser-Rand compressors are driven by Rolls-Royce turbines, but the Dolphin Energy Limited project is the first application of the DATUM compressor to be driven by the TRENT gas turbine.

Following the completion of the string test, the client approved the equipment for release. The first two complete equipment

trains were shipped from Philadelphia to Ras Laffan, Qatar, in mid-June.

The Aero-Derivative Power Leader

The Rolls-Royce industrial TRENТ 60 gas turbine is the most powerful and efficient aero-derivative available today, with up to 58MW of electric power in simple cycle service, at 42 per cent efficiency. The TRENТ 60 has established a new benchmark for fuel economy and cost savings, and offers operators a newly-designed package concept that delivers cost savings for both installation and maintenance.

The TRENТ 60 is available for both 50 and 60 Hz power generation service, without a gear, and is offered in both Dry Low Emissions (DLE) and Wet Low Emissions (WLE) models. The TRENТ's high cyclic life is a great match for the daily peaking power market. And, the design flexibility of the industrial TRENТ allows the same engine that serves the power generation market to meet the needs of mechanical drive service, with no design changes. Due to its three independent shaft design, the TRENТ 60 is capable of meeting driven equipment power demand at reduced speeds with minimal drop-off in efficiency.

All industrial TRENТ gas turbines are backed by the world class Rolls-Royce customer service business, providing aftermarket support ranging from spare parts and technical support, to long term service agreements.

A Decade of Proven Success

The Dolphin Energy Limited project represents the union of two machines with proven performance advantages - the Rolls-Royce TRENТ gas turbine, and the Dresser-Rand DATUM centrifugal compressor. Coincidentally, both machines were introduced exactly 10 years ago.

The DATUM introduced to the compressor industry a unique modular design concept with significant advancements in efficiency and ease of maintenance while reducing life cycle costs. As the single most extensive product introduction in the company's history, DATUM enabled D-R to dramatically reduce manufacturing and delivery cycle times.

To date, nearly 500 DATUM units have been sold worldwide with inlet flow rates up to 100,000 ACFM and case pressures rated up to 10,500 PSI. Each DATUM unit for the Dolphin Project is designed to compress 420 mmscfd of gas from an inlet pressure of 460 psia to a discharge pressure of 2055 psia while requiring only 43,000 bhp on a hot ambient day.

In just 10 years of commercial service, the Rolls-Royce TRENТ family of aero engines has become one of the most successful of all time, with orders surpassing the US\$25 billion mark. The TRENТ engine has enjoyed success on the Airbus A330, Boeing 777, and Airbus A340-500 and -600 aircraft. TRENТ for these aircraft have secured a 50 per cent share of all the firm and option engine orders for modern wide-body aircraft since the start of the program. Today, the expansion of the TRENТ family continues, with the new TRENТ 900 selected as launch engine on the world's largest commercial aircraft, the Airbus A380, and the TRENТ 1000 as launch engine for the Boeing 787 Dreamliner.

This enormous experience is today paying dividends for operators of the industrial version of the TRENТ, the TRENТ 60.