



Valve efficiency upgrades at SSE Great Island CCGT Power Station

SSE plc's Great Island Power Station in County Wexford is a 464 MW combined cycle gas turbine (CCGT) plant which was first commissioned in 2014. Acknowledged as one of Ireland's cleanest and most efficient natural gas power stations on the country's national grid, the plant generates enough energy to power the equivalent of half-a-million homes.

In 2016 the operators identified improvements that could be made in the heat recovery steam generator (HRSG) plant to improve efficiency and long-term asset management. The improvements involved the introduction of Master/Martyr valve sets on the high, intermediate and low pressure turbine drain valves.

By Ian Elliott, Rotork Site Services Sales Manager for the UK and Ireland

What are Master/Martyr valves?

Master/Martyr valves are two valves installed in series on the same pipeline. The Master valve sits upstream of the Martyr valve and is only operated when the Martyr valve is shut. This ensures that the Master valve never has to cope with any differential pressure when operating, giving it a greatly extended lifespan. The Martyr valve always opens and closes under pressure and will therefore require maintenance at some point. When this

happens, the closed Master valve enables maintenance to be performed easily and with minimum interruption to routine operations. The actuators controlling these valves are equipped with interlocks to ensure that the valves only operate in the correct sequence.

Turnkey project

The upgrade, involving the replacement of existing valves, installation of new valves, installation and commissioning of a

total of 30 new actuators and integration with the existing control system, was programmed to take place during a three-week outage period. Rotork Site Services was awarded a turnkey contract to carry out all the work within this challenging timescale. Rotork Site Services responsibilities encompassed:

- System design, product selection and procurement.
- Design of control system and integration with existing Mitsubishi programmable logic controller (PLC).



Blowdown valve installations at SSE Great Island prior to the upgrade.



Rotork's trained and qualified engineers ensure that the equipment is correctly set up and operating within specified parameters.

- Installation of power, control and instrumentation cabling and cable containment.
- Commissioning and site training.
- Project management.

Plant upgrades were performed in 30 areas comprising six continuous blowdown valves, six intermediate blowdown valves and 18 turbine drain valves. Valve adaption was designed and fabricated for the installation of 30 Rotork IQ non-intrusive intelligent electric valve actuators. These were specified with local plug-and-socket assemblies to facilitate removal and replacement if overhauls are required in future outages.

Why Rotork Site Services?

Padraig Dunleavy, Great Island CCGT Station Manager, explained: "We have worked closely with Rotork UK and Rotork Site Services for many years, utilising them at many of our plants in the UK including Fiddlers Ferry, Ferrybridge and Keadby. We are fully aware of their capabilities for meeting strict deadlines on major plant upgrades such as the one proposed for Great Island.

"Rotork were very professional and gave us full confidence for the timely outcome of the project, from the initial site survey through project management, installation and system integration. This confidence is reinforced by the long history of reliability demonstrated by the Rotork actuators installed on SSE sites."

Rotork double-sealed and non-intrusive actuators are designed to withstand hazardous and environmentally challenging operating conditions often encountered in the power generation industry. Secure, non-intrusive set-up and data transfer eliminates the need to remove electrical

covers for commissioning once the actuator is site wired. This feature permanently protects internal components from the time the new actuator leaves the factory, enhancing the long term reliability of the robust double-sealed enclosure design. In addition, IQ intelligent actuation technology incorporates powerful datalogging abilities, enabling operating data to be downloaded and diagnosed for the optimisation of plant performance, preventative maintenance and asset management.

Successful completion

The project was successfully completed on time and to the satisfaction of the SSE engineers.

The final word from Ian Elliott, Rotork UK Site Services Sales Manager: "We always knew that this would be a tight programme, but we submitted our full technical proposal within a few days of our initial site survey, which gave SSE the confidence to award the contract as a full turnkey project.

"Our project and engineering teams worked to exacting timescales and liaised seamlessly with site engineers, suppliers and Rotork production departments to ensure that completion within the timescale was achieved. A very pleasing outcome for all parties."

The Rotork Client Support Programme

Rotork is also offering a comprehensive Client Support Programme to support over 100 Rotork products on the site and further enhance the reliability and availability of the actuation assets. Following the recently introduced ISO 55000:2014 guidelines, the Rotork

Client Support Programme builds on Site Services' experience to deliver an enhanced, fully focussed and even more comprehensive offering, incorporating an asset management service. The programme makes it easier and more convenient for operators to identify and access the specific services that they need to improve the reliability, availability and performance of their plant assets. The service enables clients to minimise the risks of maintenance, repair and obsolescence by offsetting them against a fixed price investment that is tailored to specific requirements.

Working in partnership with the end-user to provide a full understanding of their process enables the best solutions to be achieved in terms of product suitability, accurate sizing and automation options. Using Rotork's trained and qualified engineers for installation and commissioning ensures that the equipment is correctly set up and operating within specified parameters. Following on from commissioning, a continuing partnership with the end-user facilitates efficient maintenance and long term support for the installed assets. In recent years the development of intelligent actuators with diagnostic capabilities has greatly increased the ability to seamlessly include actuators in the asset management plan and plant operations. Rotork has pioneered the development of intelligent, non-intrusive IQ actuators with integral data-loggers and diagnostic software programmes, all of which contribute to improved asset management by enabling plants to run with more efficiency, more reliability, less maintenance and less downtime. For example, the latest generation IQ3 now installed at Great Island is the only actuator to provide a window into the process at the valve, showing valve torque,

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usage profiles and service logs to enable real-time asset management at the actuator indication window. Today, the predictive maintenance facilitated by these technologies plays a crucial role in prioritising service requirements, optimising plant performance and pre-empting breakdowns. With the Rotork Client Support Programme, instead of paying for maintenance per se, the clients see their investment delivering improved performance, adding value to their operations and contributing to increased prosperity. Designed for plants of all sizes, it is not confined to valve actuators but can encompass the care of the complete actuated valve and control package. The programme is built on a range of flexible options, with strategically located support centres at the hub of the organisation. These centres provide a priority response to technical support enquiries, give access to all aspects of the service and co-ordinate all subsequent activities. Technical support is also available on-site, with Rotork certified engineers available on a range of 24 hour, 7 day week call-out options, or resident on-site. All options are designed to release the operators' own personnel from the time consuming distraction of maintenance and asset management activities. Continuing the range of services, hardware and software maintenance with lifecycle management – either on demand, planned or preventative – can contribute to reduce maintenance costs, improved operational performance and reduced year on year



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ownership costs. Centralised spares holdings with guaranteed response times can be implemented on behalf of clients, so that they pay for the availability and only the parts that they actually use, rather than the capital expenditure, inventory cost and management of spare parts on site. Reduced maintenance costs are enhanced through Rotork's on-going investment in technologies for remote connectivity and diagnostic analysis of equipment in the field. Co-ordinated through the support centres this can trigger notification of drift from set operational parameters or advanced notification of equipment deterioration.

The Rotork Client Support Programme is available in a range of levels that are structured for flexibility and individual customer requirements. Three progressive levels of cover meet differing demands and are designed to seamlessly integrate with existing maintenance procedures and strategies. Different levels of cover can be selected for equipment on the same plant, depending on its criticality to the running of the process. Customers only pay for what they need and a flexible range of payment options are available to complement financial budgets. The real value of the service for the customer is increased plant reliability, increased plant availability, reduced losses due to equipment malfunction and improved overall operational performance, all provided with predictable costs for each year.



The development of intelligent actuators with diagnostic capabilities has greatly increased the ability to seamlessly include actuators in asset management plans.

About the author



Ian Elliott is Rotork Site Services Sales Manager for the UK and Ireland. A long-term Rotork employee, with 39 years' continuous

employment, Ian has extensive global experience in aftermarket support services, plant upgrades, plant optimisation, valve automation and control and Rotork integration projects. ian.elliott@rotork.com