

New Port Ham interconnector substation



The Port Ham substation blends in with the environment on the banks of the River Severn

On the banks of the River Severn at Port Ham, Gloucester, a £12 million substation replacement project was constructed by an ABB and Balfour Beatty consortium on behalf of what is now Western Power Distribution.

The need

The Port Ham interconnector switching station is a grid supply point, feeding electricity from the National Grid substation at Walham into Western Power Distribution's (WPD) network, which supplies most of Gloucestershire and Herefordshire and parts of south and east Worcestershire – the equivalent of more than one million homes.

The old switching station dated from the early 1950s and had reached the end of its useful life. The traditional approach would have been to construct a new air insulated switchgear (AIS) substation alongside the existing one but this would have meant buying extra land.

Instead, WPD decided on an alternative approach based on ABB's ELK-04 GIS (gas insulated switchgear), the compact design of which meant that the replacement switching station could be housed indoors in a new purpose-built building that occupies less than one fifth of the space used by the previous AIS switching station.



01 Port Ham's old AIS in the foreground and new indoor GIS indoor substation | 02 Twenty bays of switchgear are housed indoors

Project details

An ABB and Balfour Beatty consortium undertook complete design, construction and installation work on the new switching station.

- The new switching station features 20 bays of switchgear and provides a 132 kV interconnection for four incoming and 12 outgoing circuits
- The smaller size of the switchgear has enabled WPD's substation to be built in a low-profile building designed to blend in with the local environment
- Switchgear was installed on the first floor of the building, 600 mm above the level of a 'once in 100 years' flood plain level
- Because the new indoor substation building is in the river flood plain, significant foundation works were required. In total, 120 concrete piles were driven 15 metres to the bedrock in just over 10 days

Limiting downtime

In addition to saving space, GIS also offered two further advantages. First, the project was able to reduce circuit downtime, as the new GIS circuits could be constructed with the existing units still in service. Downtime was limited to the rerouting of the network connections. This was a crucial factor, because of the critical position of Port Ham in the supply network.

Second, the GIS was constructed outside the existing live compound, considerably reducing health and safety risks to personnel working on site.

Completed on schedule at the end of 2006, Port Ham was a flagship project for WPD because of the size of the investment and the strategic importance of the substation.

Geraint Hancock, contract delivery manager for WPD said: "We used the project both to gain experience of applying GIS technology in challenging applications, and to develop a model approach to the delivery of large capital projects."

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