WARDPOWER

Case Study:
National Grid Canterbury 400kV Substation

Carried out 2006/07, the LVAC works at National Grid (NG) Canterbury North Sub station provided WARDPOWER with an opportunity to demonstrate first class Project Management and Scheme Design Skills as well as the supremely high engineering that National Grid were already used to…

The original generating sets at NG Canterbury were some 40 years old, as was the LVAC board. As part of an improvement programme it was proposed that these be replaced with a single 377kVA diesel generating set and a new LVAC switchboard with a fully automated transfer scheme between the EDF Mains supply, the Generating Set and a new Temporary Generating Set facility.

The works were to be performed under Construction (Design & Management) Regulations 1994 with WARDPOWER undertaking the roles of Designer and Principal Contractor.

The design process consisted of site visits, investigating drawings and performance of a sizing study to ensure that the new Generating Set was correctly sized in accordance with the site starting and running loads. The design also had to meet a detailed technical specification and set of project and test standards as required by the Client. The LVAC board was designed following a site protection study to directly replace the original board utilising modern technology to facilitate pre-determined protection settings and offer spare capacity to allow future expansion.

All the design details & philosophies, risk assessments and environmental impact studies were submitted within a comprehensive Design Intent Document and subjected to a rigorous approval process.

It Owes Nobody Anything.
One of the Original Generating Sets that had been in service at the substation since the substation was built in the 1960's.

The initial site works comprised the removal of one of the original generating sets, including disposal of waste products such as asbestos, diesel and NiCAD Cells.

And for the Next 40 Years…
The new WARDPOWER WP-V377PXD Diesel Generating Set designed with a 40 year asset life.

The installation program started to roll and the plant room was transformed into a 1 hour fire rated acoustically treated room to 85dB(A) @1m and fitted with a WARDPOWER WP-V377PXD diesel generating set, control panel suite and a temporary generating set connection point located on the outside wall. Part of the works also included the adaptation of the existing bulk fuel tank to install a fuel transfer system.

The LVAC board had an added challenge to overcome as the LVAC room's false floor was not adequate to take the weight of the new board. Not to be beaten, a prefabricated purpose built switchboard stand was designed and delivered to site in time for the delivery of the LVAC board.

The generating set commissioning phase ensured the set was fully tested in line with our own and National Grid's onerous testing procedures and witnessed on site by the Client. In addition to the comprehensive functional and load tests performed, all protection devices were subject to primary injection tests as up to 2,000A was passed through each of the devices to test and ensure correct operation. All substation alarm signals were integrated into the site Substation Control System and proven.

The New LVAC Board
All Circuits were migrated to this board without ever requiring the sub-station to leave service.

The LVAC board commissioning phase entailed a line by line project specific testing procedure generated by the WARDPOWER Commissioning Engineers and performed using our own 3 phase simulator. Derived from the panel drawings, this proved the functionality of each individual circuit, the automatic transfer scheme and the interfacing and interlocking systems both within the board and with the existing site equipment.

Once proven during the commissioning phase, noting that throughout all the works so far the site had been fully operational with mains supplies and the remaining old generating set as backup, it was time to migrate the supplies along with all the existing circuits from the old LVAC board onto the new one. This was performed by our team of electrical installation engineers working closely with the site engineers to keep the outages of each of the circuits to an absolute minimum – in some instances as short as 15 minutes!

The final stage was to remove the second original generating set and the old LVAC board and leave the plant room free of all hazardous materials, safe and secure ready for whatever it is deemed to be used for in the future. Operation & Maintenance manuals, As-Built drawings, updated Client site drawings and full commissioning records were left on site with a team of suitably satisfied Client Engineers.

Project in Brief:

- Principal Contractor and Designer under the CDM Regulations
- Full scheme sizing and protection studies.
- 377KVA Prime Rated Generating Set in 1hr Fire Rated Room
- 32 Bay 1,250A Main Switchboard
- Removal of existing equipment including disposal of hazardous waste
- Installation works including adaptation of existing fuel systems and small builders works
- Commissioning including primary injections, 3 phase simulation tests, load tests and transient tests.

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