



Since 1980, **Zeefax** has built an enviable reputation on its ability to provide excellent and reliable electro-mechanical services and solutions to the Petrochemical, Process and Power sectors in many countries around the world. This reputation is founded on our well-trained, highly skilled and well motivated workforce based at our own fully equipped manufacturing facility in the South of England. This powerful combination means that we are your single UK-based source for a wide range of SCR Drive and Power systems and solutions, targeted mainly at the Drilling and associated energy sectors.

Background to the project

Zeefax can conduct detailed Power System Studies on new and existing equipment to verify the fault rating of busbars and bracing, and ensure the suitability and co-ordination of protective devices.

ENSCO 71 is a Jack-Up drilling rig which was originally constructed at the Hitachi Zosen shipyard in 1982. The original GE motor controls comprised five 1163KVA generators and four 1800ADC SCR units with associated auxiliary transformer feeders and jacking units. The SCRs were assignable to two 1600HP twin-motor Mud Pumps, a twin motor 2000HP Drawworks and a 1000HP Rotary Table. A separate feeder drives a 1110HP Top Drive. A fifth SCR was added by Hill Graham Controls in 1985 to power a third 1600HP Mud Pump, which was cabled to the main busbars.

In early 2012, a decision was made to add a fifth 2500KVA generator and an additional auxiliary transformer, to close-couple these to the main switchboard via a bus tie circuit breaker, and to include a dedicated feeder for the fifth SCR. A sixth SCR was also included in the switchboard extension to provide an alternative drive source for the third Mud Pump, effectively removing this load from the main switchboard. The switchboard extension, including full integration with the existing GE and Hill Graham equipment, was engineered and built by Zeefax.

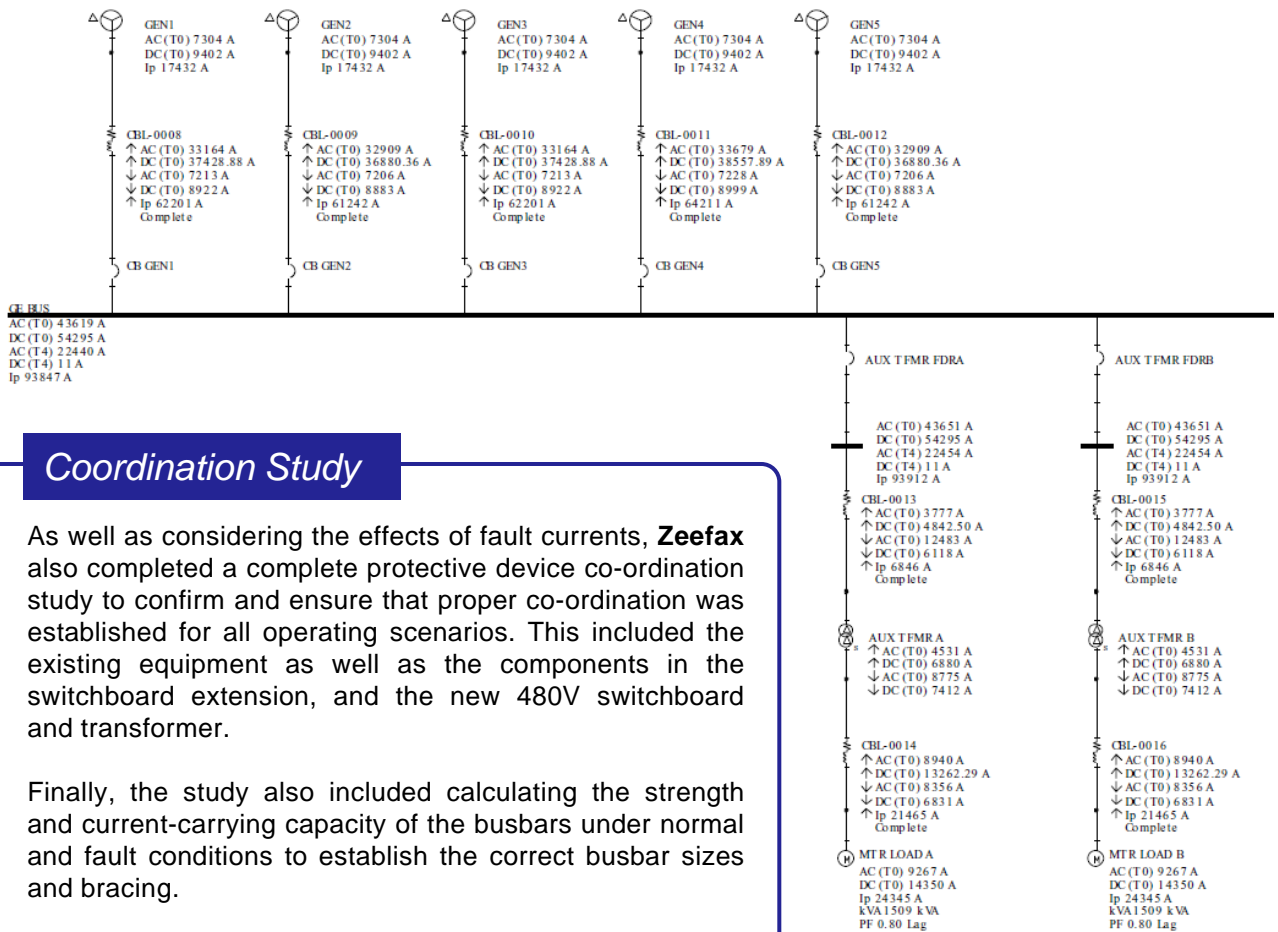
Proving the Original System

As well as providing an extension to the main 600V switchboard, Zeefax also designed, built and commissioned an accompanying 480V switchboard which comprised an incoming circuit breaker and a number of small moulded case distribution circuit breakers.

The design and engineering process included completing a detailed **Power Study** to examine the consequences, in terms of fault rating, of adding the new equipment. Various scenarios were considered, and the financial impact was assessed to determine the most cost effective interconnection configuration. As a result of the study the amount of upgrade work required on the existing equipment was minimised.

The Power Study was completed by gathering data about the existing switchboard arrangement and comparing this to the original, hand written, fault level calculations. The new calculations were performed using software modelling and verified to IEC 61363. The IEC 61363 Short Circuit study represents conditions that may affect typical marine or offshore installations more significantly than land-based systems, including more emphasis on generator and motor decay. This confirmed the original calculations were accurate.

The consequences of adding the new equipment were then considered and the appropriate decisions made and incorporated into the design.



Coordination Study

As well as considering the effects of fault currents, **Zefax** also completed a complete protective device co-ordination study to confirm and ensure that proper co-ordination was established for all operating scenarios. This included the existing equipment as well as the components in the switchboard extension, and the new 480V switchboard and transformer.

Finally, the study also included calculating the strength and current-carrying capacity of the busbars under normal and fault conditions to establish the correct busbar sizes and bracing.

The completed Power Study package was submitted to, and approved by ABS (American Bureau of Shipping).

Typical power study results

Contact us

For all Hill Graham services and manufactured parts, **Zefax** is now the preferred supplier worldwide, as well as providing a host of other related Drilling services including...

- ◆ Site Surveys and Field Service Support
- ◆ Coordination Studies
- ◆ GE752 Drive Motor Refurbishments
- ◆ SCR Refurbishments and Enhancements
- ◆ New design and build SCR systems – VFD and DC Systems
- ◆ SCR and PLC Training Courses
- ◆ Spares and Service for Ross Hill SCR Systems and Modules

Please call us to find out more about how we can help to preserve your capital investment, through a program of works, carefully designed to optimise the utility and the performance of your Power System, whilst ensuring that it provides reliable and dependable operation for all your drilling applications.

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