

## TURN KEY PROJECT

### UPGRADE OF: GENERATOR CONTROL SYSTEM

### POWER LIMITATION MODULE TO THE SCR

### SPEED CONTROL

- Isochronous load sharing
- Droop mode
- Bumpless switch over droop/isochronous mode

### SYNCHRONISATION

- Auto/manual
- +/- 3Vdc voltage interface
- Raise/lower speed

### REDUNDANT LOAD SHARING SYSTEM

- LON load sharing lines
- kW load sharing
- kVar load sharing
- kW load error check

### DIESEL PROTECTION & SEQUENCING

- Soft loading/unloading
- Start/stop sequence
- Alarm/shutdown handling



### UPGRADE OF SPEED CONTROLS, SYNCHRONISATION, LOAD SHARING MODULES,

#### Introduction

The Scarabeo platform is a semi-submersible drilling rig, held in position by anchors. The platform “stands” on six legs connected by two pontoon feet. The platform is used for oil drilling in the Mediterranean Sea offshore Alexandria, Egypt.

The power plant consists of four EMD engines, two 16 cylinder- and two 12 cylinder engines. The four engines distribute their power through four generator circuit breakers onto the bus. No split options in place. From the main bus the power is transformed for its user-groups and also converter via for main power equipment.



Parts obsolescence, engine instabilities were the reason why Turner Engine Control Solutions received in 2012 the turn-key order to replace for each engine the existing generator control system at Scarabeo 6. The generator control system consists of a Hill Graham AC40 master/slave module, automatic voltage regulator.

The spinning reserve power was calculated by an obsolete power limit module which had an interface signal through the SCR's to reduce power. The functionality provided by the module has been replaced as well.

## DRILLING RIG CONTROL UPGRADE – DIESEL ELECTRIC PROPULSION

### HARDWARE SUPPLIED

#### WOODWARD ATLAS II

- Smart core board
- Power sense board
- Power supply board

#### Human Machine Interface

- Touch panel
- Citect software

#### Voltage regulator

- Basler Decs 200

#### Prefabricated:

- Mounting plates
- Doors



### System description

The below figure provides a simplified overview of the new situation.

The Woodward Atlas II controls are used to replace the old control generator controls, kW module and interfaces with the existing Woodward EGB governor and four new supplied, installed and commissioned automatic voltage regulators.

All Atlas II controls are communicating with each other via a LON network to share real, reactive loads and other information. As a backup in case the LON network fails, there is a redundant Ethernet network which can perform the same tasks as the LON network.

For the newly installed engine an Atlas II will be used for the load share interface to the easYgen control. Furthermore, this control will contain the majority of the kW limit box functionality.

The following functionality is provided by the ATLAS II control:

- Speed control
  - Droop – Isochronous control
  - Back up droop control
- kW and kVar load sharing control
- kW limiter
- Start & maximum fuel limiter
- Synchronisation and dead bus closure
- Soft loading and unloading
- Generator protection
- Alarms & Shutdowns
- Generator winding temperature monitoring
- Parameter interface display

