



A Rockwell Automation Company

Tri Ocean Engineering Ltd. / Lasmo Nova Scotia Ltd. Cohasset/Panuke Offshore Oil Production Project Electrical Distribution System

The Client:

Lasmo Nova Scotia Limited is a wholly owned subsidiary of Lasmo P.L.C., one of the largest independent producers of oil in the world, with major reserves in Indonesia and the North Sec. The Cohasset Field, offshore Nova Scotia, is the first offshore field to be developed in Canada.

Tri-Ocean Engineering is a Calgary based independent engineering company with extensive experience in the design and specification of offshore drilling units, used in the production of oil, offshore.

The Requirement:

Tri-Ocean Engineering, acting on behalf of Lasmo Nova Scotia, contracted Hinz to design the power system for a 60,000 b.p.d. offshore oil production facility to be installed 260 km SouthEast of Halifax, Nova Scotia. The electrical power system was required to supplement the existing power system on the Jack-up Rig RGIII. During the initial years of production from the field, it was anticipated that simultaneous drilling and production would be performed on the RGIII and the existing system did not have the capacity

for both operations.

The combined power system was to be capable of supplying all anticipated demands including; hotel load, production transfer pumps, Panuke platform, drilling (including mud pumps), water treatment and re-injection, and down hole pumps on both Panuke and Cohasset. The anticipated maximum load was approximately 10 MW.

The Design Solution:

The production plan for oil from Panuke indicated that Panuke's four producing wells would require downhole pumps to enhance recovery from year two onwards and these pumps would be approximately 500 HP each. This set the requirements for power fed to Panuke from the RGIII at 2,000 kVA. Medium voltage transmission of 13.8 kV was chosen as the best compromise to allow fairly small transformers at either end and acceptable transmission losses. Detailed voltage drop studies throughout the entire system indicated that full voltage (FVNR) starting of motors would be acceptable, even on Panuke, 10km remote from the power source. The ability to FVNR start all motors offered appreciable cost savings, as there are 15 motors rated 200 HP and larger on the installation.

A by-product of oil production is gas, hence the obvious choice for the new generator drivers was gas turbine. It was decided to install two 4,000 kVA Solar Centaur Turbines with Ideal Generators. Two units provided an element of redundancy and the sizing allowed one unit, running isolated, to power the production equipment leaving the existing rig power available for drilling, etc.

A new switchboard rated 8,000 amp, 600V, was utilized to feed 5-600V/2.7 kV transformers required for submissible pumps on Cohasset, two M.C.C.'s for general production equipment, and a 2,000 amp feed to Panuke. The switchboard is arranged so that Panuke can be fed from either the existing RGIII power system or the new generation

system. This allows maximum operating flexibility while maintaining safety margins.

The transformer that feeds the 13.8 kV transmission line to Panuke is connected DELTA-WYE with the start point of the WYE high resistance grounded. The ground current is monitored and used to trip the main Panuke feed should it exceed specified limits. This is the only intentional ground in the entire system and its purpose is to limit damage to the 10km subsea cable should a fault develop. Offshore installations being steel structures surrounded by salt water give rise to complex grounding paths and large ground currents. Control is therefore achieved by stringent adherence to the code that all power systems are ungrounded and all steel/equipment is bonded to the structure. Ground fault monitoring is employed to advise maintenance personnel of problems as they occur.

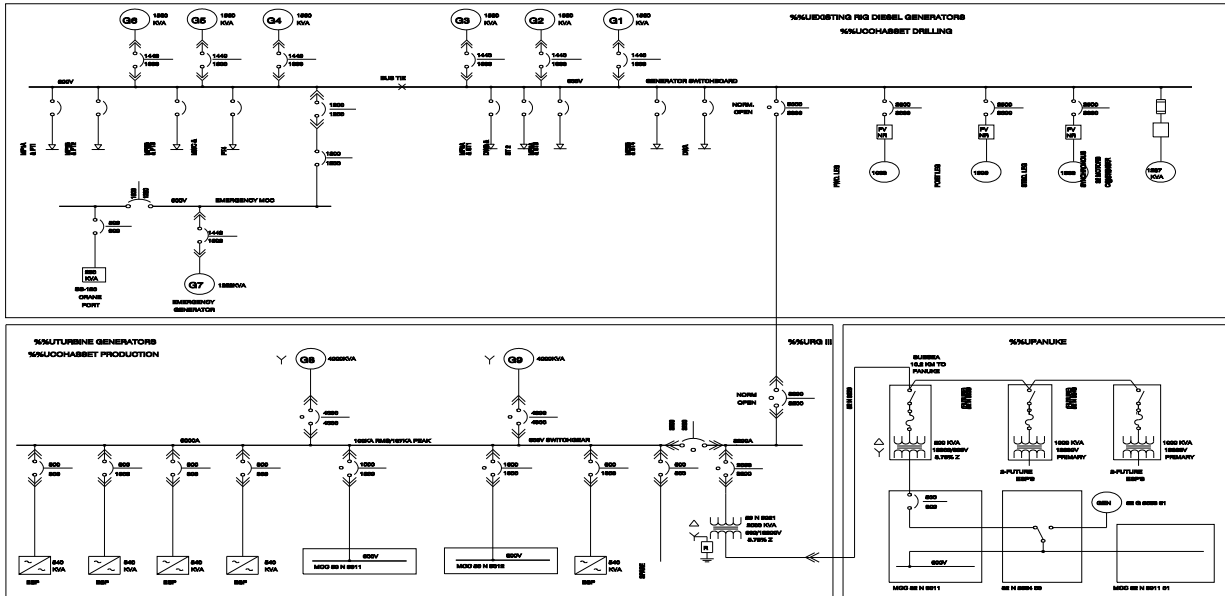
Panuke is fitted with a 350 kVA emergency diesel generator set. This generator is used to provide emergency power upon failure of the main 13.8 kV feed and is fed via an Automatic Transfer Switch (A.T.S.) to the Panuke M.C.C.

Two U.P.S. systems were required, one 15kVA, 120V on the RGIII, and one 7.5kVA, 120V on the Panuke. The RGIII unit has back-up batteries for 1 hour operation at full load, the Panuke unit has batteries to provide 7 days of operation at reduced load.



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System Specifications:

New:

- 2 - IDEAL 4,000 kVA generator with Solar Centaur Turbine drivers
- Main Switchboard - Siemens Marine Unit, 600V, 8,000A
- 4 - MCCs
 - Siemens Type 80 Marine Unit
 - Two Rated 1,600A (RGIII)
 - One Rated 1,000A (RGIII)
 - One Rated 800A (Panuke)
- 1 -350 kVA emergency generator, C.A.T. (Panuke)
- 1 -U.P.S. SAFT NIFE, 15 kVA
- 1 -U.P.S. SAFT NIFE, 7.5 kVA
- 5 -500 HP Variable Speed Drivers and Transformers, A.B.B.

- 1 - Transformer 2,000 kVA, 13.8 kV, Liquid - CARTE
- 1 -Transformer 500 kVA, 13.8 kV, Liquid - CARTE

Existing:

- 6 -GE 1560 kVA generators with CAT D399 drivers
- 1 -KATD 1287 kVA emergency generator with CAT D399 drivers
- Main Switchboard - General Electric, 600V
Emergency Switchboard - General Electric, 600V

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com