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Congo oil and gas industry tunes into efficient frequency conversion

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Because all the world is not at the same frequency, ABB PCS100 SFC technology has been developed to bridge the gap intodays industry environments where equipment has different voltages and frequencies. It provides the economical solution for converting power to and from 60 Hz and 50 Hz frequencies.

Background
Congo Republic is sub-Saharan Africas fifth largest oil producer after Nigeria, Angola, Gabon and Equatorial Guinea. N'Kossa is the biggest oil field in the former French colony. The 78,000m3 N'Kossa II is a fully refrigerated LPG carrier utilised in gas operations on the Elf N'Kossa field, 69 km off the Congolese coast in West Africa. The production rate of contributing fields is approximately 32 thousand barrels per day.

Total E&P Congo, acting as the operator of N'Kossa licences in the Congo, has signed an extension to the lease and operating contract for the LPG FSO N'KOSSA II. The contract extension will be between five and 11 years and will commence when the current lease expires in November 2011.

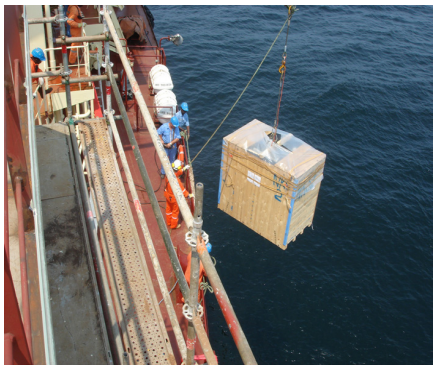
ABB's PCS100 technology has been installed to improve the performance of the remote global offshore oil and gas industry operations based in the Congo.

Solution
Two PCS100 1650 kVA static frequency converter (SFC) units were commissioned to shift power to and from 60 Hz to 50 Hz frequencies, linking LPG floating storage and off-loading vessel N'Kossa II with its connecting production platform. This multibillion dollar gas industry is heavily reliant on main-taining continuous and efficient operations of its drilling equipment, pumping systems, and refrigeration functions at the production site. Equipment must be sufficiently robust to withstand extreme conditions, flexible to support multiple services, and be cost effective to lower capital expenditures and operating costs.

Adopting technology
ABB's power converter product range represents a quantum leap in high power technology, particularly in relation to it's technical performance and economic operation.

The PCS100 SFC is a proven, efficient and effective power system that is specifically designed to interconnect incompatible networks. The PCS100 SFC units installed replaced former technology to give a highly reliable system that is a more flexible, efficient, and cost competitive approach to supplying the frequency and voltage neccessary. This particular application has been designed to supply power from the platform to the vessel, avoiding operation of its onboard diesel generators.

Key features and flexibility
Ability to parallel with multiple generators
High system availability through advanced power module redundancy
Capacity to provide output immunity to input disturbances (for voltage sags and frequency shifts)
The unity power factor rectifier with a THDi of<3% provides lower harmonics
Aligned to inflexible space constraints
Minimal operating and maintenance costs
Protects sensitive and expensive loads
Clean sinewave output voltage



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01 N'Kossa II is a, LPG Floating Storage and Offloading vessel
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02 Installing and commissioning the PCS100 SFC system on the N'Kossa II offloading vessel

Result
The SFC is successfully in operation and is operating accordingly to the expectations and technical specifications of the customers requirements. ABB's SFC is fully reliant to convert power between different frequencies so grid interconnection is achieved. "I am glad to inform you that the project on board Nkossa II has now been in operation since 6 month, and the Static Frequency Converter system - rated 3 MW - is operating fully according to the expectations and technical specifications. It has been a pleasure to work with ABB, and A.P. Moeller Maersk will in general recommend using the ABB PCS100 SFC-Static Frequency Converter Systems for future projects." (Andrea Cardellino - A.P. Moeller Maersk)

PCS100 SFC specifications
- BV by inspection
- 45 degrees celsius ambient
- IP23
- 3.3 kV 50 Hz
- 440 V 60 Hz out
- Output current 2160 amps each
- Output current total 4320 amps
- 1650 kVA
- Total 3300 kVA
- 1512 kW each
- 3024 kW total
- PF 0.92

Typical applications
- 50 to 60 Hz or 60 to 50 Hz industrial applications
- Dockside converter – allows generators to be turned off while at port to save fuel and eliminate pollution
- Replacement of motor generator sets
- As a clean power supply to isolate an unstable grid from a critical load

Static Frequency Converter Load Details	
Characteristics of gas plant	
Number of cargo tanks	4
Material	Low temp, carbon-manganese steel
Cargos	LPG
Design temp/pressure	-46°C / 0.28 bar g acc. to IMO
Max cargo density	610kg / m3
No. of segregations	2
Cargo manifolds	- 2 liquid lines, 2x12", ANSI 150lbs flanges - 2 vapour lines, 2x10" ANSI 150lbs flanges
Loading rate	800mt / day propane + 500mt / day butane
Deepwell pumps	8x500m3 / h at 100m LC
Booster pumps	1x250m3 / h at 120m LC
No of cargo heater	1
Type	Direct sea water heated
Capacity	145 t/h propane from -42°C to 0°C at 15°C sea water temp
Re-liquefaction system	Direct cycle 5x oil free cargo compressor
Refrigeration system	3 chilling units, refrigerant propane
Cargo piping system	LTCS / stainless steel AISI 316
Inert gas plant	Combustion generator
Capacity	3.000 Nm3/h at 85V % purity

To find out more about ABB's power protection solutions:
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