

A 48 MW thermo oil plant for the oil production in China (CNOOC)

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In the course of the continuously quick growth of the Chinese economy, the opening up of new energy deposits is of outstanding importance. So also in the People's Republic of China, the change from the classic primary energy sources hard and brown coal to oil and gas is of importance for the government energy strategists in Beijing. Currently new oil fields are developed with strenuous effort and in a breath-taking time offshore South China and in the Bohai bay about 200 km east of Beijing.

The "Chinese National Offshore Oil Corporation" (CNOOC) is a state owned, market quoted company incorporated in 1982. In cooperation with foreign partners, CNOOC assumes exclusively the exploitation of oil and natural gases offshore China.

The individual oil fields are developed by several oil rigs that bring the oil to a central platform first where it is processed and prepared to be suitable for the forwarding. Such a „platform“ looks first of all similar to a big oil tanker of about 300 to 500 thousand gross register tons, so it is not a real „platform“ but an interim storage floating between the individual oil production platforms (FPSO: Floating Production and Storage Offloading). Here the gas is removed from the directly brought crude oil, water elements are extracted and the oil tanks are hold at a temperature level between 60 and 80 °C to secure an economic pumpability.

The thermic energy demand of such a FPSO is quite high; it is between 30 and 50 MW depending on the construction size. Add to this there is a demand for electrical capacity in similar scale. If the new developed oil field disposes also about gas deposits worth mentioning, the concept of a power/ heat coupling (co-generation) could be taken for the total power supply of a FPSO such as it is currently realized by HTT energy systems for the Bohai BZ 25-1 project.

The electrical supply of four gas turbines has a capacity of 13 MW each. Out of the approx. 500°C hot waste gas flow of the turbines, a thermic capacity of 4 x 12 MW is then branched off in a thermo oil circuit to provide process heat. Main item of such a plant is the thermo oil heat recovery unit (Waste Heat Recovery Unit = WHRU) with 4 subsequently added thermo oil boilers with a capacity of 4,5 MW each that work at part load operation of the gas turbines as a backup system.

Each of these boilers can be operated in gas or diesel fuel mode. The complete unit will be located in open area on deck which requires special demands to construction details as well as corrosion protection.

The safety design of the HTT thermo oil system meets the large-scaled requirements and has the approval by the classification company DNV (Det Norske Veritas).

The main components of the plant dispose of quite impressive data. So e.g. the main dimensions are each 13 x 4,5 x 10 m of each WHRU at a weight of about 60 to/piece.

The fivefold pump group (V= 390 m³/h, H = 110 m l.c.) is a made-to-measure special construction with a weight of 20 to.

The total heat transfer volume of the heating unit is approx. 180 m³.

Noteworthy is also the extreme barely period for realization: Between the start of engineering of the plant and the shipment to China there are only six months.

The HTT components were shipped to China at the beginning of December, the platform left the dry dock of Shanghai shipyard at the end of January. □