

2 x 21 MW

GASTURBINE POWER STATION

KHARTOUM NORTH POWER STATION
National Electricity Corporation
The Republic of Sudan





▲ Modification of the turbine stator during pre-test of the power plant.

Installation and alignment of gasturbine (90 t per unit) and generator ► (103 t per unit).



▲ Preparation of foundation before installation ► of gas turbines and generators



THE PROJECT

In 1984/85 the National Electricity Corporation (N.E.C.) was granted a gasturbine plant for an extension of Khartoum North Power Station as a gift from the Italian government. The gift consisted of two production units each with a gasturbine connected to a generator through a reduction gear and related auxiliaries, such as coolers, filters, transformers etc.

In 1986 when the equipment arrived, it could not be installed but with a rapidly increasing need for power in Khartoum the two gasturbines, each of 21 MW, soon became indispensable. In June 1991 N.E.C. decided to complete the installation and a contract was signed with Burmeister and Wain Scandinavian Contractor A/S (BWSC), the Danish contractor that from 1981 till 1991 has constructed 10 diesel power plants in The Sudan. BWSC was

assigned to perform the supervision of the installation and commissioning of the gasturbine power station. The immediate need for power called for an early start, and BWSC succeeded in implementing the project in approximately nine months. In the summer of 1992 the two new gasturbines were connected to the grid in the capital of The Sudan.

Though the time allotted to the implementation was limited, BWSC organized the job so that the work could be performed by N.E.C.'s personnel. The first task to be performed by BWSC's mechanical supervisor consisted in supervising the transport of the gasturbines (each of 90 tons) and the generators (each of 103 tons). Once the gasturbines and generators had been mounted on the foundations, the way was prepared for BWSC's electrical supervisor. The long storage time had left

its mark on the equipment, and BWSC's personnel had to perform an in-depth check of the various parts. Some parts could be rehabilitated on site, others had to be replaced.

N.E.C.'s personnel and BWSC's supervisors cooperated as during the many projects executed in the past and secured that the tight time schedule was kept. Also, the BWSC home-office backing of the Khartoum team gave urgent clarification of technical matters and secured supply of spare parts at the right time and place.

With the installation of the two new gasturbines the total generating capacity of Khartoum North Power Station has been reinforced by 42 MW. At the same time, N.E.C.'s personnel have acquainted themselves with the new equipment and thereby enhanced their professional qualifications for securing a smooth daily operation.



◀ Commissioning and control.

BWSC supervisors advising NEC staff in installation of lubricating oil system.



◀ Erection of radiator cooler, air intake filter and exhaust stack for turbine.

▲ Mounting of a 2000 m³ fuel oil tank.

GENERAL INFORMATION

Owner:

National Electricity Corporation,
Khartoum, The Republic of Sudan

Contractor:

Burmeister & Wain Scandinavian
Contractor A/S, Allerød, Denmark

POWER PLANT

Total output:

2 x 21 MW at 36°C ambient
temperature, measured at generator
terminals

Gasturbine:

General Electric (GE) MS 5001
License builder: NUOVO PIGNONE
Fuel: gas oil

Generator:

ANSALDO T-2 22963 kVA
50 Hz, 11 kV
Power factor 0.8

Reduction gear:

Parallel shaft gear unit type VF63R
Max. power transfer : 35000 kW
Speed turbine side: 5100 rpm
Speed generator side: 3000 rpm

Fuel oil tank:

2000 m³

Line Transformer:

OEL Italy
33/11 kV
22963 kVA
On load tap changer +/-8x1.25%

Air filters:

Donaldson
498 nos single filter elements per unit

Switch yard:

SACE

DC-System:

SEIRA Elettronica Industriale
110 V DC
Load and charger section 60 A
Battery capacity 395 Ah/10 h



BURMEISTER & WAIN SCANDINAVIAN CONTRACTOR A/S

An engineering and contracting company specializing in turn-key contracts for design, construction, delivery, erection, testing and commissioning of power plants with diesel engines, steamturbines, gasturbines and other prime movers and also specializing in combined heat and power plants, co-generation and combined cycle plants, wind turbines and biogas

plants. The company's Generation Services Division undertakes service, maintenance, operation, support to operation, rehabilitation and spare parts supply. The company operates world-wide and has constructed power plants in Africa, The Far East, The Middle East and in The Caribbean Area besides plants in Denmark, The Faroe Islands and Greenland.

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