2nd EXTENSION OF

BELO JARDIM POWER STATION

THE AZORES

BUILT IN 2004 FOR

EDA

ELECTRICIDADE DOS AÇORES, S.A.

BY

BWSC

Burmeister & Wain Scandinavian Contractor A/S

Project Background

In order to meet increasing demands for power for the public grid and a major private utility on Terceira Island, Electricidade dos Açores (EDA) in 2003 invited tenders to extend Belo Jardim Power Station. The turnkey contract for this second extension to the power station was awarded to Burmeister & Wain Scandinavian Contractor A/S (BWSC) in January 2004. This latest extension is one of a series of expansions required by EDA and supplied by BWSC between February 1997 and December 2004.

Project Description, 2nd Extension

The project is based on the MAN B&W 12V48/60 four-stroke diesel engine designed to operate on heavy fuel oil and is a continuation of the 1st Extension, consisting of units G5 to G8.

The engine type belongs to the new generation of energy efficient four-stroke engines from MAN B&W, achieving not only a significant reduction in running costs, but also a reduced environmental impact because of its low fuel and lubricating oil consumption.

The extension consists of a new engine hall with the two large diesel generating sets, G9 and G10, and a mechanical annex with auxiliaries for the diesel engines. The engine hall also includes a loading bay and space for the future addition of generating set G11.

The project includes an upgrade of the control system for units G5 to G8 with a state-of-the-art overall management system ensuring safe and reliable operation of generating units G5 to G10.

Two additional 500 m^3 heavy fuel oil storage tanks were provided and, as a special feature, the plant was equipped with an extensive oily water effluent treatment system. The system handles discharge water from both the new plant and the existing plant and facilities, thus meeting very stringent discharge requirements.

Project Implementation

The major challenge during project implementation was the fast delivery time for unit G9 in 8 months from access to the green field site. The scope included relocation of power lines, soil investigation and soil improvement to a depth of 6 meters. To accommodate the very fast delivery time, special concepts were developed for engineering, production, logistics and construction. The concept of modularization was applied as much as possible to building construction and erection as well as to installation of auxiliary equipment. Most of the buildings and plant were supplied as prefabricated components.

Engine hall

Construction and handover of the entire plant was achieved in only 11 months - one month ahead of the contractual date. This extraordinary achievement was possible only because of the excellent cooperation with EDA and the local contractors involved in the project.

Environmental Commitment

To protect the delicate environment of the Azores, EDA has expressed a strong commitment to ensuring that the environmental impact of the power production facilities is maintained at an absolute minimum, as technology develops.

Effluent system

Consequently, the project includes both a new effluent treatment system for discharges from this second extension and modifications to the existing effluent and drainage systems to upgrade the treatment of all discharges from the Belo Jardim Power Station.

The large number of new and existing effluent sources provided a major challenge in terms of design, engineering and construction. However, with a combination of advanced technical solutions and equipment, the highly efficient system has fulfilled the guaranteed outlet level of maximum concentrations of 15 ppm hydrocarbons and 60 mg/liter of suspended solids.

In addition to the installation of the effluent system, the design of this extension of Belo Jardim Power Station includes an area for later installation for each engine of a NO_X reduction unit for the exhaust gases.

Summary

Contract

Type ..... Turnkey
Contract award ..... January 2004
Handing over ..... December 2004

Technical Data

Diesel Engines

Make ..... MAN B&W
Type ..... 2 x 12V48/60, 4-stroke
Speed ..... 500 rpm

Alternators

Make ..... Leroy-Somer
Type LSA-62-135-12P
Rating ..... 2 x 15,435 kVA
Voltage / frequency ..... 6.0 kV / 50 Hz
Output at 100% load ... 2 x 12,348 kW at pf 0.8

Fuel Treatment

Make ..... Alfa-Laval
Type ..... SU 850
Capacity ..... 1 x 5.0 m^3/h at 380 cSt/98°C

Radiator Coolers

Make ..... GEA Ergé-Spirale
Type ..... Horizontal, enduced draft
Cooling capacity ..... 2 x 7,000 kW

Exhaust Gas Boilers

Make ..... Aalborg Industries A/S, Denmark
Steam pressure ..... 8 bar
Capacity ..... 2 x 3,000 kg/h

Main Auxiliary Unit

Supplier ..... Aura Marine, Finland

Oily Water Effluent System

Capacity ..... 100 m^3/h
Maximum dissolved hydrocarbons .... < 15 ppm

Step-up Transformers

Make ..... Siemens
Type ..... ONAN / ONAF
Ratio ..... 6 kV / 30 kV
Rated power ..... 2 x 15.5 MVA

Power Building

Height ..... 15.5 m
Length ..... 35.0 m
Width ..... 29.0 m
Overhead crane ..... 1 x 31 t

History of Belo Jardim Power Station

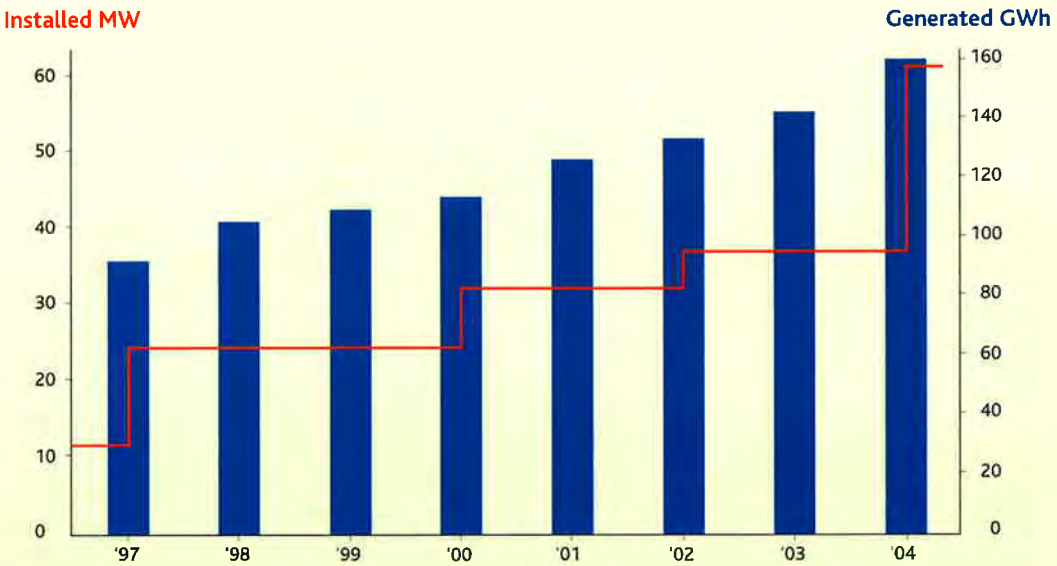
In the early 1980's, the Board and Management of EDA initiated a long-term program to respond to the increasing power demands on Terceira Island and decided to develop the new Belo Jardim Power Station.

In the mid 1990's, the requirement for the first extension to the power station became apparent, and in August 1995 the first contract for units G7 and G8 was signed between EDA and BWSC. To cater for future expansions, the engine hall was built to accommodate four units, and in 2000 the contract for unit G6 was signed, followed by another contract in 2003 for unit G5.

In 2003, EDA decided on a second extension to the plant, and in early 2004 BWSC was awarded the contract for the installation of not only two 12 MW generating sets, but also a new tank farm and a comprehensive effluent system.

Exhaust gas boilers

Summary of installed capacity and production



Summary of diesel engines

	G7 / G8	G6	G5	G9 / G10
Year	1997	2000	2003	2004
Make	MAN B&W	MAN B&W	MAN B&W	MAN B&W
Type	9L40/54	9L40/54	9L40/54	12V48/60
	4-S	4-S	4-S	4-S
MW	2 x 6.3	1 x 6.3	1 x 6.3	2 x 12

BWSC

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