LOHRMANN
INTERNATIONAL

Ref.-No.:

PB-10.48

Pre-Owned Gas Turbine Power Barge 48 MW

Presented by: Lohrmann International Germany

1. Barge Details

Name of the barge:	Dynami III
Type of construction:	Naval steel, flat fund, without propulsion

2. General dimensions

Length:	69.00 meters
Moulded Beam:	18.00 meters
Deep:	4,267 meters
Full Load Draft:	2.2 meters
Gross weight (full load):	2,643 tons
Net weight:	793 tons

3. Technical Information

Turbine:	Westinghouse 1 X W251B11/12 ECONOPAC
Configuration:	Gas Turbine, simple cycle.
Capacity:	1X48 MW ISO
Type of fuel (start):	No. 1 distillate
Type of fuel (operation):	Diesel with option to convert to natural gas, Water injection included
Turbine:	Synchronous direct coupling
Compressor:	19-stages axial flow
Turbine:	3 stages
Speed:	5,418 rpm
Speed Reduction:	3,000 rpm
Generator:	synchronous 3-phase, air cooled, 66.65 MVA, 11.5 kv, 50 Hz
Output:	11.5 kv - 50 Hz
	GSU rating 33 KV
	Operating hours - 29,894
	Starts – 804

4. General Description of the Power Barge

All power generation equipment and other equipment are mounted on the hull.
The barge is intended to be moored at the site and remain in a "floating" condition.

The hull was designed in accordance with the applicable portions of the current American Bureau of Shipping (ABS) Rules for building and classing "Steel Vessel", "Steel Vessels for Service on Rivers and Inter coastal Waterway" and "Steel Barges".

The barge was designed to be "dry-towed", expect for coastwise voyages of limited duration and exposure.

All materials were in accordance with ABS requirements for "ordinary strength steel", Grade A or B, as applicable to thickness and location. All welding procedures and materials were in accordance with ABS requirements.

The protection against corrosion and internal coatings were applied to maintain the life span of the barge.

The bed frames, the foundations and support structures are designed for the following conditions:

Operating under a storm:	Equipment dead and live operational loads plus operation storm environmental loads.
Survival under a storm:	Equipment dead loads plus survival storm environmental loads. A 1/3 increase in working stress allowance was used for these design conditions.
Transportation:	Equipment dead loads accelerations due to dry-tow transportation of the barge from the Shipyard to the operation site. A 1/3 increase in working stress allowance were used for these design conditions.
Power Train Loads:	These loads were developed from the operational criteria set out by Westinghouse.

The assumed environmental parameters used for the design of the barge and foundations are as follows:

Operating Storm: an operating storm is defined as the limiting site conditions in which the barge will remain operational.

Wind speed:	130 kph
Wave and current:	none
Relative humidity:	60% - 100%
Ambient temperature:	38 C

Survival Storm: a survival storm is defined as the limiting site conditions in which the barge / foundations will survive without damage to their structure.

Wind speed:	185 kph
Wave and current:	none

In addition to the above, the barge and equipment foundations were designed to survive sea states which produce 0.55g swat in combination with 0.20g heave forces.

5. Description of the Power Generation Plant

The ECONOPAC developed by Westinghouse was designed to provide a complete generation system. All components and subsystems were carefully selected and optimized to form a compact plant; the barge and its elements are designed to comply environmental requirements.

The ECONOPAC features modular construction to facilitate shipment and assembly. The system was pre-assembled to the maximum extent permitted by shipping limitations. Where possible, subsystems were grouped and installed in auxiliary packages to minimize field assembly.
These packages were completely assembled and wired at the factory and require only interconnection at the site.

Pipe rack assemblies were supplied eliminating the need for extensive piping fabrication during construction.

Recognized as the heart of the ECONOPAC plant, the prime mover consists of three basic elements: the axial flow compressor, a combustion system and power turbine. These three elements are combined into single assemblies that were shipped complete with rotor in place, facilitating erection in the field. Incorporated into the design are such features as a horizontally split casing, tow-bearing support, turbine air cooling system, compensating alignment system, The generator and the brushless exciter are equipped with integral lube oil piping and necessary instrumentation. A solid coupling connects the generator directly to the compressor (the cold end of the combustion turbine).

The electric motor starting package is a self-contained assembly, pre-mounted on a bedplate and shipped as a complete module. The package contains all the equipment necessary to provide breakaway torque for initial rotation of the turbine generator, torque necessary for acceleration to self-sustaining speed and a disconnect means to allow disengagement of the starting device once the unit reaches self-sustaining speed. During the cool-down periods, the turning gear automatically engages to provide for a slow roll of the combined turbine and generator.

A side inlet air duct directs flow into the compressor inlet manifold. The manifold was designed to provide an efficient flow pattern of the air into the axial flow compressor. A parallel baffle-silencing configuration is located in the inlet system for sound attenuation. A two-stage pad filter provides air filtration.

After expanding through the combustion turbine, the gases pass though the exhaust manifold and exhaust transition. The exhaust gases enter the atmosphere through the exhaust stack.

All control, protection and monitoring functions for the combustion turbine and ECONOPAC systems are performed by the Powerlogic II control system. The core of the system is the distributed processing unit (DPU) which perform all of the control and logic functions. The input/output signal cards provide the interface to the field instrumentation and control devices. A personal computer is mounted in the local panel in the electrical package and serves as the man-machine interface device for the system. This is both the systems programming device as well as the operator interface. All control and monitoring functions can be performed from this panel. A set of standard graphic displays is provided for all operational and monitoring functions. The PC also performs the logging function.

Standard sets of logs are provided for documenting combustion turbine operational performance.

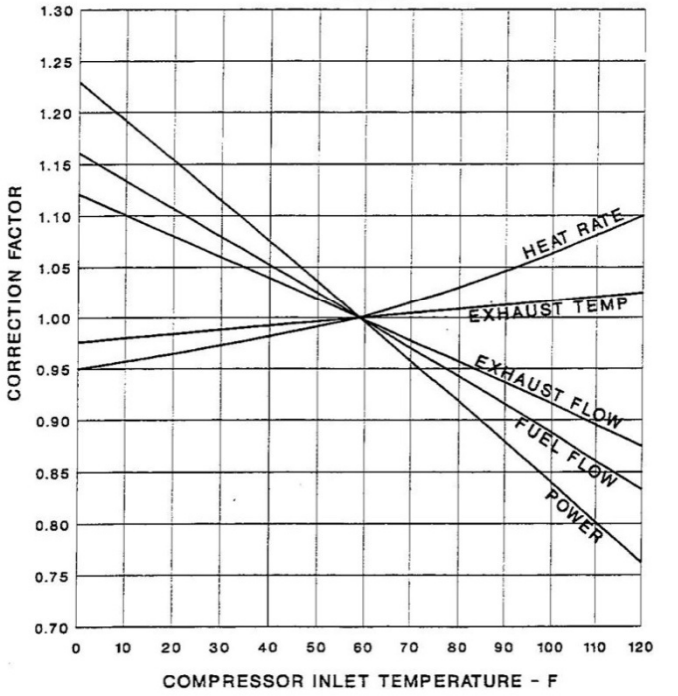
The local panel also houses other control related equipment such as the vibration monitoring system, electromechanical counters and timers, trip push-button, flame scanner electronics and other ancillary equipment.

The DPU and the operator interface and interconnected on the WDPF (Westinghouse Distributed Processing Family) Westnet II data highway system. This is a high level, high speed communication network that allows all WDPF devices to communicate with each other and share a global information database. The data highway interface to the PC is what enables the PC to be a high level fully functional man-machine interface device for the system.

251B11/12 ECONOPAC PERFORMANCE

CORRECTION CURVE FOR POWER, HEAT RATE, FUEL FLOW, EXHAUST TEMP & FLOW vs COMPRESSOR INLET TEMPERATURE

FIGURE 2a

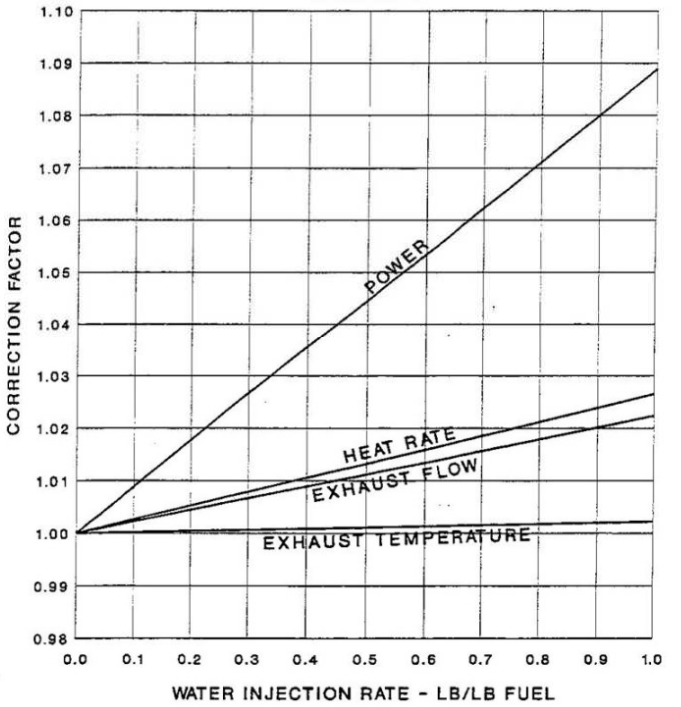


REF: CW251-203
192070

251B11/12 ECONOPAC PERFORMANCE

CORRECTION CURVE FOR POWER, HEAT RATE, EXHAUST TEMP & FLOW vs WATER INJECTION NATURAL GAS

FIGURE 6a

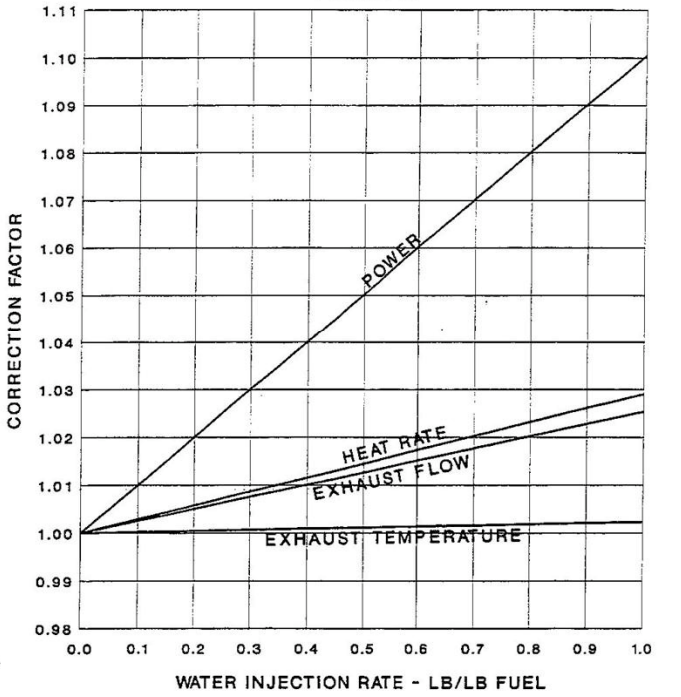


192070

251B11/12 ECONOPAC PERFORMANCE

CORRECTION CURVE FOR POWER, HEAT RATE,
EXHAUST TEMP & FLOW vs WATER INJECTION
No. 2 FUEL OIL

FIGURE 7a



192070

IMPORTANT DISCLAIMER:

Although the statements and technical information contained herein are believed to be materially accurate as of the date hereof, no representation or warranty is given as to the accuracy of any of the information provided. Certain information contained herein is based on information from sources considered to be reliable. The information referred to herein is subject to change. Lohrmann International GmbH and their affiliates and any of their officers, employees, agents and professional advisors, expressly disclaims any and all liability as to any reliance on such information; NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. This information has been provided to you for informational only and may not be relied upon b you in evaluating the merits of purchasing the assets described herein. This communication is not intended as and is not to be taken as an offer or solicitation in any jurisdiction, including these in which such an offer or solution is not authorized or to any persons to whom it is unlawful to make such a solution or offer. This document contains confidential information intended only for the use of the addressee. If you are not the intended recipient of this information then you are hereby notified that any use, dissemination, distribution or reproduction of this message is prohibited. If you have received this communication in error, please contact the sender immediately and delete this material in its exhibits.

Thank you for your attention !

LOHRMANN INTERNATIONAL

Taunusstraße 5 a
65183 Wiesbaden, Germany

Tel. +49 611 50402 0
Fax +49 611 50402 50

www.lohrmann.com
info@lohrmann.com