

ENAGAS

LNG Terminal

Palos de la Frontera

In February 2002, Enagas awarded Foster Wheeler the liquefied natural gas (LNG) terminal expansion contract at Palos de la Frontera in Andalusia, Spain. Christopher Columbus set sail from this location in 1492, bound for America.

Foster Wheeler Iberia

Foster Wheeler Iberia (FWI) in Madrid is executing the project. FWI's scope of work includes basic design, detailed engineering excluding the tank, material and equipment procurement services, and construction supervision. The basic design was completed in May 2002. Mechanical completion is scheduled for the second quarter of 2004.

Expansion

The terminal export capacity is currently 575,000 Nm³/hr of natural gas and this will be expanded to 900,000 Nm³/hr. The primary seawater vaporisers have a capacity of 300,000 Nm³/hr of gas with an additional 275,000 Nm³/hr supplied from submerged combustion vaporisers. These will be upgraded.

Existing facility

The existing terminal installation has two LNG storage tanks with a total capacity of 160,000 m³. This will be almost doubled, with the construction of the third tank of 150,000m³ capacity.

Inside the tanks, LNG is stored at a pressure slightly higher than atmospheric pressure, and at a temperature of approximately -160°C.

One tank has four submerged LNG pumps installed and the second has three similar primary pumps. These pumps deliver LNG to the recondenser.

Liquid from the recondenser is then boosted to the pipeline export pressure using the secondary pumps before flowing to the vaporisers. The open rack vaporisers (ORV) use seawater as the heat source, with the chilled water returned to the sea.

The ORVs are used to meet the baseload export gas demand. To meet peak demand the combustion vaporisers are used in parallel with ORVs.

Boil-off gas generated within the terminal and during ship unloading is compressed and condensed in the recondenser using pressurised LNG from the primary pumps.

New facilities

As part of the terminal expansion three new submerged pumps are being added to the existing tanks, similar to those already installed. They will provide higher capacity and flexibility to the system.

Four new secondary pumps will also be installed. Three will discharge to a new LNG collector that will feed four new seawater vaporisers, similar to the existing ones, as well as to a new submerged combustion vaporiser.

Expansion of the seawater system requires an additional five new seawater pumps.

Once the LNG is gasified, the natural gas will be metered and its pressure regulated in the new metering station. Before flowing to the distribution pipeline this gas is odourised by injecting small amounts of mercaptan. An odourising unit consisting of a small tank and adjustable injection pump will be added to the existing facilities.

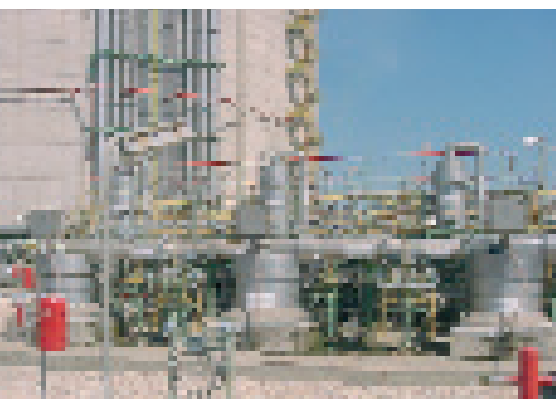
A new compressor will also be installed which will allow the recovery of boil-off gas. The existing jetty where the fire-fighting pumps are located does not have enough capacity to house the new seawater pumps so a new offshore concrete platform is being built.

New systems

The existing distributed control system will be modified to accommodate the terminal expansion. A new dedicated safety system is being installed. This is a triple modular redundant system which has a very high availability and reliability to assist in improving the safety and reliability of the plant.

Cartagena

FWI is also executing the expansion of the Enagas receiving terminal (pictured right) at Cartagena, also in Spain.



Palos de la Frontera. Top: Existing LNG tank and send-out pumps. Bottom: Seawater open rack vaporisers.

