

REGENERATOR BOILER

CASE STUDY

CATEGORY
PRODUCTS / HEAT EXCHANGERS

Industry : LNG

Reference : LA2128-2129

Client: Woodside Energy Ltd.

Year : 2005 to 2007

Overview

The NWS Train V project was a major LNG infrastructure investment by Woodside to increase its LNG production capacity. LA Services had delivered pressure equipment to Woodside's NWS venture since Train I. Train V was the largest single contract LA Services had received. The two kettle regenerator boilers were major items in the package due to their size and value and engineering requirements. Heat exchanger manufacturer is a specialised area of pressure equipment and these units were no exception from design through to testing, painting and logistics.

Scope

Design and manufacture of two kettle type regenerator boilers for Woodside's NWS Train V LNG plant. The project was a greenfield venture, these two heat exchangers were two of 32 pieces of pressure equipment LA Services provided for the project.

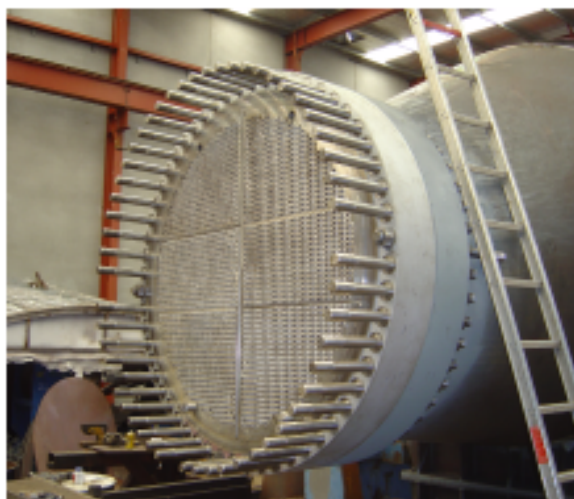
These 58 tonne exchangers came with an onerous set of design and specification requirements which included a road transport to the Karratha WA site for installation with large modules coming from Indonesia.



PROJECT DETAILS

Design

-  Design Pressure : 4072 kPag to Full Vacuum
-  Design Temperature : 14°C to 253°C
-  Dimensions : 2.9m ID, 4.2m O/A height x 12.2m long
-  Mass : 53,250 kg
-  Standard : AS1210 Class 1
-  Configuration : 6 pass, U-tube x 1416 tubes



Materials

- Shell AS1548-7-490TL50 x 20mm thick
- Channel AS1548-7-490TL50 x 36mm thick
- Tubesheet ASTM A182-F316L, 2m dia x 275mm thick

Manufacture

- NDE 100% Visual, RT, UT / MT, HT, PT, PMI
- PWHT 635°C =+/-15°C per 25mm
- Hydro pressure 6468 kPag

Surface Treatment

- Interzinc & Inorganic butyl system
115-170um



Planning

The manufacture of two 58 tonne kettle heat exchangers with a 2m diameter x 275mm thick 316L tubesheet would normally be a significant project on its own, however these units were only two of thirty other pieces of pressure equipment to be delivered over an 18 months timeline by LA Services. To tackle this project a skilled team was assembled consisting of project management focused on planning and scheduling, engineering, raw material procurement & logistics, QA / QC and workshop trade supervision. Long lead items were engineered and ordered early while ancillary design details were finalised with Woodside's UK based EPC engineering team.

Challenges

Design required close collaboration with production know-how to develop solutions to service through life maintenance requirements such as bonnet removal for tube cleaning while maintaining a shell side seal. Handling and assembly also required workshop support for our engineers to ensure the 28 tonne U-Tube bundle could be installed and removed with relative ease in the field. The final challenge came in planning the transport, the exchangers needed to be unloaded and reloaded at the paint yard without cranes. To solve this special support beams with removable outriggers were designed and supplied with the unit.

Notes

The exchanger's thick large diameter tube sheet and body flanged made it very heavy at the bonnet end, to manage this the work shiplifting study required a two crane lift at this end and a third bridge crane over the shell. This configuration also presented a concentrated transport load, requiring 6 trailer axles eveningy straddling the load bearing front saddle.

[Find out more at www.la.services](http://www.la.services)

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