

# Focus on Major New LP Gas Facilities around the Globe



## The LP Gas Terminal at Mer Rouge, Mauritius - A WLPGA Case Study

WLPGA member and Industry Council member Petredec opened a new LP Gas terminal in Mauritius in March 2014.

The LP Gas Mounded Storage Import/Re-export Terminal facility and is the largest on-land LP Gas storage facility in the region.

Construction of the Mer Rouge terminal began in January 2012 and represents an investment of circa. 42 million USD. From planning to commissioning the story of the terminal represents a successful combination of the latest technologies and in-country cooperation. Much of the work went to local contractors and the terminal has been designed to industry best practice guidelines ensuring a maximum level of security and product safety.

This case study looks at some of the highlights and challenges of the successful heavy lift operation of transporting the world's largest capacity LP Gas mounded storage pressure vessels from the fabricator to their final destination.

**World LP Gas Association**

182 avenue Charles de Gaulle  
92200 Neuilly-sur-Seine - France

[www.worldlpgas.com](http://www.worldlpgas.com)

[www.exceptionalenergy.com](http://www.exceptionalenergy.com)

## 1. An Operation on a Major International Scale

Petredec Mauritius engaged the services of Lloyd Jones Construction Ltd (LJC) to design and build the LP Gas Terminal facility on a turnkey EPIC basis.

The design of the LP Gas terminal, including the detailed engineering of the LP Gas Mound and more specifically the ground breaking enhanced-scale LP GAS vessels, were all completed by LJC's sister company BC&T Consultants in the UK. The LP Gas mound design by BC&T was the culmination of a concept that originated over 10 years ago in BC&T to develop higher capacity LP Gas Mounded Storage Terminals for the market to address four key issues:

- The storage vessels (the main assets) could be relocated if necessary to a new location if markets change.
- The storage would have a better economy of scale to compete with the alternative midscale solution of a LP Gas refrigerated terminal.
- The LP Gas vessels would be fabricated in a workshop to guarantee fabrication quality and could be deployed on an accelerated programme if necessary.
- The design would ensure civil works proceed independently of vessel works for as long as possible minimising risk and reducing the programme to completion after vessels are installed.

- Designed & engineered by BC&T Consultants, United Kingdom
- Main contractor Lloyd Jones Construction Ltd. (15 Mauritians & 5 (UK) expatriates)
- Total project investment cost USD 42 million

The LP Gas Vessels were fabricated at Walter Tosto in Ortona, Italy. Once completed the Vessels were then moved one at a time by Barge to the Port of Bari to allow trans-shipment to a large ro-ro (roll on roll off) Ship the Zhen Hua 21.

The LP Gas Vessels were driven from the Barge onto the Zhen Hua 21 one at a time using Self Propelled Modular Trailers (SPMTs) and positioned at pre-engineered positions on the ro-ro deck. Rigid seafastenings and load spreading mats were then welded to the deck of the Zhen Hua to make the cargo seaworthy. With all three LP Gas Vessels positioned correctly and welded in place the ro-ro departed Bari on 2nd January 2013. The 8,200km journey to Port Louis, Mauritius around the Cape of Good Hope went to plan with transit taking 42 days at typically 10-12 knots.

On arrival in Port Louis the Zhen Hua 21 could not berth at the agreed discharge quay due to recent cyclone activity and a high swell. It was agreed with the Port that the Zhen Hua 21 be moored at another more sheltered berth and seafastenings partially removed in preparation for discharge at the planned quay (MCT).

## 2. Discharge Plan in Place and Offloading Route

The Mauritius Container Terminal (MCT) was designed for heavy lift discharge using geared ships and as a result the first 7m of the quay could not be loaded with heavy lift cargo. The heavy lift offload zone being some 7m from the quay wall necessitated the construction of a 1,000T capacity ramp shipped along with the Zhen Hua 21. In addition, a compacted stone ramp was built to ensure the tanks could safely ramp down to the quayside and progress through the flood defense gates.

The offloading route had been laser scanned earlier to verify clearance and in particular, one pinch point with the flood defense gates was re-checked where there was only a 25mm clearance for the operation. Finally, a route through the container terminal was cleared of approximately 600 containers, the MCT terminal boundary was actually demolished with new access controls and two offsite parking positions prepared on local virgin ground.

With two LP Gas Vessels parked at the offsite parking position the third Vessel was discharged from the ro-ro and taken directly to the mound for installation using hydraulic skidding. On completion of the first LP Gas Vessel into the mound, the other two LP Gas Vessels were then taken from the parking area and skidded into the mound over 2 days. From arrival of the Zhen Hua 21, the installation of all three LP Gas Vessels took only eight days with all engineering and heavy load logistics planned by BC&T/LJC.

The operation proved a huge success involving meticulous organisation and co-ordination amongst all parties resulted in no damage to the cargo during the operation. As this account illustrates, the operation was fraught with challenges and uncertainties and prior preparation and careful planning were crucial to its success.



- The contract created a total of 170 local jobs utilising 3 major sub-contractors
- Expenditure of local subcontractors MUR 360,500,000
- Terminal consists of mounded LP Gas storage bullet tanks, a control building with offices, a utility building and gatehouse/firewater pump house

### 3. Completion of the LP Gas Terminal

The balance of the terminal then took approximately 12 months to complete and whilst the installation of the three LP Gas Vessels proved a major milestone, the civil works for a LP Gas terminal of this scale proved a major undertaking. For example the foundation for the mound required 420 piles 700mm diameter 20m in length and along with a concrete raft to support the mound the foundation is capable of supporting a 12 storey building.

#### What is the scale of the operation?

- Each of the three 5,000 Tonne capacity LP Gas vessels measures 15.5m o/d x 55m LOA
- Each vessel weighs just over 1,000 Tonnes on saddles with ro-ro transport fixtures
- The vessel's were transported on one vessel 8,200 km from Italy to Mauritius



### 4. The Grand Opening



The Terminal was officially opened on 20<sup>th</sup> March 2014 by the Minister of Industry and Commerce for Mauritius, Mr Cader Sayed-Hossen, and followed by a reception at the stunning Chateau de Mon Desir in Balaclava.

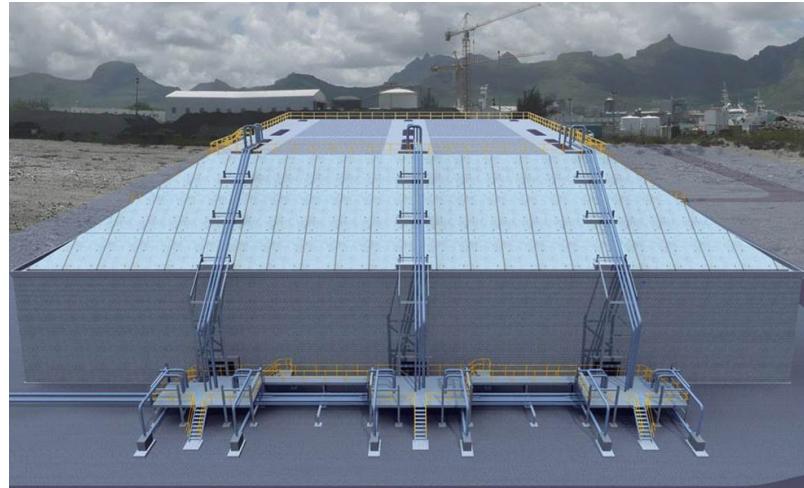
**Klaus Gohra**, Director of Petredec Mauritius stated that with plans to re-export LP Gas to Eastern and Southern African markets, this terminal aims to transform Mauritius into a regional LP Gas hub. The terminal is now fully commissioned and has become an integral part of Petredec's LP Gas shipping and trading system in the region.

**Nathalie Venis** is the General Manager of Petredec Mauritius and stated that the completed facility 'will allow Petredec to stock and supply Mauritius with increased efficiency and demonstrates long term commitment to the Indian Ocean Islands and East African markets into the future. The facility is designed to supply not only Mauritius' LP Gas requirements but also to function as a re-export hub. The jetty can accommodate the largest LP Gas carriers ever built, some of which have a capacity of up to 84,000 cubic metres.'

- Total storage capacity 15,000 MT (current storage capacity in Mauritius approx. 5,400 MT)
- Terminal will be operated by a team of ten local operators
- Once commissioned the terminal will be considered to be the largest pressurized above ground LP Gas storage facility operational in the African region and a global benchmark in terms of mounded LP Gas storage design.

## 5. Today

At the point of writing the terminal now supplies STC with up to 3,000 Tonnes of LP Gas every two weeks via pipeline to the existing LP Gas Filling Plant operations. The terminal has also exported a number of re-export pressurized cargos to East African ports. More significantly the completion of the terminal has allowed the VLGC floating storage previously located permanently outside the Mauritius Port Authority to be removed.



## 6. Acknowledgements

**Petredec** is a leading independent LP Gas logistics specialist; a global company that buys, sells, transports, stores and distributes LP Gas. Petredec delivers product on a fleet of owned and chartered ships, which is one of the largest LP Gas fleets in the world.



**Lloyd Jones Construction**  
LJC specialise in the provision of LP Gas facilities across the Oil & Gas sector on an EPIC basis.



**BC&T Consultants** specialise in the detailed engineering of all Oil & Gas Terminals with a particular niche in the design of LP Gas Mounded Storage and LP Gas Cavern Storage Terminals.

