

# LNG REGASIFICATION STATION

## LNG STORAGE AND REGASIFICATION

### CASE STUDY #9

#### Company:

A leading copper producer in India comprises smelting and processing of copper and production of its byproducts. Their operations include a smelter, phosphoric acid plant, sulphuric acid plant, two refineries, and three copper rod plants.

#### Challenge:

Replacement of their existing propane system to natural gas. Utilized components across Chart facilities (Chart Ferox, Czech Republic and Chart New Prague, MN) and Chart Service Providers to provide a complete solution to the customer. The project was managed at Chart New Prague – Engineered Systems Group. The customer wanted to replace their existing propane system to a more cost effective natural gas system to feed the burners of their copper smelters. They intend to return their investment within 6-8 months. They view Chart to have superior products than locally made competitors. Chart also provides a guarantee that the system will operate and function as intended. A great advantage over others.

#### Solution:

- 26,000 SCM/day (standard cubic meter) LNG Vaporization and Control System
- Designed to sustain consumption and operate between 30-75 psig on the final line. The pressure fluctuations within 2.5% at full design flow
- The system was designed for automatic operation with provision for manual intervention, utilizing a PLC and HMI
- VT105/12 LNG Storage Tank, 105 m<sup>3</sup> gross volume, 12 bar built to PED Code
- Manufactured assemblies built to NFPA 59A, Chapter 13
- Redundant off load pumps, liquid withdrawal circuits, standby vaporizer, final line strainer and pressure control valves



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*Regasification Station*



*LNG Storage Tank & Vaporizers*

Chart provided an equipment package which takes LNG from a vertical storage tank and regasifies the liquid to supply gas at a specified pressure for end use application. The equipment package consists of items manufactured across Chart's multiple international facilities and business partners. The storage tank was manufactured at Chart's Ferox facility (Czech Republic), the pre-manufactured plumbing assemblies at Chart's New Prague, MN facility (USA) and Vaporizers provided by SNT (India), Chart's Indian business partner.

The pre-manufactured assemblies include an offload connection, LNG offload pump, switching stand, and a final line pressure control.

System operation is controlled from a remote panel containing both PLC (Programmable Logic Computer) using pneumatic logic and HMI user interface. The air-actuated valves in the system select the various operating modes and can serve as emergency shutoff devices. The air-actuated valves fail closed in the event of a loss of air pressure. The system is completely instrumented, with pressure, level, and temperature transmitters feeding the Control System.

During filling, the control system monitors the temperature of the pumps to ensure that proper temperatures have been reached and maintained during offload. Also the control system selects either top fill or bottom fill mode to maintain the tank pressure as to not disturb the end use pressure or flow.

The system will allow for automated switching of liquid flow between two or more ambient air vaporizers (lead and lag) to allow for ample amount of time for the vaporizers to defrost in between cycles as to not affect the system flow rate during continuous use.

Pressure regulation is completely automatic by utilizing a Proportional Integral Derivative (PID) control loop and a flow control valve sized for this specific application. Provisions are provided to mechanically control the system without the Control System.