

A decorative collage of hexagonal images in the top-left corner, showing various industrial scenes: a white truck, a large blue valve, a white storage tank, and a bright blue flame.

# Modular Products for LNG Applications

US DOT PHMSA LNG Workshop  
Presented By: Matt Martineau (Chart Inc.)



# What's New since 2001 ed of NFPA 59A?

- Small scale LNG ramped up in the last 7+ years
  - Liquefaction: 100K, 250K, 450K GPD plants
  - Regasification: Stationary and mobile regas applications that allow customers to use natural gas as an alternate energy source for heating and/or power generation.
  - Vehicle Fueling: Trucks and other HHP power vehicles like mine trucks
  - Transport, Rail and Marine loading: Bunkering and loading facilities that support virtual pipelines to move liquid to stranded markets.
- More utilization of modular shop-built solutions
  - Bulk storage tanks up to 260,000 Gallons (1000 m<sup>3</sup>). Well past the limits posed in Ch 13 (was Ch 10 in 2001 ed)
  - Vacuum Jacketed Pipe being used in small and large scale applications
  - Pre-skidded equipment packages (e.g. cold boxes, pump skids, vaporization skids, pressure regulation manifolds, etc..)
- Changes in ASME BPV code
- CGA Natural Gas Committee formed

# Large Bore VJ Pipe – Darwin LNG Terminal

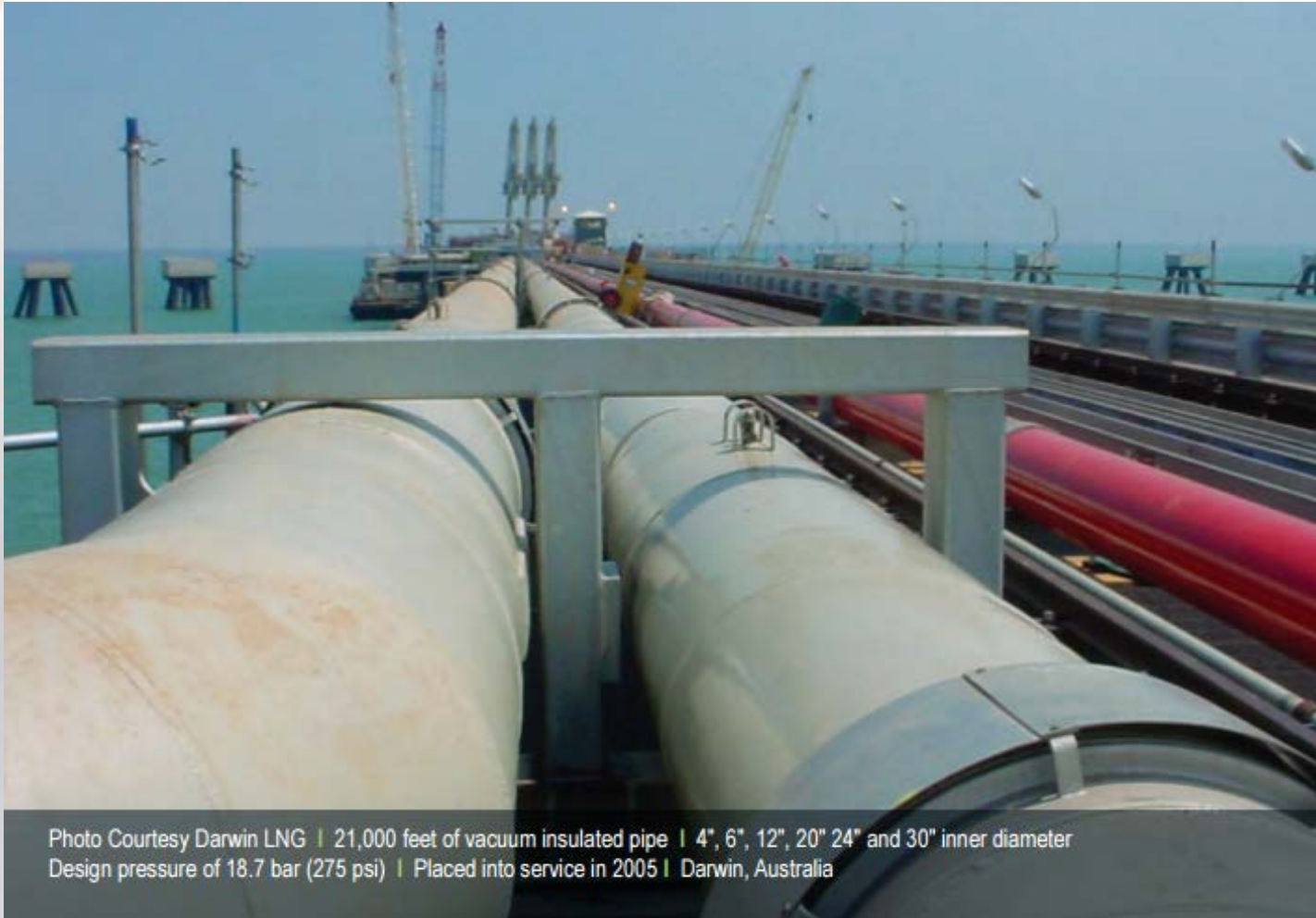


Photo Courtesy Darwin LNG | 21,000 feet of vacuum insulated pipe | 4", 6", 12", 20" 24" and 30" inner diameter  
Design pressure of 18.7 bar (275 psi) | Placed into service in 2005 | Darwin, Australia

- Darwin LNG
  - 21,000 ft of VJ pipe
  - 4", 6", 12", 20", 24" and 30" inner dia.
  - Design Pressure of 18.7 bar (275 psi)
  - Placed into service in 2005 in Darwin, Australia.

# Large Bore VJ Pipe – Freeport LNG Terminal



- Freeport LNG
  - 14,000 ft of VJ pipe
  - 26” Process 12” Vapor return
  - Design Pressure of 15.4 bar (224 psi)
  - Placed into service in 2008 in Freeport, TX



# 1000m<sup>3</sup> Storage Tanks





# 100K GPD Liquefaction and Truck/Rail Loadout Facility – Miami, FL





# 100K GPD Liquefaction and Truck/Rail Loadout Facility – Miami, FL



# 100K GPD Liquefaction and Truck Loadout Facility - George West, TX





# Combination Regas/Vehicle Fueling Application - Florence, VT



# BPV Section VIII, Div 1

- 2001 ed of 59A currently references 1992 edition of the BPV code (Keep in mind that vessel registration must be – and always has been - to current edition).
- Current edition is 2015. There have been 8 edition updates since.
- Change in allowable stress and subsequent test pressure (1998)
- Cold-stretch fully adopted in 2008 – Appendix 44



# CGA Natural Gas Committee

- Industrial gas industry uses this scale of cryogenic equipment - and has for decades.
- CGA has a working relationship with NFPA (e.g. NFPA 55).
- CGA has formed a Nat Gas committee in order to leverage their experience in small scale cryogenic applications.



*Innovation. Experience. Performance.®*

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

