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Panel 1
Technical Perspectives on Gas Interchangeability and Quality
"Gas Quality & Interchangeability 101"

FERC Conference
Washington, D.C.
February 18, 2004

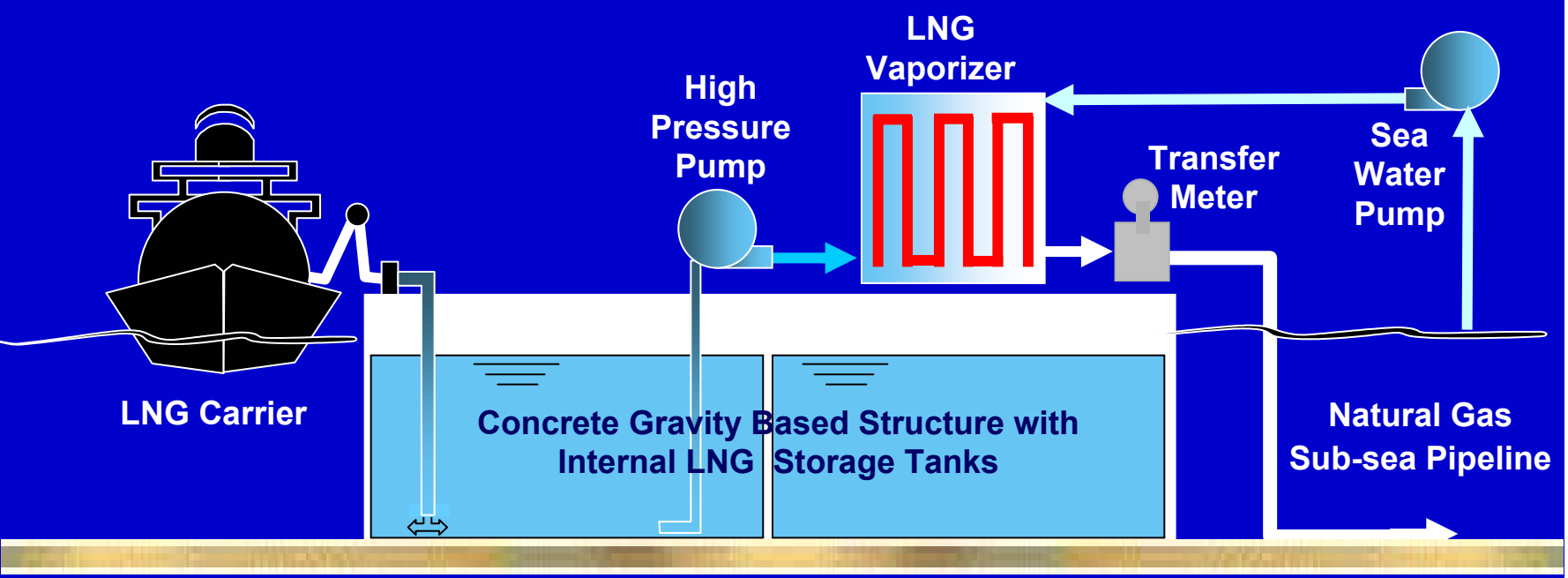
Bob Dimitroff

Objectives

Provide technical perspective regarding :

- ✓ *LNG Quality – Purity of LNG*
- ✓ *Hydrocarbon Dewpoint – Relationship to LNG Imports*
- ✓ *End User Interchangeability Issues*

Simplified Schematic
Offshore LNG Regasification Terminal



- LNG storage, -255º F @ atmospheric pressure
- High pressure LNG pumps to pipeline pressure
- Open Rack Vaporizer units convert LNG into natural gas
- Sea water pumped to vaporize LNG
- Custody transfer meters gas transmission to Pipeline / Market

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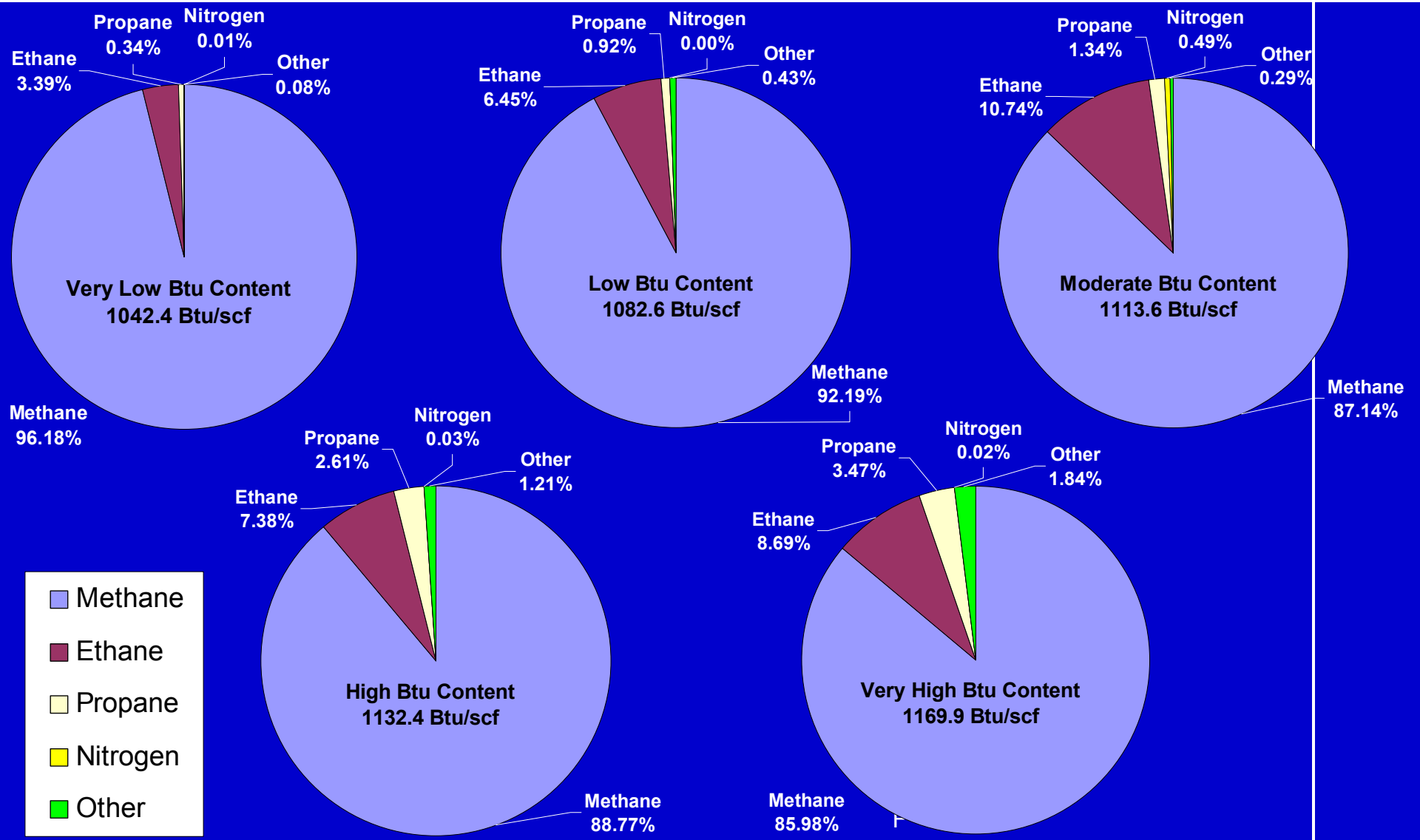
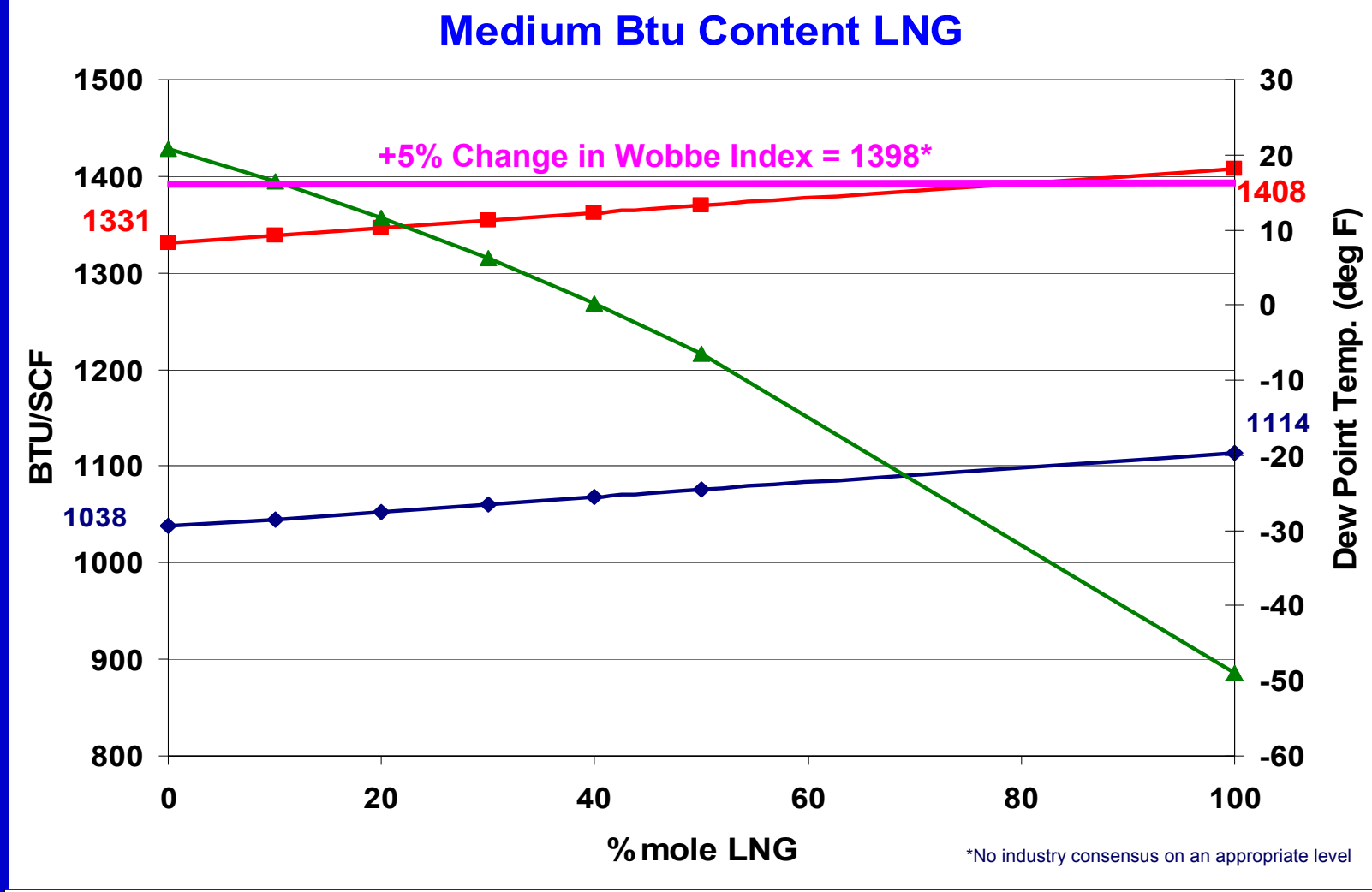
LNG Composition Examples

High quality natural gas



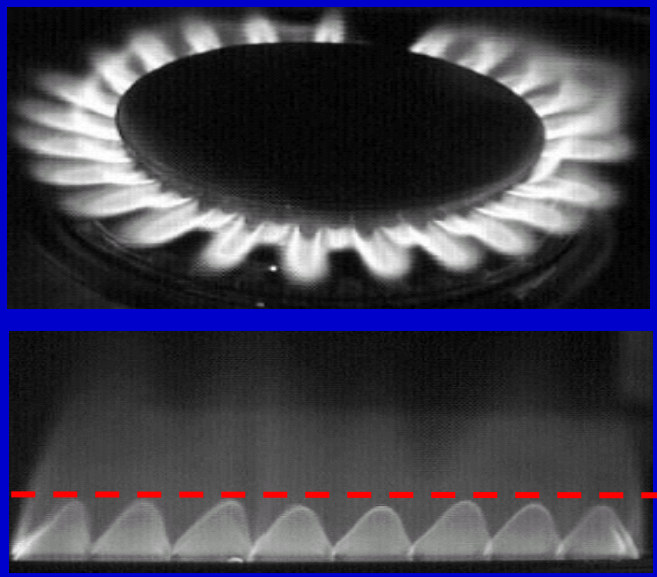
Benefits of LNG Imports
Impact on Combined Gas Stream



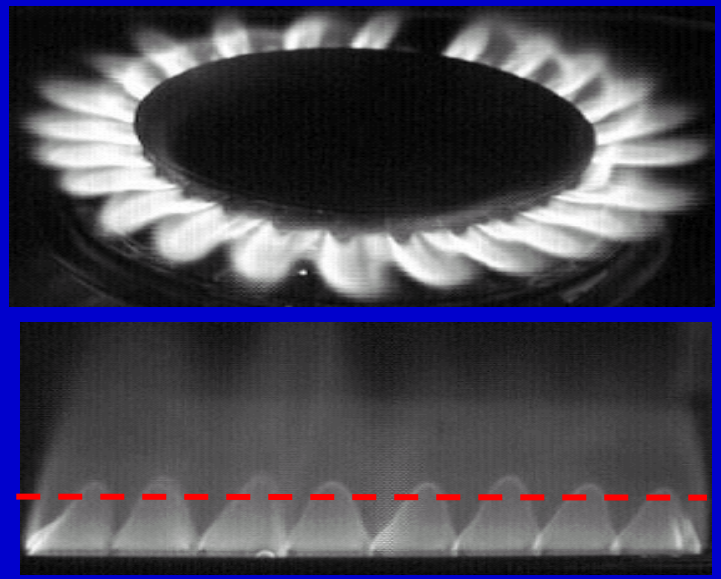
Key Issue – End User Gas Interchangeability
Burner tip characteristics

- Burner Temperatures - Temperature control & NOx Emissions
- Flame shape & stability
- Incomplete Combustion – HC & CO Emissions

Domestic Natural Gas
HHV = 1020 Btu/SCF



LNG (High BTU Content)
HHV = 1160 Btu/SCF



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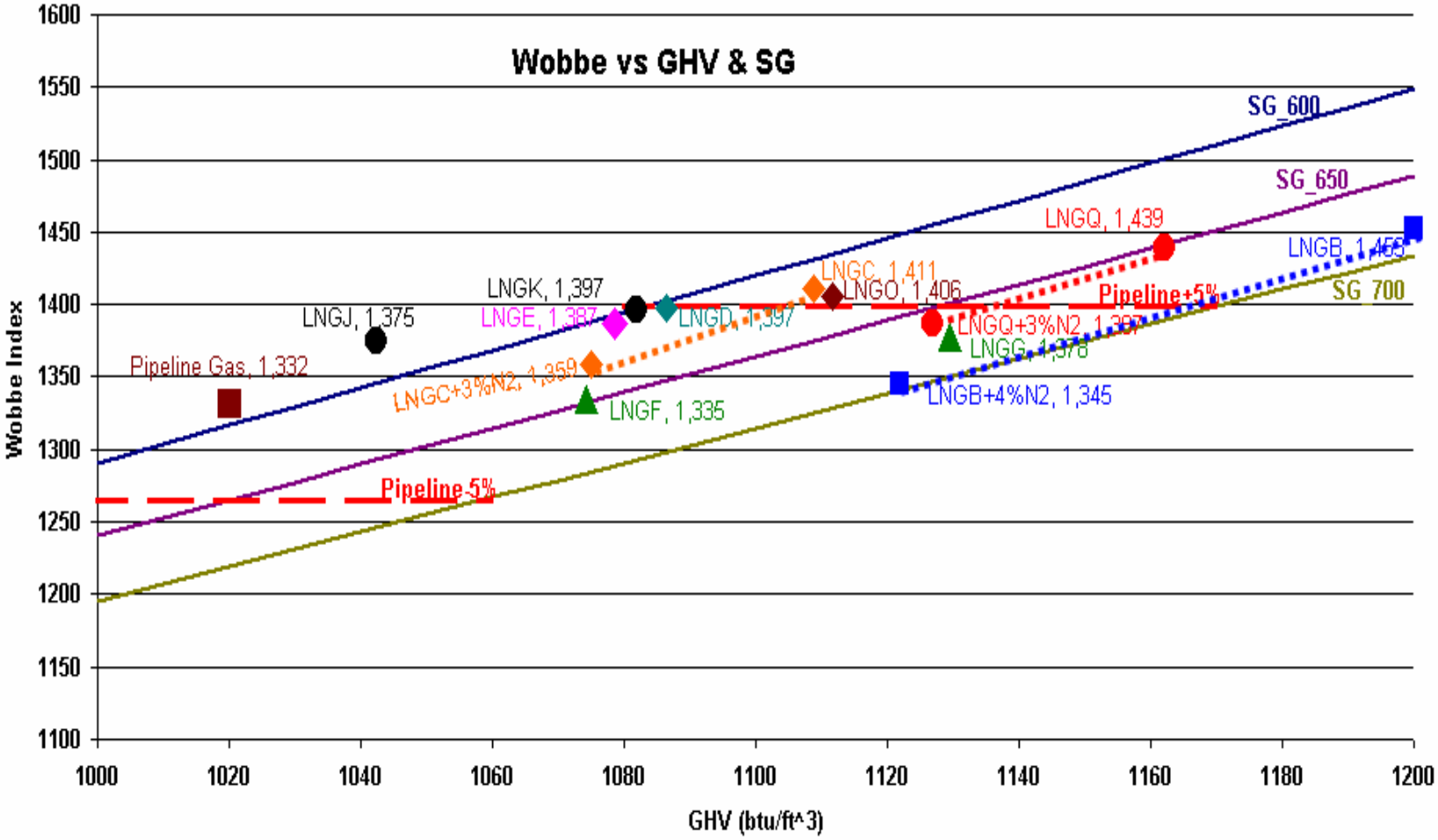
Benefits of LNG Imports
LNG vs. Wobbe Index



Summary & Path Forward

Summary

- ✓ LNG is a clean, high quality source of energy for the US
- ✓ HC Dewpoint is a preferred solution for P/L Operations
- ✓ End User Interchangeability
  - ✓ *Most LNG supplies fall within end user flame requirements*
  - ✓ Previously conducted tests generally document LNG interchangeability
  - ✓ Additional testing may be required on a case-by-case basis

Path Forward

- ✓ Establish a *standardized process* for the gas industry to use to review LNG imports.
- ✓ FERC is the appropriate agency to establish this process

References

1. Dominion Cove Pint LNG, LP, Docket No. CP01-076, CP01-077, RP01-17-01, CP01-156-000, and CP-01-156-001, July 16, 2003
2. GTI, *2003 Collaborative Project: Interchangeability of International Liquefied Natural Gas (LNG) with Domestic U.S. Pipeline Natural Gas,* Phase II – Industrial and Commercial Burners, Turbines and Microturbines
3. Halchuck, Rosemarie A., Gas Quality Specifications Ensure Interchangeability For End Users, Pipeline & Gas Journal, April 2003
4. Rogers, Daniel R., *Gas Interchangeability And Its Effects On U.S. Import Plans*, Pipeline & Gas Journal, August 2003
5. Rogers, Daniel R., *Long-Term Solution Needed To Embrace Imports With Pipeline Gas*, Pipeline & Gas Journal, September 2003
6. SoCalGas/SDG&E Gas Quality Standards, Meeting on Gas Quality for Baja LNG Project Developers, June 19, 2003

Appendix

LNG Projects

ChevronTexaco –Port Pelican and Baja California

Baja California Offshore LNG

- Gravity Based Structure (x2)
- 700MMSCFD expandable to 1.4 BCFD
- 13 KM offshore Tijuana

Port Pelican

- Gravity Based Structure (x2)
- 1.6 BSCFD
- 40 miles offshore Louisiana

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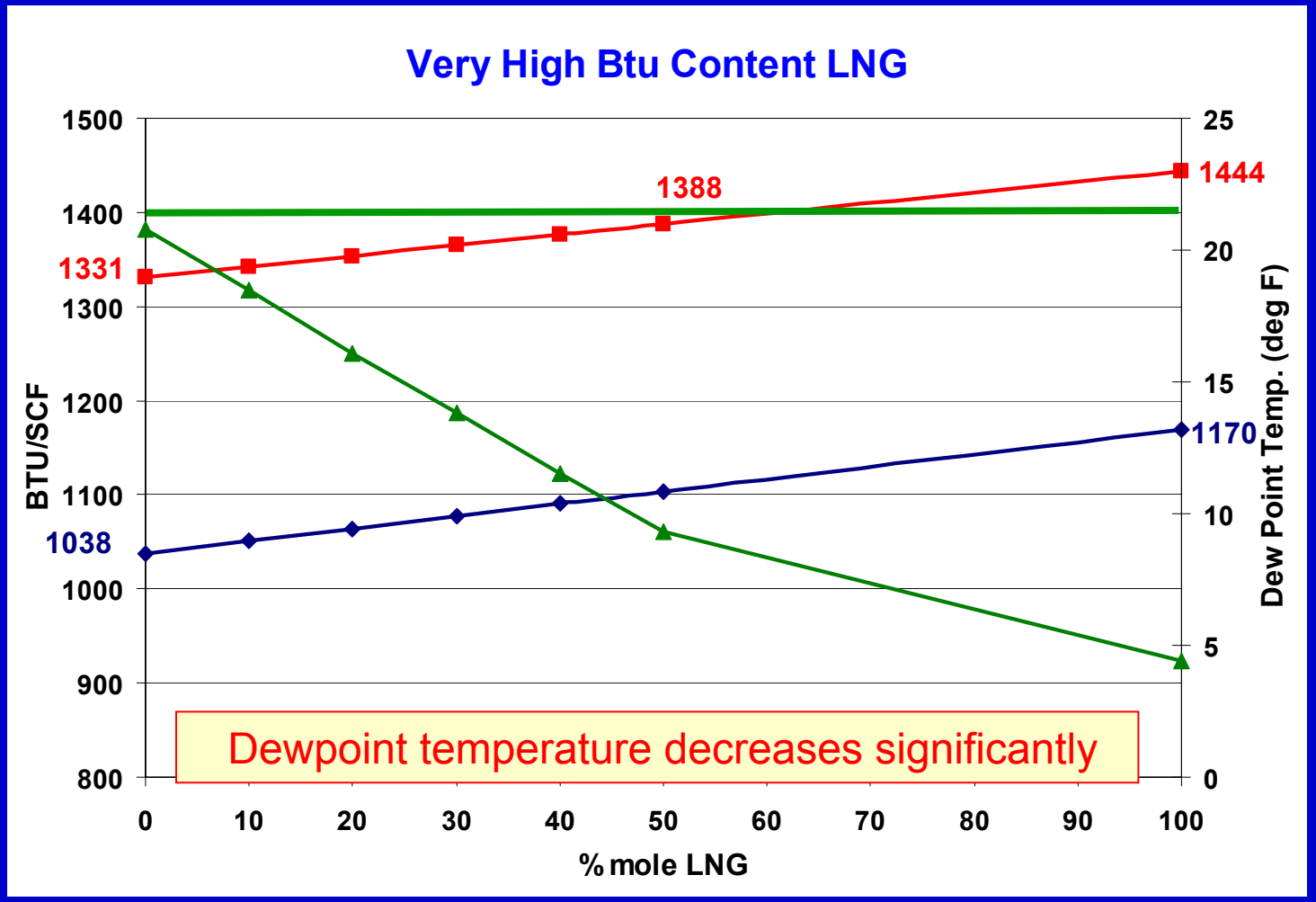

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Impact on Combined Gas Stream