

# Negotiating Sales Gas Specifications

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# Definition of Interchangeability

- From the 1930s to 2000
  - Flame characteristics are satisfactory after substitution of one gas for another.
- 2004 Natural Gas Council
  - Ability to substitute one gas for another without materially changing safety, efficiency, performance or emissions.

# The need for Interchangeability

- 1930s – Introduction of natural gas with locally produced town gas.
- 1940s – Peak shaving including propane-air systems.
- 1970s – Imported liquid natural gas.
- Today - More imported liquid natural gas and changes in domestic gas.

# Interchangeability Methods

- Single Index Method
  - Wobbe Index (1926)
- Multiple Index Methods
  - AGA Bulletin #36 (1946)
  - Weaver (1951)
- Lifting, Flashback, Yellow Tipping

# AGA Indices

- Lifting
  - 1.0 ideal,  $> 1.0$  lift tendency
- Flashback
  - 1.0 ideal,  $> 1.0$  flashback tendency
- Yellow Tipping
  - 1.0 ideal,  $< 1.0$  tendency to soot

# Weaver Indices

- Heat Rate
  - 1.0 ideal,  $> 1.0$  higher heat delivered
- Lifting
  - 1.0 ideal,  $< 1.0$  lift tendency
- Flashback
  - 0.0 ideal,  $> 0.0$  flashback tendency
- Yellow Tipping
  - 0.0 ideal,  $> 0.0$  tendency to soot
- Incomplete Combustion
  - 0.0 ideal,  $> 0.0$  tendency to produce CO

# Interchangeability Procedure

- Obtain pipeline gas flow and gas data.
- Calculate interchangeability indices for 100% Sales Gas and 100% pipeline gas.
- If not 100% interchangeable, calculate indices for blends to determine maximum allowable Sales Gas content.

# Project Results (1 of 2)

- **EBI Blend** into Trans Québec & Maritimes
  - Spec: 80% CH<sub>4</sub> min., 2% CO<sub>2</sub> max.
  - Sales Gas: 83% CH<sub>4</sub>, 0.6% CO<sub>2</sub>
  - 100% Sales Gas **Blend** acceptable
- **Winder Blend** into City of Buford
  - Spec: 95.5% CH<sub>4</sub> min., 1% CO<sub>2</sub> max.
  - Spec: Wobbe 1270 to 1395
  - 49% Sales Gas **Blend** acceptable

# Project Results (2 of 2)

- Point Loma Digester Gas
  - End of SDG&E pipeline, Rule 30 applies
  - Spec: 97.8% CH<sub>4</sub> min., Wobbe 1279 to 1385
  - Lifting ( $\leq 1.06$ ) Flashback ( $\leq 1.2$ ) YT ( $\geq 0.8$ )
  - 100% Sales Gas acceptable **Substitute**

# Selected Documents (1 of 2)

- 1927 Wobbe, A New Definition of Gas Quality
- 1946 AGA Bulletin #36, Gas Interchangeability
- 1951 Weaver, Formulas for gas interchangeability
- 1980 GRI, Prediction models for interchangeability
- 1982 GRI, Nonconventional gases and equipment
- 1984 Rossbach, What interchangeability means
- 1986 GRI, Trace constituents in landfill gas

# Selected Documents (2 of 2)

- 2003 Halchuk, Specifications for interchangeability
- 2004 Messics, Do you really need pipeline quality?
- 2004 Pomerantz, Pipeline gas from LFG in Canada
- 2005 NGC Paper on Natural Gas Interchangeability
- 2006 Halchuk, AGA Bulletin #36 and Weaver indices
- 2008 Pomerantz, Converting LFG into pipeline gas
- 2010 Pomerantz, High Btu project operating lessons