

TECHNICAL ISSUES AND RESEARCH NEEDS IN GAS INTERCHANGEABILITY IN THE U. S.

EF1: LNG QUALITY

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BACKGROUND DEVELOPMENTS IN THE U. S. NATURAL GAS INDUSTRY

- **Reduced Vertical Integration of U. S. Gas Industry**
- **Increased Levels of Horizontal Diversity**
- **Compositional Changes in Domestic Resources**
- **Changes in Gas Processing**
- **Increasing Prospects for Expansion of LNG Importation**
- **Changes in Gas Transport**
- **U. S. Market Size**

CONTEMPORARY DEFINITION OF GAS INTERCHANGEABILITY

“The ability to substitute one gaseous fuel for another in a combustion application without materially changing operational safety, efficiency, performance or materially increasing air pollutant emissions.”

U. S. NATURAL GAS COUNCIL ACTIVITIES

- The Natural Gas Council (NGC) and “NGC+”
- Formation of Gas Interchangeability Task Group
- 15 Month Work Effort
- *“White Paper on Natural Gas Interchangeability and Non-Combustion End Use”*
- Availability
 - U. S. Federal Energy Regulatory Commission
 - http://www.aga.org/Gas_Quality/

TASK GROUP FINDINGS AND RECOMMENDATIONS

- **Heating Value Alone is Not Sufficient**
- **Most Pipeline Tariffs Do Not Have Adequate Specifications**
- **A Large Body of Work Has Been Completed**
- **Wobbe Number is the Most Robust and Efficient Parameter, But More is Needed**
- **Guidelines Must Consider Historical and Regional Supply Characteristics**
- **Limited Data is Available on Changes in Supply**
- **Rates of Change in Supplies is Important**

TASK GROUP FINDINGS AND RECOMMENDATIONS (CONTINUED)

- **Presently, Limited Information on the Full Range of End Use Requirements**
- **Interchangeability Indices Are Widely Used and Serve as a Tool for Specifications**
- **European Experience Includes Important Lessons and Differences**
- **Problems in Applying Indices May Produce Overly Broad or Overly Narrow Interchangeability Specifications**
- **Significant Gaps in End Use Operating Data is Impeding Progress**

TASK GROUP CONCLUSIONS

- **Adoption of Limit Gas Testing Should be Investigated**
- **Additional Research Needed on Operation Limits of Equipment**
- **Value Would be Provided by National Specifications, But With Flexibility**
- **National Specifications May Suggest Broader Limits Than Local Conditions**
- **A U. S. Transition Plan Needed, Including “Interim Guidelines”**

INTERIM GUIDELINES FOR GAS INTERCHANGEABILITY, GAS INTERCHANGEABILITY TASK GROUP 2005

A. A range of plus and minus 4% Wobbe Number Variation from Local Historical Average Gas or, alternatively, Established Adjustment or Target Gas for the service territory.

Subject to:

Maximum Wobbe Number Limit: 52.16 mJ/m³ [1,400]

**Maximum Heating Value Limit: 41.36 mJ/m³ [1,110
Btu/scf]**

INTERIM GUIDELINES (CONTINUED)

B>

B. Additional Composition maximum limits:

Maximum Butanes+: **1.5 mole percent**

Maximum Total Inerts: **4 mole percent**

C. EXCEPTION: Service territories with demonstrated experience with supplies exceeding these Wobbe, Heating Value and/or Composition Limits may continue to use supplies conforming to this experience as long as it does not unduly contribute to safety and utilization problems of end use equipment.

ONGOING TECHNICAL ACTIVITIES

- **Gas Appliance Manufacturers Association-Led Testing**
- **Regional Programs, Including SempraUtilities/Southern California Gas**
- **GTI Program on Heavy Commercial/Industrial Burners**
- **U. S. Department of Energy/National Energy Technology Laboratory Program on Power Turbines**
- **European Activities**
- **Proprietary Activities**

CONCLUDING COMMENTS AND ISSUES

- **Natural Gas as a Fungible Commodity in the U. S. Market?**
- **Balance of End User Requirements with U. S. Supply Needs?**
- **Gas Interchangeability Requirements and the Potential of Excluding Supply?**