

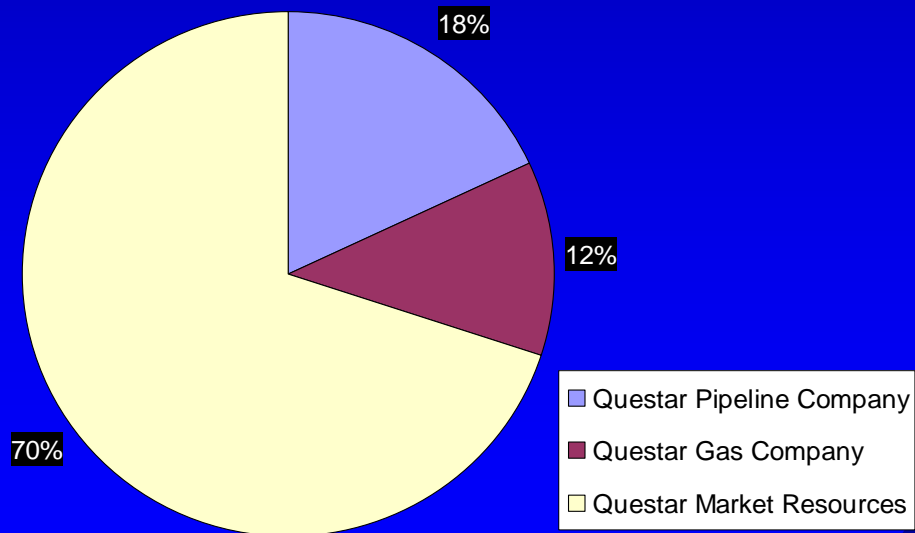
NARUC Summer Committee Meeting

Salt Lake City
July 11, 2004

Chuck Greenhawt
Manger, Regulatory Affairs
Questar Regulated Services

Questar

- ◆ Exploration and Production
- ◆ Interstate Pipelines
- ◆ Local Distribution



Net Income by Company

Why is gas quality an issue after decades of natural gas distribution?

- ◆ Production historically sourced to a market
- ◆ FERC orders create a national grid
- ◆ The rise and fall of gas processing
- ◆ The rise and fall of production areas
- ◆ The rise and fall of gas prices
- ◆ The emergence of non-traditional supplies
LNG/coal seam gas
- ◆ Electric generation and other specialized end uses

Current Quality Issues

- ◆ Liquids fallout - Gas Quality
- ◆ Supply interchangeability / LNG – coal bed methane

Specific Concerns

- ◆ Burner tip safety
 - Lift off, yellow tipping, flashback, CO
- ◆ Increased air emissions - turbines, CNG vehicles, line heaters
- ◆ Turbine performance
- ◆ Pipeline corrosion
- ◆ Equipment damage from liquids

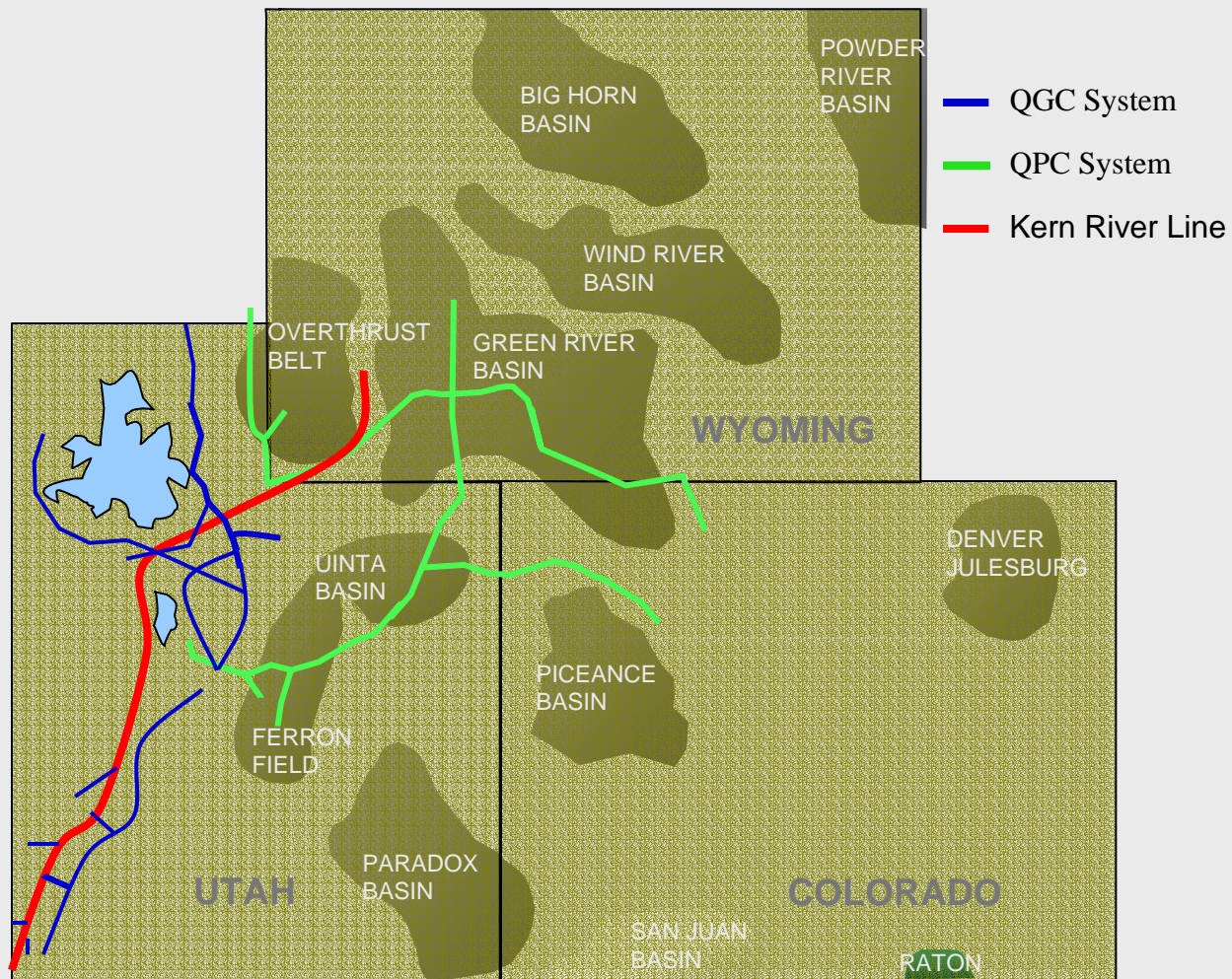
Historical Quality Environment

- ◆ More processing
- ◆ Better processing technology
- ◆ Lower BTU values

Gas Processing Volatility

- ◆ Sustained high gas prices
- ◆ Sudden loss of processing affecting gas quality

QGC / QPC System Map



Wet / Dry Gas

GAS QUALITY COMPONENT	Dry Gas	Wet Gas
Methane	96.39%	85.47%
Ethane	0.38%	7.85%
Propane	0.09%	2.54%
Iso-Butane	0.02%	0.53%
Normal-Butane	0.01%	0.52%
Iso-Pentane	0.00%	0.19%
Normal-Pentane	0.00%	0.15%
Hexane	0.00%	0.14%
Heptane	0.00%	0.10%
Octane	0.00%	0.06%
Nonane	0.00%	0.01%
Nitrogen	0.18%	0.00%
Carbon Dioxide	2.94%	2.33%
BTU/SCF	988	1137
SPECIFIC GRAVITY	0.5871	0.6719
HYDROCARBON DEW POINT TEMP (Degrees F)	-107.0	72.8

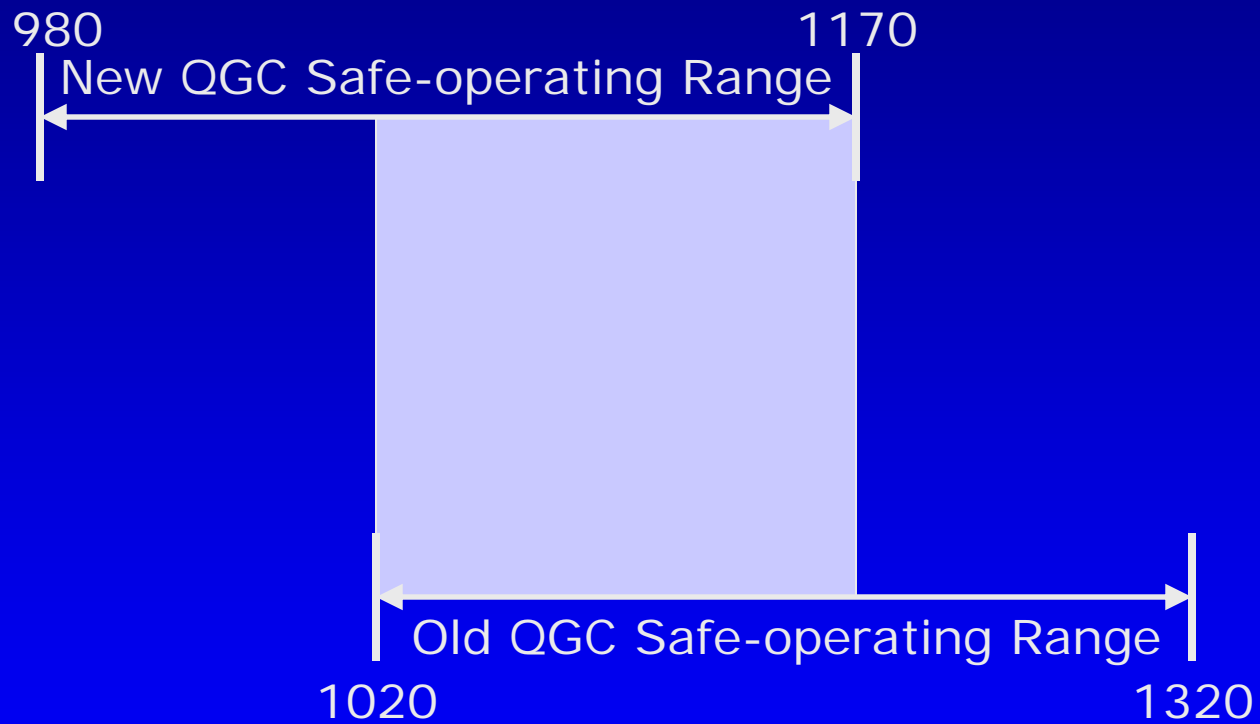
QGC BTU Ranges



QGC BTU Ranges



QGC BTU Ranges



Responsibilities / Roles

- ◆ LDC – maintain heat value of gas within the commission-approved range, (Utah commission rule 746-320-2.B)
- ◆ Regulators – approve the operating range (Commission rules)
- ◆ Manufacturers – produce equipment that will safely operate within the range (American National Standards Institute)

Responsibilities / Roles (cont.)

- ◆ Contractors – install and adjust equipment to safely operate within the range (Appliance-manufacturer's installation instructions)
- ◆ Building-Code Officials – Inspect to ensure new installations have been properly done (International Mechanical Code 107.1)
- ◆ Customers – Maintain their equipment to ensure it operates safely

Major Issue / Interchangeability

- ◆ Where are your LDC ranges?
- ◆ Where are your appliances adjusted to?
- ◆ What gas will enter your LDC's system?

SDGE Gas Quality

	Current Range of Gas Supplies	Current System Average	Potential LNG Supplies
Heating Value:	1007 - 1150 Btu/cf	1020 Btu/cf	1063 - 1166 Btu/cf
Wobbe Index:	1283 - 1431	1332	1373 - 1446
Carbon Dioxide:	0.9 - 3.0%	1.25%	Trace
Air (N ₂ , O ₂):	0.1 - 3.2%	0.7%	Trace
Total Inerts:	0.3 - 4.0%	1.95%	Trace
Methane:	84 - 99%	95.4%	83.2 - 91.2%
Ethane:	0.1 - 10%	2.1%	4.3 - 13.2%
C ₃ +	0.1 - 7.1%	0.5%	2.2 - 5.0%
C ₆ +	Trace - 0.1%	Trace	Trace

Current SDGE Gas Quality Standards

SoCal Rule 30

- ◆ Heating Value: 970 Btu/cf Min
1150 Btu/cf Max
- ◆ Carbon Dioxide: 3% Max
- ◆ Oxygen: 0.2% Max
- ◆ Inerts:
 - CO₂, N₂, O₂: 4% Max
- ◆ Interchangeability:
 - Meet AGA Bulletin 36 interchangeability indices relative to typical gas in system

CARB NGV Fuel Spec.

- ◆ Hydrocarbons:
 - Methane: 88% Min
 - Ethane: 6% Max
 - C₃+: 3% Max
 - C₆+: 0.2%Max
- ◆ Inerts
 - CO₂ + N₂ : 1.5% Min
4.5% Max

SDGE Findings

- ◆ Southern California safely handles a wide range of gas supplies with a significant variation in gas quality
 - Limited volumes of outlying gas supplies
- ◆ Magnitude of potential LNG supplies & system characteristics will limit ability to blend LNG with pipeline gas
 - Swings in gas demand will result in a significant number of customers regularly being switched back and forth between LNG and pipeline gas
- ◆ Current Gas quality standards require review and may require modification
 - Interchangeability Indices may not apply for new burner technologies
 - Combustion equipment may not be sufficiently robust to handle rapid swings in gas composition
- ◆ Current CARB NGV Fuel Specifications will inhibit introduction of most potential LNG supplies

FERC Issues

- ◆ Feb 18th conference
- ◆ Trying to balance interests of interstate pipes, producers, LNG importers, direct connect customers, & LDC's
- ◆ Interconnectivity / Free flow across markets
- ◆ More supply – Pro LNG, coal seam production

Natural Gas Council Efforts

- ◆ AGA, INGAA, NGSAA IPAA and other stakeholders – 7 principles
- ◆ Quality concerns – liquid fallout (HDP, Cricondentherm)
- ◆ Interchangeability issues – How do we get LNG / Coal seam gas and traditional gas sources to flow nationally (WOBBE Index)

Natural Gas Council Principles

- 1 The Industry is committed to leading the development of a timely solution to the gas quality and interchangeability issue, in coordination with FERC.
- 2 Any solution should allow the natural gas delivery system sufficient operational flexibility to maintain system integrity and reliability for their diverse service regions and customer mix.
- 3 Any solution should not limit a diverse gas supply.
- 4 Any solution should recognize end-use equipment and customer needs.
- 5 Any solution must be consistent with protecting public safety.
- 6 Any solution should be cost efficient.
- 7 Any solution should provide for required communications among parties.