Unconventional Gas as a Resource for LNG

Opening Remarks
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Natural Gas Resources

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Characteristics of Shale & Tight Gas

• Composition can vary widely
  – Typically ~80-97% methane
  – If present, C2-C4 can be extracted for sale
  – In North America, fed into pipeline network
  – Some heavy hydrocarbons (C5+) remain

• Heavy hydrocarbons must be removed
  – Will freeze-out at LNG temperatures
  – Removal by distillation and/or adsorption
Heavy Hydrocarbon Removal

Removal Before Liquefaction

Removal Integrated With Liquefaction

- Several process configuration options
- Removal before liquefaction
  - Requires more equipment
  - Can handle a wider range of feed gas compositions
  - Particularly attractive for lean feeds
Characteristics of Coal Bed Methane

• Contains almost pure methane
  – Typically heavy hydrocarbon removal is not needed

• Many small wells manifolded together
  – Flow to liquefaction plant can vary
  – High turndown requirements

• Lengthy de-watering process
  – May have to be reestablished if flow is stopped
  – Important to keep plant online with a robust liquefaction process
Other Considerations

• Conversion of existing liquefaction facilities
  – Composition may change as more gas is brought on-stream
  – Facility reassessment required to identify bottlenecks

• Environmental  – reduced carbon emissions
  – Efficient, reliable facility with high on-stream
Key Considerations for Liquefaction of Unconventional Gas

- Feed gas composition and variability
- Upstream recovery and processing requirements
  - e.g. de-watering for coal bed methane
- Impact on equipment and performance for existing facilities
- Environmental considerations