LNG Quality and the UK Gas Market
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- Meeting the UK gas quality
- What LNG spec to design for?
- Variation of LNG quality
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Isle of Grain - Background

- National Grid Grain LNG is the Terminal Owner responsible for all operations at the terminal

- Capacity rights for Isle of Grain Phase I was awarded jointly to BP and Sonatrach in October 2003

- Terminal commissioning was planned for 1Q05
The UK Gas Specification

What were the choices?

• **UK Gas Specification**
  - Current restrictions to LNG import
    - wobbe range 47.2 - 51.41 MJ/Sm3
    - Incomplete Combustion Factor (ICF) <= 0.48
  - Unlikely to change in the time frame required

• **Pipeline mixing**
  - Additional infrastructure would be required to deliver sufficient pipeline gas for blending
  - Required further detailed studies with no guarantee of solution in the time frame

• **Nitrogen ballasting**
  - Feasible in time frame and provided a flexible solution with a mix of capital investment and variable costs
Nitrogen Loss during Shipping

Nitrogen Change vs Journey Time

% N2 Loss vs Voyage time, Days

Graph showing the percentage of nitrogen loss over voyage time.
Effect of Voyage on LNG Quality

Loaded and Discharge Wobbe vs Nitrogen content
- Typical Middle East LNG

Wobbe, MJ/m³ vs Nitrogen, mol%
Gas Quality Solution

- **Nitrogen ballasting**
  - Mix of fixed pre-investment for long term nitrogen generation on site and a short term flexible supply by trucked-in liquid nitrogen
  - Enabled a two phase solution that provided a fast track solution for early terminal operation
    - Phase I – Trucked in liquid nitrogen with storage on-site
      - Delivery 1Q05
    - Phase II – On-site gaseous nitrogen production
      - Delivery 3Q05
  - Combination of significant liquid storage at site combined with on-site nitrogen generation gives high availability of nitrogen
  - Long term build, own and operate contract awarded to Air Products in June 04
Phase I - LIN tanks arriving at site
Phase II - Nitrogen production at the Isle of Grain Terminal

Facility installed within the Grain facility but operated by Air Products

Recondenser – due for completion 2Q06
Summary

- Nearly all LNGs require gas blending measures to meet the UK gas specification.
- The UK spec is unlikely to change in the foreseeable future.
- Quality adjustment to attract LNG supply from the widest number of possible sources.
- Close co-operation on both technical and commercial issues enabled delivery in time for the terminal start-up.
• Thank-you for your attention