



WHEN TRUST MATTERS

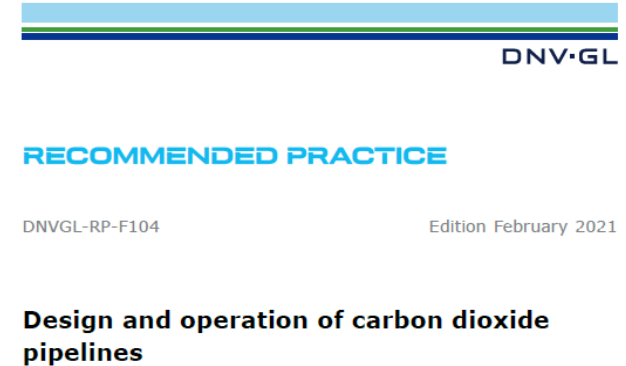
Requalification of Pipelines for CO₂ Service in Industrial Hubs

14th April 2021

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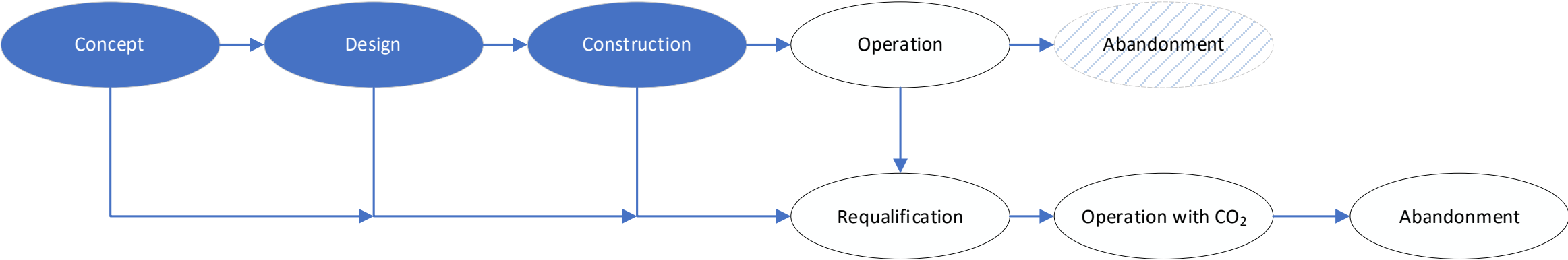
Approach and Experience

- Industrial hubs and hydrogen manufacturing centres will need to transport CO₂ to sequestration
- The most economic solution is repurposing existing hydrocarbon pipelines
- We have completed several projects in this area for offshore and onshore operators
- Our current approach is based on DNVGL-RP-F104 “Design and operation of carbon dioxide pipelines”



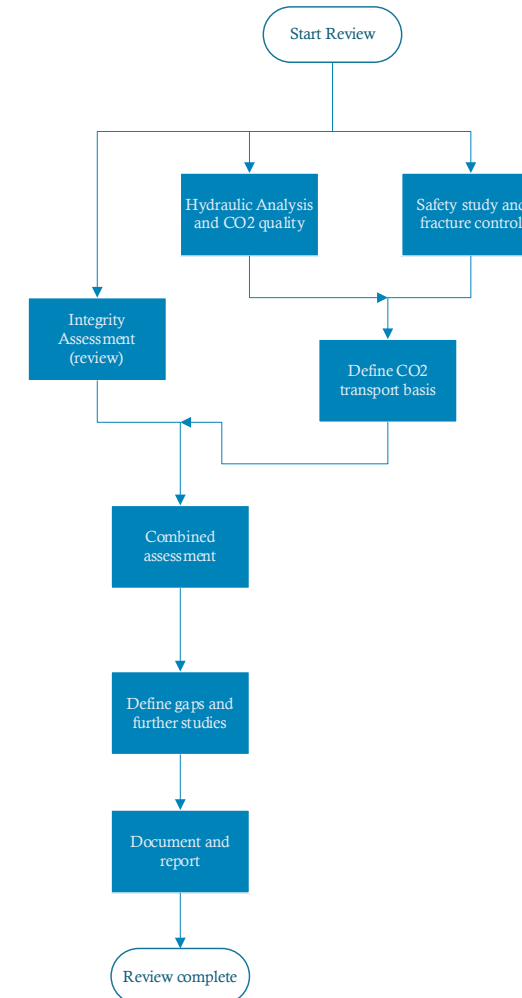
The electronic PDF version of this document, available at the DNV GL website dnvgl.com, is the official, binding version.

F104 Requalification Process



Review Process

- Structured review
- Includes:
 - Hydraulic analysis (Pipeline capacity/Phase behavior)
 - CO₂ Quality (Source)
 - Safety (Dispersion etc.)
 - Fracture control (Linepipe/weld properties)
 - Integrity Assessment (current and future condition)
- Defines the transport basis
- Then combine and advise feasibility



Key Aspects



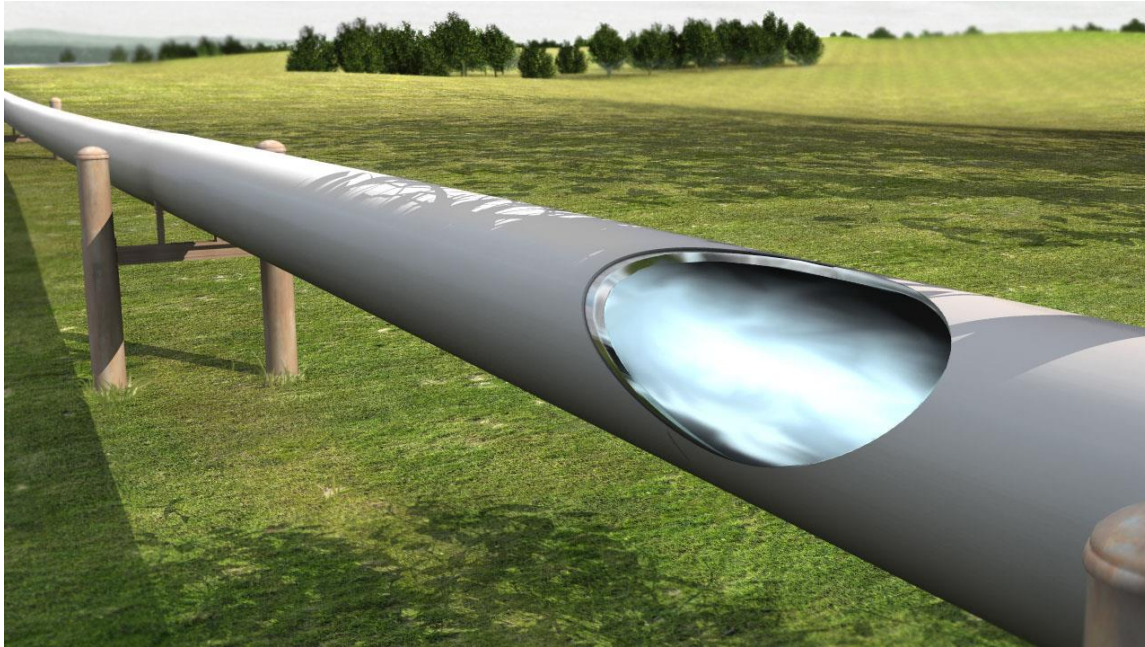
CO₂ Impurities

- Influence phase behaviour
- Influence corrosion

Water Content

- Dehydration reliability
- Water detection

Key Aspects



Safety

- Consequence of failure can be high compared to natural gas
- Understand dispersion distances
- Control probability of failure with excellent corrosion control

Current condition

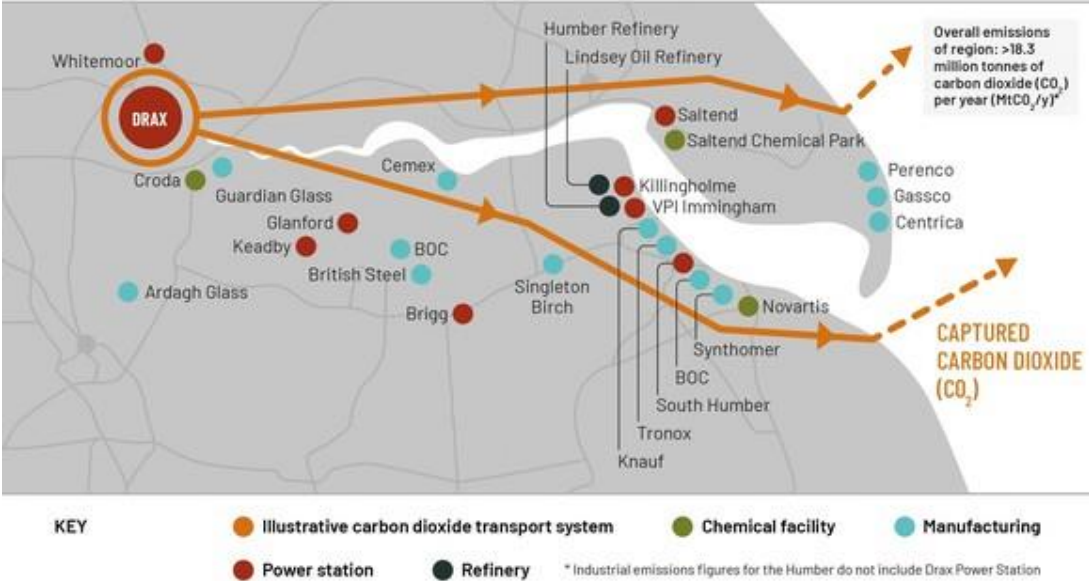
- Vital to know maximum operating pressure
- Controls whether dense phase transport is possible

UK Projects

THE UK'S LARGEST CLUSTERS BY INDUSTRIAL EMISSIONS ONLY



POWER STATIONS AND INDUSTRIAL PROCESSES IN THE HUMBER REGION



Conclusions



It is possible to requalify hydrocarbon pipelines for CO₂ service

High pressure natural gas pipelines are most suitable for dense phase transport

Other hydrocarbon pipelines may need to be used for gas phase CO₂

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