

Cadent

Your Gas Network

Challenges for future exercises

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Agenda

- 1. Reminder of why we have Emergency Planning**
- 2. What changes does hydrogen bring?**
- 3. New challenges with emergency planning under hydrogen**
- 4. Future Work in this area**
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Reminder of why we have Emergency Planning

Compliance with Pipeline Safety Regulations [10] a Local Authority is required to have an emergency response plan for sections of major accident hazard pipelines that cross their area.

Must be specific to the pipeline – rather than a generic document

Supports the coordination across the emergency service – giving clear roles and responsibilities

Reviewed and tested regularly – if we continued with Natural Gas pipelines only, this could continue with minimal change



What changes does hydrogen bring?

Today, with Natural Gas, we have prepared plans for incidents on major accident hazard pipeline based on understanding of risk

A change of the gas that we transport changes that risk



Risk profile change

Our understanding so far is that volume of escaping gas under hydrogen increases, but due to the lower calorific the energy is similar to methane

Risk profile change

The thermal radiation under hydrogen is lower than with Natural Gas reducing the wider risk for fires

Risk profile change

For BPDs, we are still progressing with the initial assumption from the HyTechnical work which is that the natural gas BPDs are suitable for hydrogen. This is as written in IGEM/TD/1 Supplement 2.

New challenges with emergency planning under hydrogen

Delayed ignition

We know from previous incidents that delayed ignition is possible for above ground hydrogen releases.

However, it remains uncertain for buried pipelines. The hazard extents and risk contours can vary widely depending on the assumptions used for ignition probability and ignition timing.

There were some initial tests at Spadeadam carried out as part of the FutureGrid project, but further testing is needed to validate the assumptions used in risk models.

Future Work in this area

1 Work Instructions

SGN are currently in the process of developing Work Instructions (WI's) for our live trial emergency response which will be trial specific instructions. In addition, we are also scheduling an emergency response desktop workshop with all key stakeholders for August this year. This will then follow into completion of an actual emergency response simulation during the live trial.

2 Delayed Ignition

We have further tests scheduled through the Pipeline Safety Group this year and next year.

3 Mechanical Damage

Testing on response to mechanical damage is a gap to fill on the correct response to damage to manage risk

General hydrogen evidence building update

LTS future – delivery due to HSE

- Stopple testing assessing current technologies capability under 100% hydrogen
- Tensile testing (slow strain and standard rate)
- Diffusion and flux testing
- Case studies – Grangemouth to Granton pipeline
- Case studies – Newton block valve
- Design of the supply pipeline
- Capacity assessment test plan for Grangemouth to Granton pipeline
- Fatigue and fracture toughness testing



General hydrogen evidence building update

- Futuregrid - delivery due to HSE
 - Rupture tests and QRA
 - Safe venting and recompression for transition
 - Conclusion of the testing of blend up to 100% hydrogen at Futuregrid microgrid
 - Impact on valve actuation systems of hydrogen
 - Lab testing permeation testing of X52,X60,X65,X70 and various gas compositions



General hydrogen evidence building update

HyNet

- Development of philosophies for Operational Readiness
- Development of QRA methodology for new build pipeline network
- Assessment of impact for Land Use Planning



Q&A



Thank you

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