

Network Innovation Allowance Closedown Report

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form.

Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

Project Closedown

Project Title

Alternatives to Venting

Project Reference

NIA_NGGT0001

Project Licensee(s)

National Grid Gas Transmission

Project Start Date

Apr 2009

Project Duration

4 Years 4 Months

Nominated Project Contact(s)

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Scope

Planned venting can arise from a number of sources around the network, including venting at compressor sites and pipeline decommissioning for repair, replacement or modification. Planned venting at compressor sites is monitored and recorded through the on-line control system. For 2011/12, this was reported as 2984 tonnes of natural gas.

For pipeline decommissioning current best practice employed by the Pipeline Maintenance Centre (PMC) involves transfer of gas from the decommissioned section to an active section by means of a compressor but this is only feasible until the decommissioned section pressure reaches 7 bar. At this pressure the Portable Recompression Equipment operation cannot increase the pressure sufficiently to transfer the gas to the active section. So the final operation during decommissioning is to then vent the remaining gas. To improve the environmental performance of final stages of the decommissioning process several options are available including:

- 1 Collect the gas and use either on the decommissioned site or elsewhere with the network.
- 1 Flare the gas. Methane is recognised as having a significantly greater "Global Warming Potential" (GWP) than carbon dioxide, approximately twenty times. Thus flaring will reduce the environmental impact.

The programme of works looks to address some of these issues arising from the need for National Grid to vent either pipelines or compressor pipe sections as part of the normal operation either for maintenance requirements or as part of the normal control sequence. Its scope looks to cover the following areas:

- 1 Developed a venting decision/logging support tool.
- 1 Conduct trials to demonstrate mobile recompression equipment.
- 1 To develop and test the suitability of large scale adsorbed natural gas (ANG) technology to constructively reuse gas that would otherwise be vented to atmosphere.

This project is world leading with respect to the scale of the adsorbed natural gas (ANG) trials and will therefore deliver both a specific piece of new equipment and specific novel operational practices associated with the operation of the NTS.

Objective(s)

The desired result is the development of new best practice for lowering methane emissions during planned venting activities on the NTS.

Success Criteria

The programme will provide a comprehensive set of experimental and design information relating to the behaviour of large scale ANG natural gas capture. The results will confirm whether ANG is a viable natural gas capture technology and will provide valuable design information for the assessment of suitable utilisation technologies for the captured gas.

The delivery of the ANG programme will provide National Grid with a fundamental building block towards a venting capture and fugitive emissions 'road map' giving the company the opportunity of employing a holistic natural gas capture strategy across the network.

Performance Compared to the Original Project Aims, Objectives and Success Criteria

The Absorbed Natural Gas (ANG) demonstration plant was commissioned and operated onsite at a National Grid Flow Centre during the Spring and Summer of 2013.

The commissioned ANG test facility at a design adsorption capacity of 400m³ is the largest of its kind in the world. It was designed to be fully automatic and comply with all the necessary safety and operational requirements for remote unattended operation. For the purposes of demonstration the plant was manned during operation due to the high level of instrumentation monitoring and gas quality sampling requirements.

The trials demonstrated:

- 1 Repeated natural gas transfer on and off the activated carbon beds was achieved without reduction in take up volumes (degradation of carbon activity).
- 1 The plant achieved consistently high volume adsorption rates of between 90% to 95% of the capture design capacity of 400m³. The adsorption volume was found to be largely insensitive to the gas flow rates.
- 1 Full control of gas quality within the required limits of GS(M)R^[1] was maintained throughout all sections of the adsorption and desorption cycle.
- 1 The plant was operated in modes and at pressures that were consistent with compressor and pipeline venting allowing direct assessment of the technology for these applications.

The ANG results confirm that:

- 1 Large scale adsorbed techniques are practical alternatives for the capture and storage of typical UK natural gas.
- 1 The development of a large-scale ANG facility could be practically implemented within the existing safety frameworks without increasing plant complexity.
- 1 The project trials provided sufficient clarity in terms of possible future design avenues that enable the technology to be readily retrofitted to existing compressor facilities or sufficiently portable for pipeline venting activities.

^[1] GS(M)R :- Gas Safety (Management) Regulations 1996

Required Modifications to the Planned Approach During the Course of the Project

During the detail design stage, it was felt necessary to ensure that the ANG facility could be operated completely automatically. This was considered appropriate and would facilitate future implementation.

Lessons Learnt for Future Projects

The development and operation of a facility at a scale that is consistent with in-service requirements has greatly assisted in the evaluation and future implementation of this technology.

The change to a fully automatic requirement, increased control complexity and resulted in a final control philosophy that was overlaid upon the initial design rather than fully integrated into it. However, the eventual control philosophy adopted will provide important information for the design of subsequent ANG storage facilities.

Note: The following sections are only required for those projects which have been completed since 1st April 2013, or since the previous Project Progress information was reported.

The Outcomes of the Project

This Alternatives to Venting project delivered:

- 1 Provision of a venting support tools and demonstration of mobile pipeline recompression equipment to improve the company's future GHG emissions portfolio.
- 1 The world's largest ANG natural gas vent capture facility able to adsorb and desorb gas at rates commensurate with compressor venting cycles without performance loss of the adsorbent.
- 1 Solid learnings that place National Grid in a strong position to develop a flexible ANG capture facilities that could be implemented across a number of NTS scenarios.

Planned Implementation

National Grid is currently evaluating the most cost effective ways to reduce emissions. The information provided by this project enables National Grid to determine the most appropriate place for ANG within the strategy.

Other Comments

n/a