UNC Workgroup Report

UNC 0808:

Reverse Compression

Reverse Compression UNC Mod 0808
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John Baldwin
Managing Director
CNG Services Ltd

john.baldwin@cngservices.co.uk
www.cngservices.co.uk
07831 241217

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CNG Services Ltd

- CNG Services Limited (CSL) provides consultancy, design and build services to the biomethane industry, all focused on reducing Greenhouse Gas (GHG) emissions
- In the past 10 years our efforts have produced a material impact with an estimated 20 year project life reduction in CO_2 emissions of 17,500,000 tonnes through:
  - Biomethane injection into the gas grid
  - Running trucks on Bio-CNG
  - Acting as developer and design and build contractor for the Highlands CNG Project
- Working on a number of Biomethane, H_2 and CCUS innovation projects including:
  - Biomethane from manure with CCS
  - Green H2 into the NTS
  - Reverse Compression to Create Capacity
- CSL is an ISO 9001, 14001 and 45001 approved company and has also achieved Achilles certification. CSL is GIRS accredited for design and project management and has been certified as a competent design organisation for high pressure UK onshore natural gas works by DNVGL

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Update re Mod 0808 – Reverse Compression

- The GDNs legal advice was that the party owning the compressor(s) and inlet and outlet pipework must have a GT Licence with associated Safety Case
- This means that the Mod 0808 as drafted is no longer appropriate as this envisaged that the compressor owner (and owner and operator of the short connection pipelines to the low and high pressure pipelines) did not have a GT Licence
- Smart pressure control is a good innovation and that should be the first way to provide capacity for biomethane
- However, for many projects it cannot provide the capacity
- CNG Services Ltd (CSL) believes there are 3 Options:
    1. GDN Provided RC as per Cadent Doncaster which will provide capacity in a very large area that has a common 7 bar pipeline
    2. GDN provided RC but with the RC adopted under a self-lay process (as per Cadent transmission pipelines)
    3. An iGT owns and operates the RC
- CSL Services has 8 projects in the Cadent area that need RC for capacity.
    - 4 may be suitable for Option 1 or Option 2 as each RC will support 2 biomethane projects
    - 4 of the RC projects only support a single biomethane site and may be more suitable for Option 3
- The next slide sets out the proposed way forward for Option 3

RC site in France

Summary

1. iGTs can build networks and connect to a DN. That is what a Reverse Compressor iGT (RCiGT) will do. Nothing out of the ordinary. For the purposes of this briefing RCiGT will be used but it is identical to a normal iGT

2. RCiGTs want connections exactly like any other existing or future iGT, with no different rules, no changes. The RCiGT would be a standard iGT owner and operator with no special conditions and no special treatment. The RCiGT will have a Safety Case approved by the HSE which will cover compressor operations

3. The RCiGT always connects to two different pipelines in the same LDZ/GDN area, typically MP/IP at the low pressure side and LTS at the high

4. CNG Services Ltd/Barrow Shipping believe that this should be treated like any other iGT connection. The UNC is silent in relation to an iGT having only one connection to the GDN. So we believe that having a second connection is identical to the first as far as all the UNC etc arrangements are concerned

5. With two connections there is an added complication that, just like any other pipe in a network, there is a theoretical possibility that flow could move in either direction and could be in to rather than out of the GDN. But we do not think this makes any difference as the RCiGT wants a connection and if that allows more flow options, we do not see any issues with that

6. RCiGTs should be free to install compressors just like a GDN is free to do so. The key issue for the RCiGT, though, is to agree this with the DN concerned so that the planned capacity increase will actually work as intended. This requires a new Operating Agreement that is not currently in existence. This principle is agreed by all and required to cover items as discussed on the next slide

7. There is a question is about the status of the Operating Agreement. Can it just be a standalone bilateral between the DN and RCiGT or does it have to be referenced in the UNC? CNG Services Ltd/Barrow Shipping has no view if the Operating Agreement is or is not referenced in the UNC. But if it is referenced to the effect that the DN must offer an agreement and the terms are spelt out as far as practical, we would support that

8. Next steps – GDN feedback re above

DN- RCiGT Operating Agreement – Draft Scope

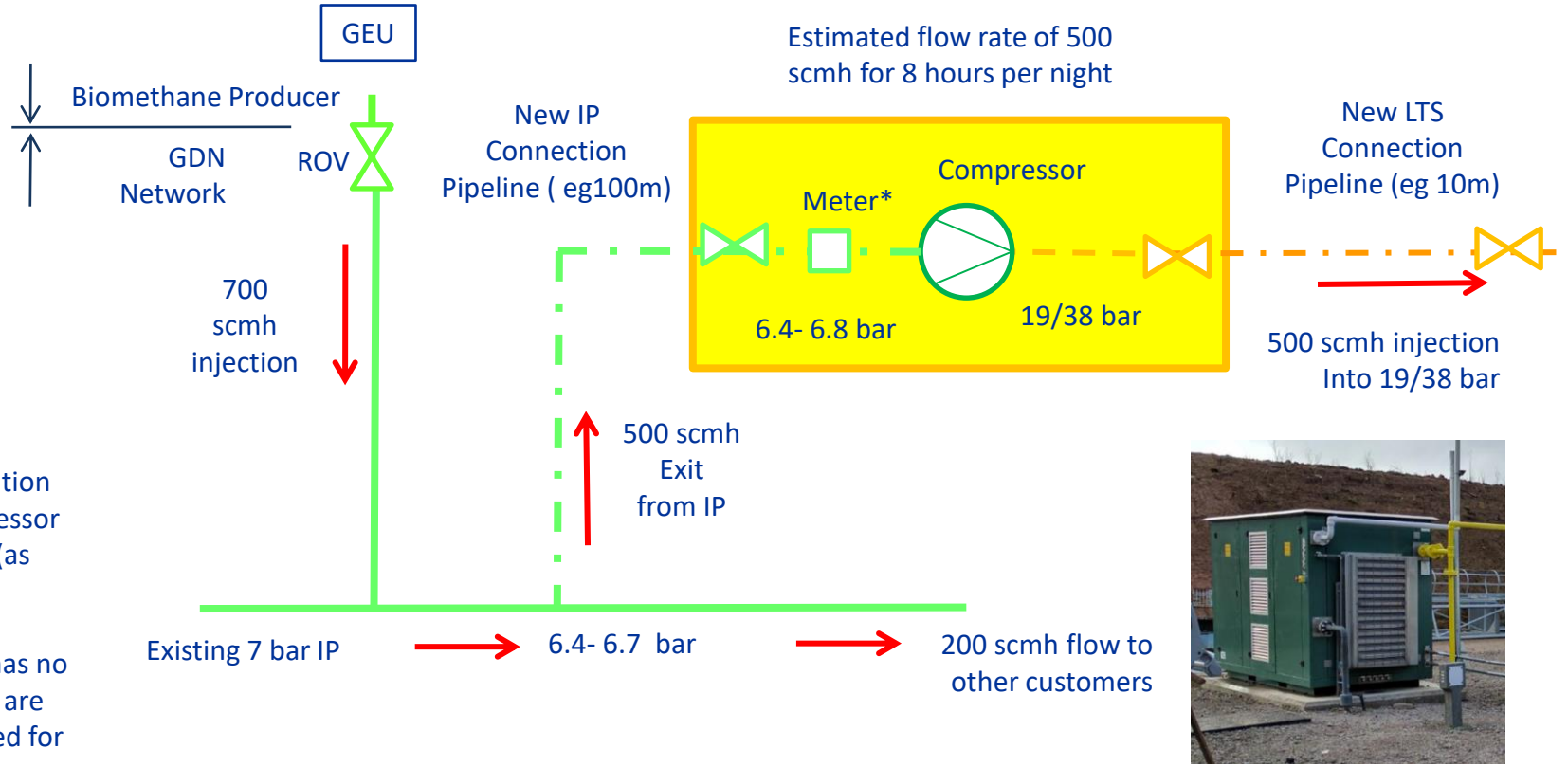
The list below contains data items that SGN feels need to be included in the Network Connection Agreement / Ancillary Agreement these considerations may need to be included in the modification solution to aid the legal text production. The comments from CSL/Barrow Shipping are given in response

	SGN Comments	CSL/Barrow Response
1	Communications between 3rd party & GDN – planned exit and entry flows from and onto the network. How would this work in terms of communication channels?	Envisaged that the RC site would have connectivity to the Internet/Telemetry as appropriate so allow the DN to access information such as compressor status (on or off), flow rate out of low pressure side, alarm status
2	Site management – agreement would need to cover non-operational windows when GDN required site to be turned down / off for network maintenance activities.	Agreed, there would be agreement in relation to maintenance co-ordination to help to minimise down time/flaring at the biomethane site (eg try and avoid maintenance on summer Sundays)
3	Gas quality – agreement would need to cover any mandatory requirements in relation gas quality monitoring and rules around operation of the asset. Possible G8 risk workshop.	The issue relates to oil from the compressor as the gas is not changing any other parameters. The RCiGT can demonstrate how it is ensuring no oil contamination into the high pressure grid
4	Site operation – agreement would detail how the site is operated, i.e. would it be manually triggered by the biomethane site or automatically by a control system which monitors the biomethane site flow rate?	The site would be unmanned and would start based on pressure, agreed with the GDN. Typically it would start at an MP pressure of 1.8 bar (say) and stop when the MP pressure had fallen to 1.5 bar. Pressures to be agreed for each specific site in an Appendix
5	The GDN may require the installation of a ROV to control gas flow off/on to the network.	It is envisaged that the reasons to shut off flow are defined in the Operating Agreement (eg gas leak alarm or high temperature) and these would close down the compressor and require site visit. In effect the compressor is the ROV
6	Asset responsibility – delineated lines of ownership and operational responsibility. 7	Agreed, drawings showing this would be an Appendix in the Operating Agreement
7	Exit and entry rates (Scm/h)	Agreed, in an Appendix in the Operating Agreement
8	End of life decommissioning responsibilities + impact of conversion of network to hydrogen.	RCiGT responsible to remove assets at end of life. The conversion of the network to hydrogen would impact the biomethane plant that the RCiGT serves and that will be the key driver from the RCiGT perspective

Example - IP to LTS Reverse Compression plant

Compressor Operations

Compressor operates when insufficient capacity in the IP for the biomethane project
The GDN is asked to set the IP at 6.5 bar (say) in summer
When the IP pressure reaches 6.8 bay (say) the compressor starts and runs until the IP pressure falls to 6.5 bar, it then stos
This cycle repeats as necessary
RCiGT owned and operated assets shown in yellow box



Note * - the meter provides useful management information for the RCiGT so that compressor efficiency can be measured (as electricity consumption is known). The reading can be provided to the GDN but it has no impact on control and there are no commercial uses proposed for the meter