

Stage 02: Combined Workgroup Report

0498:

Amendment to Gas Quality NTS Entry Specification at BP Teesside System Entry Point

0502:

Amendment to Gas Quality NTS Entry Specification at the px Teesside System Entry Point

At what stage is this document in the process?



0498: This modification will facilitate a change to the current contractual Carbon Dioxide limit at the BP Teesside System Entry Point, through modification of a Network Entry Provision contained within the Network Entry Agreement (NEA) between National Grid plc and Amoco (UK) Exploration Company LLC in respect of the CATS Terminal (BP Teesside).

0502: This modification will facilitate a change to the current contractual Carbon Dioxide limit at the px Teesside System Entry Point, through modification of a Network Entry Provision contained within the Network Entry Agreement (NEA) between National Grid Gas and px (TGPP) Limited in respect of the px Teesside System Entry Point.

Since these modifications are identical in nature, differing only in the impacted NEA, the Modification Panel requested a single report encompassing both. For simplicity, information in this report has been presented once but applies equally to both 0498 and 0502.



The Workgroup recommends that these modifications should now proceed to consultation.



Medium Impact: Transporters, Shippers and Consumers

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About this document:

This combined report will be presented to the Panel on **21 May 2015**.

The Panel will consider whether these modifications should proceed to consultation or be returned to the Workgroup for further assessment.



Any questions?

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1 Summary

Are these Self-Governance Modifications?

The Modification Panel determined that these are not self-governance modifications because they are likely to have an impact on Shippers, Transporters or consumers of gas conveyed through pipes.

Why Change?

0498 - The current carbon dioxide limit at BP Teesside System Entry Point of 2.9 mol% is incompatible with the anticipated gas quality specification of some potential new offshore developments. While the inclusion of processing and treatment solutions to remove the excess carbon dioxide are being considered upstream of the National Transmission System (NTS), these would require significant investment and/or operating costs, reducing the economic delivery of those developments. Hence, this modification seeks to establish whether a change of one of the existing Network Entry Agreement (NEA) parameters would be a more efficient and economic approach to facilitate delivery of potential new supplies to the System, subject to ensuring no adverse impact on consumers or on the operation of the pipeline system.

0502 - The px Delivery Facility receives the same composition of commingled gas from the CATS pipeline as the BP CATS Facility, and currently has the same carbon dioxide limit within its Network Entry Provisions.

Solution

Both modifications propose an amendment to a Network Entry Provision, to permit an increase in the CO₂ limit of gas delivered from the respective Entry Points into the NTS.

0498 - This modification, in accordance with UNC TPD I 2.2.3(a), proposes an amendment to a Network Entry Provision within the existing NEA in respect of BP Teesside System Entry Point. This amendment would increase the CO₂ limit of gas delivered from the BP Teesside System Entry Point into the National Transmission System to 4.0 mol% from the current limit of 2.9 mol%.

0502 - This modification, in accordance with UNC TPD I 2.2.3(a), proposes an amendment to a Network Entry Provision within the existing NEA in respect of the px Teesside System Entry Point. This amendment would increase the CO₂ limit of gas delivered from the px Teesside System Entry Point into the NTS to 4.0 mol% from the current limit of 2.9 mol%.

Relevant Objectives

For both Modifications **0498** and **0502** it is believed that the increase to a higher CO₂ limit will permit economic delivery of additional UK Continental Shelf (UKCS) gas production, increasing GB supply security and reducing reliance on imported gas. This will contribute to the economic and efficient operation of the total system through maintaining a diversified supply base and by continued use of existing capacity.

It will provide greater competition between Shippers and between Suppliers by increasing gas availability in the market and also securing greater supply for consumers.

Implementation costs

No significant implementation costs have been identified with changing the Gas Entry Conditions in respect of BP Teesside System Entry Point or of px Teesside System Entry Point.

Implementation

The Workgroup has not proposed a timescale for implementation of these modifications, but would suggest that they are implemented simultaneously at the earliest practical opportunity.

Does this modification impact a Significant Code Review (SCR) or other significant industry change projects, if so, how?

This does not affect the Nexus delivery.

2 Why Change?

0498 - With the increasing maturity of the UKCS as a gas production area, the accessibility of new fields and improved extractability from existing fields increase in importance to the UK. Some current production relies on blending with other fields in order to meet Gas Entry Conditions, and other potential new upstream developments are known to have CO₂ levels that exceed current limits. The current CO₂ limit at Teesside already causes curtailments to production on certain days when insufficient blending gas is available and the current limit would be temporarily exceeded. In addition, by analysing the CO₂ content of future gas production potentially entering the System at Teesside, BP has identified an increasing risk that, especially in summer months and from 2019 onwards, the availability of sufficient blending gas cannot be guaranteed prior to entry into the NTS.

Under the prospect of reduced blending opportunities there would be an increasing risk of interruption of gas flows, which would affect gas production processes. This problem could be addressed by treating the gas for removal of CO₂ at the wellhead or at the terminal, but the investment to bring the quality in line with current specification would be significant, thus increasing materially the risk of making some upstream projects, currently being evaluated, less economic.

To assess the feasibility of a higher CO₂ content, BP has undertaken an analysis of the potential impacts and has engaged with National Grid NTS to understand whether a higher limit would be compatible with network safety and operational efficiency. The preliminary results of National Grid NTS and BP work have so far identified no material increase in risks in the NTS associated with 4.0 mol% carbon dioxide content. In addition, as there are some legacy arrangements in place granting a similar limit at some NTS Entry Points, it seems plausible that gas with higher CO₂ content could be potentially accommodated without impacting NTS integrity and/or consumers and/or cross border trade. It should also be noted that CO₂ is not a defined parameter in the Gas Safety (Management) Regulations 1996, and no amendment of GS(M)R is required.

Similar arguments for change have been put forward under [Modification 0502](#).

0502 - The px Delivery Facility receives the same commingled gas from the CATS pipeline as the BP CATS Facility, and therefore any changes to the commingled gas composition that may affect BP's processing ability, would have the same impact upon the px Delivery Facility. If Modification 0498 is approved and the specification in the pipeline changes as predicted by BP, then without this equivalent Modification 0502 to change the carbon dioxide limit at the px Teesside System Entry Point to align with BP, there is a risk that deliveries from the px Teesside System Entry Point will be curtailed when the CATS pipeline specification reaches the current CO₂ limit, resulting in the interruption of gas flows into the NTS.

Industry engagement was sought, through this combined Workgroup, to assess more thoroughly the impact of the proposed changes under these modifications, in order to establish whether a higher CO₂ limit at the px Teesside System Entry Point, alongside the same higher limit proposed at the BP Teesside System Entry Point, would be beneficial for the GB market.

3 Solution

UNC (TPD Ref I 2.2.3(a)) states the following:

“2.2.3 Where

- (a) the Transporter and the relevant Delivery Facility Operator have agreed (subject to a Code Modification) upon an amendment to any such Network Entry Provisions, such Network Entry Provisions may be amended for the purposes of the Code by way of Code Modification pursuant to the Modification Rules”

Modification 0498

This modification seeks to amend a Network Entry Provision within the existing BP Teesside NEA. This amendment would increase the CO₂ upper limit for gas delivered from the BP Teesside System Entry Point into the NTS to 4.0 mol% from the current limit of 2.9 mol%.

Modification 0502

This modification seeks to amend the Network Entry Provision within the existing px (TGPP) Limited NEA. This amendment would increase the CO₂ upper limit for gas delivered from the px Teesside System Entry Point into the NTS to 4.0 mol% from the current limit of 2.9 mol%.

User Pays
Classification of these modifications as User Pays, or not, and the justification for such classification.
No User Pays service would be created or amended by implementation of either of these modifications and they are not, therefore, classified as User Pays Modifications.
Identification of Users of the service, the proposed split of the recovery between Gas Transporters and Users for User Pays costs and the justification for such view.
None
Proposed charge(s) for application of User Pays charges to Shippers.
None
Proposed charge for inclusion in the Agency Charging Statement (ACS) – to be completed upon receipt of a cost estimate from Xoserve.
None

4 Relevant Objectives

Impact of the modifications on the Relevant Objectives :	
Relevant Objective	Identified impact
a) Efficient and economic operation of the pipe-line system.	0498 and 0502 : Impacted
b) Coordinated, efficient and economic operation of (i) the combined pipe-line system, and/ or (ii) the pipe-line system of one or more other relevant gas transporters.	0498 and 0502 : Impacted
c) Efficient discharge of the licensee's obligations.	None
d) Securing of effective competition: (i) between relevant shippers; (ii) between relevant suppliers; and/or (iii) between DN operators (who have entered into transportation arrangements with other relevant gas transporters) and relevant shippers.	0498 and 0502 : Impacted
e) Provision of reasonable economic incentives for relevant suppliers to secure that the domestic customer supply security standards... are satisfied as respects the availability of gas to their domestic customers.	0498 and 0502 : Impacted
f) Promotion of efficiency in the implementation and administration of the Code.	None
g) Compliance with the Regulation and any relevant legally binding decisions of the European Commission and/or the Agency for the Co-operation of Energy Regulators.	None

Impact on Relevant Objectives (whole section to be considered and confirmed)

a) Efficient and economic operation of the pipe-line system

A more efficient and economic operation of the pipeline system can be expected, thanks to an increased utilisation of the existing infrastructure capacity and extending the useful life of existing NTS assets compared to potential curtailment of feasible supplies entering at Teeside.

b) Coordinated, efficient operation of the offshore and onshore systems

This positive impact applies to the combined pipe-line system upstream and downstream. In addition, allowing a wider range of gas into the network would likely reduce the instances of interruption in production flows, due to seasonal maintenance programmes which affect the overall blending of gas entering the NTS

at Teesside. This is supported by the fact that National Grid NTS' analysis in respect of the NTS has not identified any material impacts that would cause additional costs or reduced operational efficiency.

d) Competition between relevant shippers

Competition between Shippers should be improved through maximization of available production, maintaining diversity and reducing reliance on imported gas. In addition, the presence of domestic supplies could contribute to efficient price formation and help sustain the NBP as a liquid hub.

e) Incentives to provide gas for domestic customers in line with supply security standard.

An additional competitive supply source of locally produced gas will make it easier for suppliers to meet current supply security standards with a higher level of certainty.

WORKGROUP ASSESSMENT (to be confirmed)

In addition to the normal Workgroup assessment, these modifications have been preceded by discussion between National Grid NTS and the terminal operators, aimed at assessing the operational feasibility of such change.

Assessment of Risks

National Grid NTS has completed an exercise, supported by network analysis, to assess the possible NTS operational risks arising from higher CO₂ levels. National Grid NTS has assessed the risks (which are discussed further below) in terms of:

- a) Safety**
- b) Operations**
- c) Contractual obligations and cross border flows**
- d) Potential for impacts on parties downstream of the NTS**

Safety – There is no prescribed regulatory limit for CO₂ in GB, and parts of the NTS (e.g. two of the St Fergus subterminals) have had 4 mol% legacy contractual CO₂ limits for many years with no known evidence of additional corrosion (as expected from the “dry gas” NTS system). CO₂ levels in the NTS in Scotland are typically higher than in southern parts of the network e.g. September 2013 to August 2014 – average from St Fergus ASEP of 2.0% CO₂, compared to average 1.1% CO₂ in Norfolk.

DRa to provide evidence of flows at [St. Fergus] to demonstrate (or not) that the NTS has experienced gas at 4mol% CO2

- a) Operations – This is similar to safety in terms of engineering operation. Commercially the lower CV expected from higher CO₂ gas has been assessed with CV shrinkage modelling and was shown to be not material by NTS. Impact on CO₂ emissions from NTS’ gas fired compressors is likely to be small and not material in the context of all the other variables that affect this.
- b) Contractual obligations and cross border flows – There are currently no regulatory CO₂ limits at cross border points. Whilst the workgroup did discuss EU initiatives on gas quality harmonisation it also recognised that there are no gas quality limits (including CO₂) in the EU legislative development process¹.

IUK has an entry condition (exit from NTS) of 2.5% CO₂ (driven by Belgian limits) but otherwise there are no CO₂ contractual obligations at NTS offtakes. Network analysis based on the range of scenarios indicated in the 2013 Gas Ten Year Statement (derived from Future Energy Scenarios) shows that gas from Teesside would expect to be little or no proportion of the flow offtaken at Bacton (IUK).

Offtake of gas at Moffat to Ireland is in a part of the NTS that has had higher legacy CO₂ limits (than for Teesside) for more than a decade. Again Teesside gas would not typically be expected to be a substantial part of the flow at Moffat.

- c) Impacts for parties downstream of the NTS – Prior to these modification proposals being published National Grid NTS wrote out inviting comments from potentially impacted parties. National Grid NTS’s network analysis also enabled publication via this workgroup of maps (high demand and low demand) showing where Teesside gas is modelled to make up a proportion of 25% or more of the flow at NTS offtakes. During the course of the development phase National Grid NTS has written out again encouraging potentially impacted parties to bring their views to this workgroup.

Include details/diagrams for flow patterns for Teesside into the NTS

- d) Impacts for parties downstream of the NTS – Prior to these modification proposals being published National Grid NTS wrote out inviting comments from potentially impacted parties. National Grid NTS received 9 responses provided on a private basis and all² substantive points have since been discussed in the workgroup. National Grid NTS’s network analysis also enabled publication via this workgroup of maps (high demand and low demand) showing where Teesside gas is modelled to make up a proportion of 25% or more of the flow at NTS offtakes. These maps are shown in Appendix 1.

During the course of the development phase National Grid NTS has written out again encouraging potentially impacted parties to bring their views to this workgroup.

1

http://www.fluxys.com/belgium/en/Services/Transmission/Contract/~//media/Files/Services/Transmission/ServicesAndModels/fluxys_opratingconditions_qualityrequirements.ashx

² At as 12th January 2015, a DN is considering whether or not a point is substantive and relevant.

Impact on NTS offtakes

Initial representations were received from SSE, GrowHow and Tata Steel and are published alongside this report and views from Scotia Gas Networks were included in the minutes of 3rd July 2014 workgroup meeting.

[include further information from reps here, include a reference that some are confidential]

CO₂ variability/high absolute values and its effect on exit points

Likelihood

Range / frequency

Positive and negative effects

Local or wider areas

Wider impacts upstream/downstream

Costs

What happens to Teesside flows when Jackdaw comes on stream? (TGPP/BP)

Simplified technical explanation of any increasing CO₂ impacts upon gas quality (TGPP/BP)

Also consider the impact on flame stability (JCh?)

Consequential impact on consumer plant to be provided via Energy UK and GSOG

The impact on consumers (warranty, operational and emissions related)

Immediate and future? If change is made / not made.....

Positive and negative?

ETS impacts

Safety related

Shipper identified...commercial and contractual issues – to be considered by shipper participants

Transporter identified ...

Consumer identified.....Energy UK

Storage identified.....GSOG

CCGTs can only tolerate limited changes in gas composition (referenced as WI and or Heating Value), dependent on the OEM (Original Equipment Manufacturer) and control systems. Each CCGT must be tuned to operate in a particular narrow band of gas composition to maximise efficiency and remain within environmental emissions limits.

The proposed increase to the level of inerts creates the potential for a greater range of gas composition. Within this wider range, the potential then exists for larger fuel composition variation. This can have a negative impact on CCGT operation despite the gas being within that range allowed by GSMR and OEM specifications. Varying gas specification within this wider range will lead to a requirement for unpredictable gas turbine re-tuning in order to maintain combustion stability and dynamics to avoid Environment Agency breaches. If this is not possible the plant will trip to be protected from further damage, although the trip event is undesirable due to asset life reduction, loss of revenue , cash out and penalty regimes. The sensitivity of

CCGTs to gas quality is more fully described in the document shared with the workgroup on:

[http://www.gasgovernance.co.uk/sites/default/files/Impact of Natural Gas Composition - Paper_0.pdf](http://www.gasgovernance.co.uk/sites/default/files/Impact%20of%20Natural%20Gas%20Composition%20-%20Paper%200.pdf)

Currently, re-tuning of gas turbine combustion systems takes around 4 hours, it is costly as it requires the services of specialist OEM combustion engineers to retune the combustion system and prevents flexible, load following operation during that period. This lack of flexibility will not only impact on being able to support intermittent generation and subsequent security of supply but lead to loss of revenue, the magnitude of which will be dependent upon when the gas composition changes.

A number of examples have been provided of times when plant has tripped. The workgroup will investigate the cause of the trips which is suspected to be a change in gas quality.

The proposed increase in CO₂ of the gas composition will increase the amount of CO₂ released to the atmosphere and will lead to additional costs for gas turbine operators because they will have to pay for the increase in inherent CO₂ through EU ETS liabilities.³

Why should CO₂ be removed – and whether this is best carried out onshore or offshore

Immediate and future? If change is made / not made.....

In each case.....

Environmental impacts

Costs

Advantages to which party(ies)

Disadvantages to which party(ies)

Impacts upstream if mod not approved (TGPP/BP)

Explain the options – no removal and the likely impacts of this – then the removal options (TGPP/BP)

Schematic (Appendix?) and explanation of what/how (TGPP/BP)

Completion of a Carbon Cost Assessment

[To be provided by the Proposers as an Appendix?]

Future outlook for similar gas sources in terms of setting precedents, and the context and value/cost for the UK

Predictions of composition of future gas supplies? Short term and long term views? Forward planning?

Risk of setting precedent

Impacts ? Costs? Immediate and future?

Value to UK economy

Non-discrimination

Policy explanation of Carbon reduction vs sustainable UKCS

TGPP/BP to consider and compile this section

Conclusions

³ http://ec.europa.eu/clima/policies/ets/monitoring/docs/gd1_guidance_installations_en.pdf (p80/81)

(under narrow remit of UNC) ?

Next Steps

(for wider industry) ?

5 Implementation

The Workgroup has not proposed a timescale for implementation of these modifications, but would suggest that they are implemented [simultaneously] at the earliest practical opportunity.

6 Impacts

Does this modification impact a Significant Code Review (SCR) or other significant industry change projects, if so, how?

No other industry change is impacted.

7 Legal Text

No changes to the UNC are proposed under either Modification 0498 or 0502.

Suggested text to modify the Network Entry Provisions contained within the relevant NEA has been provided by each Proposer.

No issues were raised by the Workgroup regarding either content.

Suggested Text - Modification 0498

Given the relative simplicity of the legal change, the following legal text is suggested to modify the Network Entry Provisions contained within the NEA.

2.3 Gas tendered for delivery by System Users to the System at the System Entry Point shall not contain any solid, liquid or gaseous material which would interfere with the integrity or operation of the System or any pipeline connected to such System or any appliance which a consumer might reasonably be expected to have connected to the System. In addition, all gas delivered to the System at the System Entry Point shall be in accordance with the following values:

[...]

(k) Carbon Dioxide Not More than ~~2.9%~~ 4.0 mol%

Suggested Text - Modification 0502

The following legal text is suggested to modify the Network Entry Provisions contained within the NEA:

2.3 (k) Carbon Dioxide not more than ~~2.9~~ 4.0 mol%

8 Recommendation

The Workgroup invites the Panel to:

- AGREE that these modifications should be submitted for consultation.

[?? Any additional questions for UNC Modification Panel consideration / potential inclusion in the consultation focus ???]

9 Appendix 1: Teesside Flow Maps

