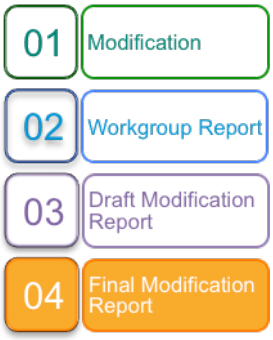
Stage 04: Final Modification Report	At what stage is this document in the process?

0581S:

Amending the Oxygen content limit specified in the Network Entry Agreements at Grain LNG



This modification will enable an increase to the oxygen content limit of gas permitted by the Network Entry Agreements (NEAs) at Grain LNG.

	The Panel determined that this self-governance modification be implemented.
	The Panel determined that this self-governance modification should not be implemented.
	High Impact: None
	Medium Impact: None
	Low Impact: Transporters, Consumers.

Contents

About this document:

A Final Modification Report was originally presented to Panel on 19 May 2016 and was subsequently sent to the Workgroup for consideration of the issues raised in the representations.

This Workgroup Report will be presented to the Panel on 21 July 2016. The Panel will then consider whether the modification should proceed to re-consultation, be returned to the Workgroup for further assessment, or be implemented.

The following timetable applies:	
Initial consideration by Panel	21 April 2016
Modification Proposal sent for Consultation	21 April 2016
Consultation close-out for representations	13 May 2016
Final Modification Report available for Panel	16 May 2016
Modification Panel Decision – refer to Workgroup	19 May 2016
Initial Workgroup consideration of Issues	02 June 2016
Workgroup Supplemental Report presented to Panel	21 July 2016
Final Modification Report sent for Consultation	dd mmm 2016
Consultation close-out for representations	dd mmm 2016
Final Modification Report available for Panel	dd mmm 2016
Modification Panel Decision	dd mmm 2016

Any questions?

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1 Summary

Is this a Self-Governance Modification?

This enabling modification is suitable for Self-Governance because it is unlikely to have a material effect on gas transporters and consumers whose offtake facilities are sensitive to the level of oxygen content in gas.

Is this a Fast Track Self-Governance Modification?

This modification is not suitable for Fast-Track as it is not a house keeping modification.

Why Change?

The current oxygen content limits set out in the 3 relevant Network Entry Agreements (NEAs) at Grain LNG are set at what can be regarded as a minimum level. This unduly and unnecessarily restricts the UK market in accessing certain LNG cargoes and is not conducive to promoting market liquidity, gas security of supply or competition between Users. The Proposer therefore believes that allowing a relatively modest increase to the oxygen content limit in each relevant NEA will be beneficial to the UK gas market as a whole.

This modification request has therefore been raised to enable the proposed changes to the NEAs, pursuant to Section I of the UNC Transportation Principal Document.

The Proposer believes that workgroup assessment of this proposal is unnecessary and requests that it is referred directly to consultation.

Solution

The proposal is to increase the limit for oxygen, as defined within each of the 3 Grain LNG NEAs, from the current limit of 0.001 mol% (10 ppm), to 0.02 mol% (200ppm). The proposed value falls well within the Gas Safety (Management) Regulation limit of 0.2 mol% (2000ppm) and is consistent with the oxygen level recently approved for the BBL/NTS Interconnection Agreement under UNC Modification 0561S.

Relevant Objectives

The proposal will promote effective competition between shippers and suppliers by allowing greater scope for the importation of gas via sources of LNG. This furthers relevant objectives d) (i) and d) (ii).

Implementation

No implementation timescale is proposed but it is recommended that implementation is as soon as reasonably practicable under modification governance arrangements.

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

This modification will have no impact on the Switching SCR or Project Nexus.

2 Why Change?

Importers of LNG are seeing a slightly broader range of cargo compositions arrive on the LNG market and, in particular, the oxygen content of the gas will vary from cargo to cargo.

The ability of a Delivery Facility Operator (DFO) to deliver gas to the NTS at an entry point (or sub-terminal) is limited by the Network Entry Provisions contained in the relevant Network Entry Agreement

(NEA) between the DFO and the relevant gas transporter. Amongst other things, the NEA will set a limit on the oxygen content of the gas to be delivered to the gas transporter's system.

At the Isle of Grain LNG import terminals, Grain LNG (the DFO) has 3 NEAs in place with gas transporters: 2 with National Grid Gas and one with SGN. The oxygen content limit in each NEA is currently set at 0.001 mol%. This limit is expected to be too restrictive for the delivery of some LNG cargoes, meaning that such cargoes may not be available to the UK market. This would have implications for:

- security of gas supply
- security of price
- market liquidity
- competition between gas shippers and gas suppliers.

It is therefore in the interests of the UK gas market to better facilitate the delivery of LNG cargoes at the Isle of Grain and this can be achieved by increasing the oxygen content limits in the relevant NEAs to 0.02 mol%. This is a relatively modest increase when one considers that the limit imposed by the Gas Safety (Management) Regulations is 0.2 mol%.

Further, the proposed new limit would not appear to be out of step with permitted levels of oxygen at other NTS entry points. A letter written by Ofgem to industry stakeholders, dated 20 September 2004, and titled "Establishing a gas quality Review Group" contained a table (Annex 3 of that letter) providing the then gas quality parameters applicable at 21 NTS entry points. Based on this, the oxygen content limits can be summarised as follows:

O_2 Content Limit (mol%)	# Entry Points	Cumulative # Entry Points
0.001	8	8
0.100	9	17
0.200	4	21

The proposed new limit of 0.02 mol% for the relevant Isle of Grain NEAs sits well towards the lower end of the above distribution.

It should be noted that a similar enabling Modification, 0561S "Amendment to the Oxygen Limit within the BBL/NTS Interconnection Agreement", was approved by the UNC Modification Panel in November 2015 and implemented under self-governance arrangements in December 2015. An identical 0.02 mol% oxygen content limit was agreed.

Therefore, consistent with similar change requests to NEAs in the past and in accordance with paragraph I2.2.3 (a) of the UNC Transportation Principal Document, a Code Modification has been chosen as the means by which to effect the changes to the oxygen content limits in the NEAs at Grain LNG.

Justification for Consultation

On the basis that this is an enabling modification that is entirely consistent with other recent amendments to arrangements and that the Transmission Workgroup was consulted ahead of submission, with no concerns raised, the Proposer suggests that there is no further assessment required. It is therefore requested that it be issued directly to consultation.

3 Solution

Increase the maximum oxygen limit in each of the three Grain LNG Network Entry Agreements.

The solution to the issue raised in this proposal is to increase the permitted oxygen content of gas in the Grain LNG Network Entry Agreements from 0.001 mol% to 0.02 mol%.

This increased level would remain well within the level of 0.2 mol% allowable under the Gas Safety (Management) Regulations. It would also appear to be significantly lower than the limits permitted at the majority of other NTS entry points.

The Proposer understands that the Delivery Facility Operator has consulted the relevant gas transporters on the proposed changes and that they appeared supportive.

User Pays	
Classification of the modification as User Pays, or not, and the justification for such classification.	This modification is not User Pays as it will not amend or create a User Pays service.
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.	N/A
Proposed charge(s) for application of User Pays charges to Shippers.	N/A
Proposed charge for inclusion in the Agency Charging Statement (ACS) – to be completed upon receipt of a cost estimate from Xoserve.	N/A

4 Relevant Objectives

Impact of the modification on the Relevant Objectives:	
a) Efficient and economic operation of the pipe-line system.	None
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.	None
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.	Positive
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.	None

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

Positive Impact of Increasing Oxygen Limits

Removing unreasonable restrictions on the deliveries of LNG will allow more gas to enter the UK market, improve liquidity and will therefore help to promote competition between gas shippers and gas suppliers as per relevant objectives d) (i) and (ii).

5 Implementation

To be implemented as soon as possible, consistent with the code governance arrangements.

6 Impacts

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

This modification would not impact the Switching SCR or Project Nexus.

7 Legal Text

As this is an enabling modification, no UNC text changes are required.

8 Consultation Responses

The summaries in the following table are provided for reference on a reasonable endeavours basis only. We recommend that all representations are read in full when considering this Report. Representations are published alongside this Report.
Of the 11 representations received 4 supported implementation, 3 offered qualified support, and 4 were not in support.

Representations were received from the following parties:

Organisation	Response	Relevant Objectives	Key Points
British Gas Trading Limited	Support	d) (i) positive d) (ii) positive d) (iii) none	• By allowing a modest increase in the oxygen content of gas delivered to the system at the Isle of Grain, more gas will be attracted to the UK market and this will better facilitate competition in gas shipping and gas supply. There should also be benefits for security of gas supply and market liquidity. • In addition to the above benefits, the modification

			merits implementation on the basis that: o Is identical to Modification 0561S which was implemented towards the end of 2015. o The requested level of oxygen content still sits well below the limit prescribed by the Gas Safety (Management) Regulations. o Evidence has been provided that shows the majority of other system entry points can flow gas into the system with much higher oxygen content limits than the limit being requested for the Isle of Grain. • Self-governance is appropriate and consistent with similar Modifications in the past.
EDF Energy	Oppose	d) (i), Negative. d) ii) None d) iii None	• This Modification is likely to introduce distortion between Shippers who will benefit from and those who will be picking up the cost of this Modification • No evidence provided to support positive impact on relevant objectives. • Proposes to modestly increase the oxygen content limit in each relevant NEA at Grain LNG similar to that implemented in Modification 0561S. • However, while the reasons behind Modification 0561s were clear, the reasons under Modification 0581s are unclear, as no evidence has been provided to support the claim that the current limit is unduly and unnecessarily restricts the UK market in accessing certain LNG cargoes. • Increasing the Oxygen limit in LNG gas will significantly impact the plant and equipment of downstream gas assets such as CCGTs and storage facilities leading to extra cost and potentially operational restrictions for the following reasons: o The requested 200ppm is a 20x increase and would likely result in a continuous stream of close to 200ppm O_2 gas as LNG terminal switches from Nitrogen to air ballasting. o For gas storage sites using molecular sieve type dehydration systems, 200ppm oxygen can react with natural gas at bed regeneration temperatures resulting in water and CO2 production. This makes beds harder to regenerate by introducing water to the system and the CO2 could pose a corrosion risk.

			○ More expensive molecular sieve may be required, with higher oxygen tolerance. ○ For gas storage sites using glycol type dehydration systems, 200ppm oxygen can oxidise the glycol, poisoning it and producing toxic, acidic and corrosive by-products. ○ For copper piping systems, 200ppm oxygen could accelerate the reaction of trace amounts of H2S into pyrophoric copper sulphide (black dust) – increasing the already significant network issue of black dust and black powder. ○ For any wet gas system, 200ppm oxygen could introduce additional corrosion mechanisms in carbon steel systems. ○ 200ppm oxygen increases the risk of the formation of elemental sulphur from trace amounts of H2S, which can desublime downstream of choke valves to coat pipework and quickly block Coalescer filters. ○ All Storage Connection Agreements would have be reviewed / amended as the proposed 200ppm oxygen content would exceed the 10ppm limits imposed by National Grid when exporting the gas back into the grid. • Should not be implemented without a full Impact Assessment. • Could set a dangerous precedent that would allow other LNG facilities to request an automatic increase as the driver here seems to be the cost benefits of switching from nitrogen to air ballasting. • Should not be subject to self-governance because of the significant impact it might have on downstream gas assets such as CCGTs and storage facilities. • Requires at least two year's notice to assess the actual impact on storage facilities and make adjustments to equipment and operations. • Although Gas Transporters were consulted no gas storage operator or other owner of gas assets were consulted when considering the significance of this Modification.
E.ON UK	Qualified Support	d) (i) positive d) (ii) positive	• The increase in the permitted level of Oxygen in the gas that enters the gas network at Grain LNG will allow greater flexibility in accepting LNG onto the network, which will improve competition in shipping

			and supply. • Is consistent with changes already implemented, however, due to the compressed modification assessment and consultation timelines the issues being identified in respect of impacts on storage arrangements and equipment and the consequential costs have not been considered. • Self-governance is appropriate, as this does not have a material impact on competition. • The omissions in this modification are concerning the costs and benefits of introducing LNG with higher oxygen content at Grain, and the longer term financial impacts on storage & related costs. • Equally, the other wider consequences from the changed nature of the gas, such as increased burning times resulting in increased emissions, are not yet known.
Gas Storage Operators Group	Oppose	d) (i) Negative d) (ii) None d) (iii) None	• Likely to introduce distortion between Shippers who will benefit from and those who will be picking up the cost of this Modification • Proposes to modestly increase the oxygen content limit in each relevant NEA at Grain LNG similar to that implemented in Modification 0561S. • However, while the reasons behind Modification 0561S were clear, the reasons under Modification 0581S are unclear as no evidence has been provided to support the claim that this limit in NEAs unduly and unnecessarily restricts the UK market in accessing certain LNG cargoes. • Increasing the Oxygen limit in LNG gas will lead to higher O_2 content in the gas delivered to gas storage facilities, which in turn will significantly impact the plant and equipment of downstream gas storage facilities for the following reasons: o The requested 200ppm is a 20x increase and would likely result in a continuous stream of close to 200ppm O_2 gas as LNG terminal switches from Nitrogen to air ballasting. o 200ppm oxygen can react with natural gas at bed regeneration temperatures resulting in water and CO2 production. This would make beds harder to regenerate by introducing water to the system and the CO2 could pose a corrosion risk and extra heating requirement adding more cost.

			○ More expensive molecular sieve may be required, with higher oxygen tolerance. ○ May increase the already significant network issue of black dust and black powder as witnessed at storage facilities in the UK ○ Could result in the increased formation of Carbonic Acid within brined salt caverns exacerbating corrosion within the mild steel pipework ○ Higher Oxygen can lead to an increased risk of formation of elemental sulphur (8H2S + 4O2 = 8H2O + S8) , which can desublime downstream of choke valves to coat pipework and quickly block Coalescer filters. National Grid Storage Connection Agreements (SCA) specify the maximum O2 level in methane as 0.001 mole%. ○ If the gas received is over 0.001 mole% the SCAs will need to be amended for Storage Operators to then reinject the gas into the NTS. • Considers a full Impact Assessment is required. • Should not be subject to self-governance because of the significant impact it might have on downstream gas storage assets. • One year's notice would at least be needed to assess the actual impact on storage facilities and make adjustments to equipment and operations. • At least two year's notice would be required to assess the actual impact on storage facilities and make adjustments to equipment and operations. • Notes Gas Transporters were consulted, however no gas storage operator or other owner of gas assets were consulted.
National Grid Grain LNG	Support	d) (i) positive d) (ii) positive d) (iii) positive	• Increasing the oxygen content limits at Grain LNG will enable the terminal to receive a broader range of LNG, which in turn will enhance security of supply. • It is vital that the UK is able to attract LNG from all over the world to not only meet its energy requirements, but to foster competition and liquidity in the market. • Suitable for Self-Governance as it could have a low impact on transporters and consumers of gas conveyed through pipes and may also have a positive effect to some degree on competition in the

			LNG market, supporting future GB market requirements. • Implementation as soon as possible, following the relevant amendments to the NEAs. • No additional costs apparent and understand that analysis from previous, similar NEA amendments have not realised any negative impacts. • Currently the oxygen restriction may act as a significant barrier to entry for Shippers wishing to send LNG to the UK market and may impact the free flow of gas between EU member states. • Has a positive impact on LNG availability and competition between shippers and suppliers, therefore furthering Relevant Objective d). • Potentially aiding the progress towards the alignment of gas importation agreements in both the EU and other parts of the UK, in line with Article 15 of the Interoperability Network Code.
National Grid NTS	Support	d) (i) positive d) (ii) positive d) (iii) positive	• Considers this modification would benefit UK security of supply. • Not identified any adverse impacts on NTS assets, nor seen any evidence that it would cause problems at any NTS offtake. • Whilst a higher level of oxygen content in natural gas presents a higher risk of asset corrosion, the presence of water is needed to make this materialise and, historically, the NTS has been a dry network. • Agrees it satisfies the self-governance criteria. • Implementation is consistent with the self-governance process. • National Grid NTS may incur some costs if instrumentation and/or telemetry systems need to be re-ranged but do not expect these would be material. • On page 4 of the Draft Modification Report, the Proposer summarises the oxygen content limits at NTS entry points as stated in Ofgem's open letter of 20th September 2004 and concludes that the proposed oxygen limit for Grain LNG sits well towards the lower end of the distribution. Whilst this is a true statement, it is important to clarify that the four entry points with a limit of 0.2% are all storage

			facilities, not beach entry points.
RWE Supply and Trading GmbH	Qualified Support	d) (i) positive d) (ii) positive d) (iii) none	• Seeks to enable an increase in the permitted Oxygen limit under the Grain LNG NEAs. • Agrees that this should allow more gas to be delivered into the GB market as it will allow higher Oxygen content LNG cargoes to be accessed. • However, is concerned that there has been no analysis undertaken to assess any potential adverse consequences from increasing the permitted limit. • There is currently considerable focus on gas quality harmonisation in Europe in the context of the Interoperability Code. Should binding changes to the gas quality standard be proposed, it is believed that implementation must be based on a full impact analysis. • Is consistent with self-governance, although the reduced timescales do not lend themselves to undertaking any meaningful analysis of potential impacts, particularly on end-users.
ScottishPower	Oppose	d) negative	• Understands the underlying rationale for the Modification, however, considers that there has been inadequate assessment of the wider potential impacts of implementation. • Furthermore having had insufficient opportunity to evaluate such impacts on their facilities. As a consequence, do not support the modification. • Does not agree with Self Governance on the basis that no assessment has been made of potential impacts, or their materiality, for such as CCGT and Gas Storage Operators. These potential impacts only came to light as part an internal review process. • A view on implementation lead time could only be taken once a fuller understanding of potential impacts had been gained. • Any quantification of costs is dependent on an assessment of the impacts identified to this point in time and like other potentially impacted users, have had inadequate time to conduct any such assessment allowing for the limited development and consultation periods. • The report contains no assessment of potential impacts.

South Hook Gas	Qualified Support	d) (i) positive d) (ii) positive d) (iii) positive	• Agrees there is a benefit to the UK gas market in increasing the oxygen content limit at Grain. Increasing the limit to 0.02 mol % does not compromise operational risks as this is still within the GSMR limits. • Allows potential for wider specifications of LNG to be delivered into the UK from the global market, helping to maintain the current and future of the UK energy security. • In order for the UK gas market to reap the full benefits of this Modification, all LNG entry points in principle should have the ability to amend their oxygen content limits. • Agrees that the modification is suitable for Self-Governance.
SSE	Oppose	d) negative	• Proposes an increase of 20 times in Oxygen levels, which could have consequences for Storage facilities. As it could allow LNG terminals to reduce nitrogen blasting by replacing it with air resulting in a continuous stream at this new higher level. • The increased content of Oxygen could result in up to 20 times more water generated during the storage regeneration process resultant in higher costs to return gas to the NTS. • Could increase the probability of the formation of Carbonic acid. Leading to increased corrosion, which would lead to early de-commissioning of plant, or increased maintenance and refurbishment costs. • Not suitable for Self-Governance, because it is likely to have a material effect on gas Storage Operators and their consumers whose offtake facilities are sensitive to the level of oxygen content in gas. • The development was very compressed and it was only after internal investigation that the negative unforeseen consequences of this modification have become apparent. • A cost benefit analysis should be undertaken to assess the impact of increasing the oxygen content of gas before a decision regarding implementation is made. • Could lead to increased corrosion of mild steel equipment. Where residual brine in a storage cavern mixes with natural gas and increased levels of

			Oxygen there is an increased probability of the formation of Carbonic acid. • Although Modification 0561 allowed for the increased flow of oxygen at BBL, however these are relatively limited. Given the greater capacity for LNG imports the issue of increased oxygen is likely to be more significant.
Uniper UK	Support	d) (i) positive d) (ii) positive d) (iii) positive	• Will help secure GB gas supplies, particularly in light of the increasingly diverse sources of global LNG. • Increasing the Oxygen limit within the three NEAs will allow gas to come to the UK, which would other be “locked out” or simply sent else where in Europe, where it can already be accepted into the system without blending. • Given that the proposed increase is within G(S)MR standards and is at the lower end of existing Oxygen limits set in other NEAs, no commercial or safety issues arise from implementation. • It should noted, that if there are further increases in oxygen limits across the NTS, then there will be a need to consider these in greater depth and how this might impact specific end users, such as gas storage and CCGTs. • Implementation should be as soon as possible and consistent with self-governance arrangements. • No costs are anticipated, although non-implementation could result in additional (perhaps prohibitive) blending costs for Shippers seeking to bring in gas at this terminal in future. • In addition, as noted above, if there are further increases in oxygen limits across the NTS, then there will be a need to consider in greater depth, how this might impact specific end users, such as gas storage and CCGTs.

Please note that late submitted representations will not be included or referred to in this Final Modification Report. However, all representations received in response to this consultation (including late submissions) are published in full alongside this Report, and will be taken into account when the UNC Modification Panel makes its assessment and recommendation.

9 Workgroup Supplemental Report

As requested by the UNC Modification Panel on 19 May 2016, the Workgroup has considered the issues and concerns raised via the representations made during the consultation and has provided its views as

detailed below.

The key issues arising from the consultation were:

1. Penetration of higher-O_2 gas from Grain into the NTS
2. Potentially a move from Nitrogen ballasting to air ballasting at Grain, leading to;
    a. A potential continuous stream of c. 200ppm O_2 gas from Grain
    b. Lower operating costs at Grain, offset by higher costs elsewhere
3. Potential for additional corrosion within connected systems, because;
    a. Water and CO_2 can be produced at bed regeneration temperatures in molecular sieve type dehydration systems leading to production of Carbonic acid within brined salt caverns and wet gas systems
4. Consequential investment at storage sites
    a. A more expensive molecular sieve may be required
5. Potential formation of elemental sulphur that might block Coalescer filters
6. National Grid Storage Connection Agreements may need to be amended as a consequence.

Issue 1: Penetration of higher O2 gas from Grain into the NTS

The Workgroup considered this issue on 07 July 2016, hearing updates from National Grid NTS (see Appendix 1 – page 18), National Grid Grain LNG (Appendix 2 – page 19) and Scotia Gas Networks (Appendix 3 page 21). The key findings can be summarised as:

a) Evidence presented (based upon reasonable scenarios) showed no significant impacts associated with flows of higher-O_2 gas from Grain into the connected networks.

b) Modelling indicates that gas from Grain is unlikely to reach any wet systems (such as storage facilities).

Issue 2: Potentially a move from Nitrogen Ballasting to air ballasting at Grain

The Workgroup received the following report from National Grid Grain LNG:

> The assumption that IoG (Isle of Grain) terminal is moving from nitrogen ballasting to air ballasting is incorrect. The terminal has never had any intention of switching from nitrogen ballasting to air ballasting and hence will continue to utilise a nitrogen ballasting system in order to comply with GS(M)R gas specifications. The reason IoG terminal has proposed a modest increase to the oxygen content limit is to accommodate supply of LNG from the US shale gas market. The terminal has been advised by two of its shippers that future cargos from US which could be offloaded at the Isle of Grain Import Terminal may contain oxygen at a concentration of up to 60 ppm. During the unloading process this LNG will be mixed with rest of the terminal stock hence the actual send out should not therefore exceed 60 ppm O_2 and there is no likelihood of a continuous stream of 200 ppm O_2 gas from Grain to the NTS.
>
> During the process of unloading an LNG ship additional quantities of gas are produced and exported to the Local Distribution Zone as part of the unloading process. The gas produced during the offloading process is richer in the lighter compounds of the LNG, i.e. it preferentially contains higher quantities of nitrogen, and in this case oxygen. This gas could contain upto 200 ppm oxygen, but it is exported into the LDZ only and will have no impact on the NTS and cannot therefore affect the gas storage site at Humbly Grove. It is also limited in duration, to the duration

of the ship offloading process, which would normally take around 24 hours.

A change in the oxygen limit will not require IoG to change the site plant process operations and therefore there will be no impact on the terminal operating costs as the site plant process operations will remain unchanged.

On the basis that the analysis demonstrated a very low likelihood of the remaining issues materialising directly from this proposal, a majority of Workgroup participants felt that further assessment would not be of value.

Recommendations:

The Workgroup recommends that:

1. Panel should recognise the Workgroup's conclusion that there was a very low likelihood of Grain gas reaching the storage installations highlighted by respondents to the consultation.
2. Panel proceeds to consider whether the modification should be implemented.

10 Panel Discussions

Panel Discussion 19 May 2016

The Panel Chair summarised that Modification 0581S proposes to enable an increase to the oxygen content limit of gas permitted by the three relevant Network Entry Agreements at Grain LNG. The proposed level of 200ppm is to provide access to wider LNG cargoes. It is well within the Gas Safety (Management) Regulations limit (2000ppm) and is consistent with many other entry points.

Members considered the representations made noting that, of the 11 representations received, 4 supported implementation, 3 offered qualified support and 4 were not in support.

Members noted that several respondents had identified initially unforeseen, and potentially far-reaching, impacts that they felt warranted further assessment. Members also noted views that increased oxygen content did not necessarily directly increase corrosion.

The Panel Chair reminded Members that there had not been a Workgroup assessment carried out previously because Panel initially agreed with the Proposer that there should be a small impact from the proposal. Recognising the issues raised by respondents to the consultation, Members voted unanimously to refer this proposal to a Workgroup for assessment.

Panel Discussion 21 July 2016

Consideration of Workgroup Supplemental Report

Consideration of Relevant Objectives

Panel Determinations

11 Recommendation

Panel Decision

Having considered the Modification Report, the Panel determined that:

- proposed self-governance Modification 0581S [should/should not] be made.

12 Appendices

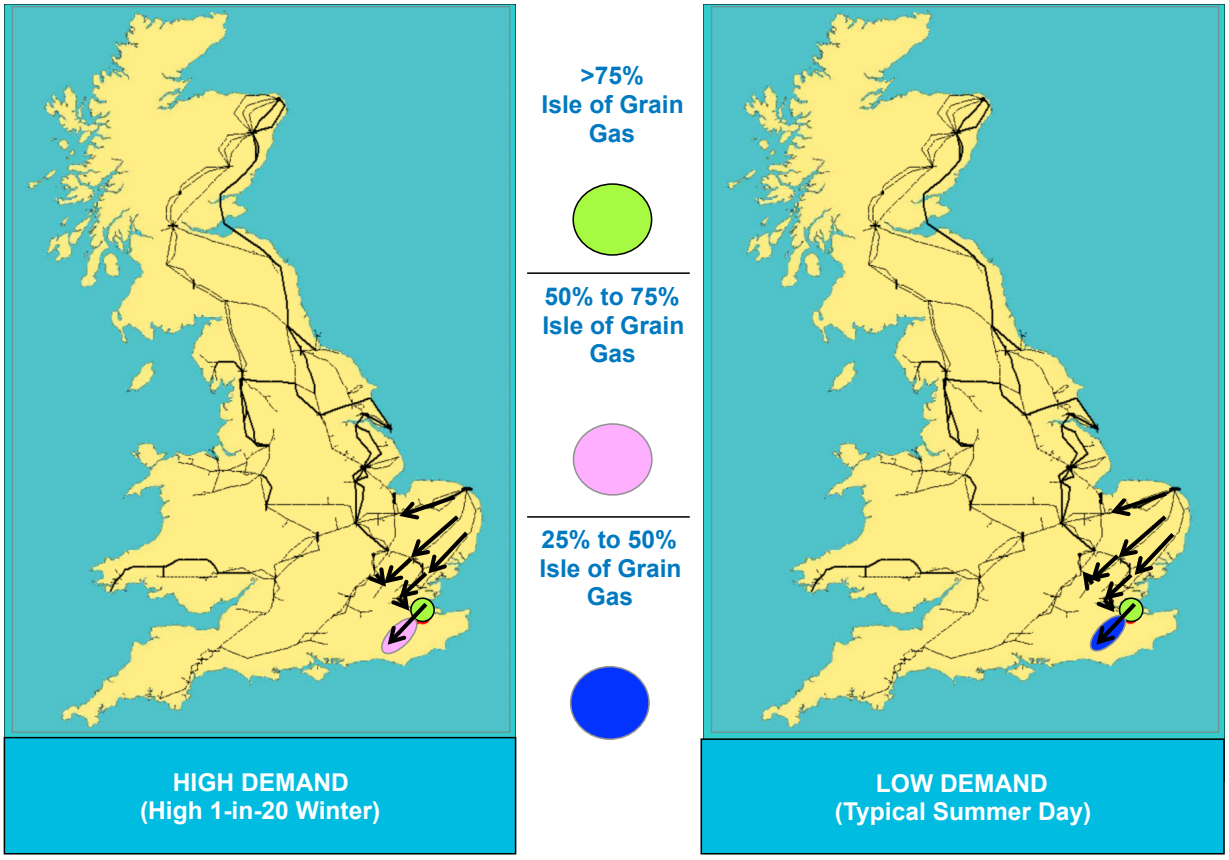
Appendix 1 - National Grid NTS' Assessment

Introduction

- National Grid NTS performs a two-part process each year to gauge the long term (10 year) adequacy, utilisation and development needs of the NTS
  - Scenario Definition
    - Consultation with industry stakeholders via the Future Energy Scenarios (FES) process to help define scenarios of future flow into and out of the NTS
  - Flow Modelling
    - Modelling of potential flow patterns which may arise from these future scenarios and their impact on NTS network development, the results of which are summarised in the Gas Ten Year Statement (GTYS)

Analysis

- The results of the 2015/16 modelling cycle were examined in order to determine the likely future penetration of Grain gas into the NTS
- The degree of penetration depends on a number of factors, particularly the seasonal and geographic pattern of supplies and demands



Conclusions

- Based on the latest available FES scenarios, we do not currently expect Grain LNG gas to either:
  - Penetrate beyond the south-east extremity of the NTS; or
  - Reach a UK storage facility connected to the NTS

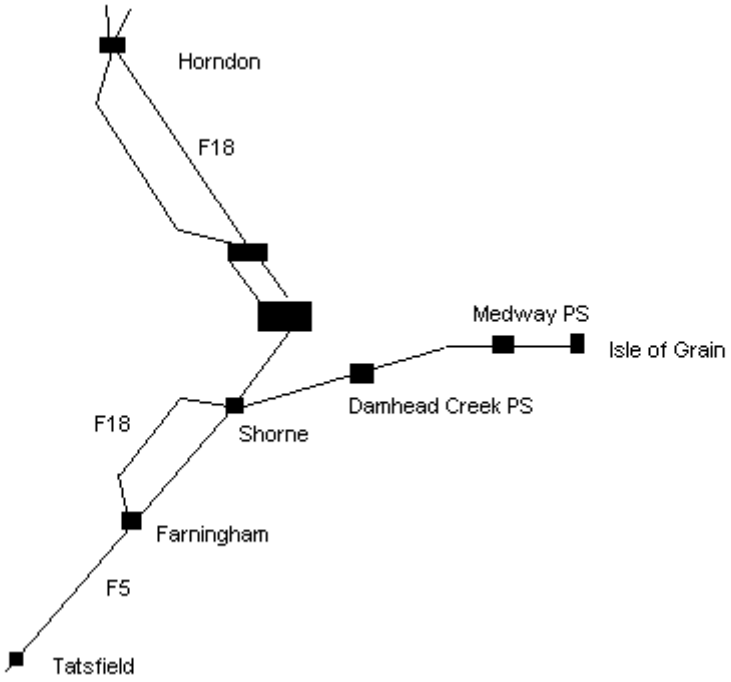
Other ASEPs are expected to meet demand requirements elsewhere on the NTS

Appendix 2 – National Grid Grain LNG's Assessment

In order to assess the impact of the impact of the proposal to raise the oxygen limit at the Isle of Grain, DNV GL were commissioned to carry out a study and risk assessment of the proposal. The risk assessment was carried out according to the process outlined in T/PM/GQ/8 Management Procedure for Assessing the Requirements for Gas Quality, Calorific Value and Flow Measurement Systems.

As part of the risk assessment a zone of influence was established, the following is an extract from the DNV GL report.

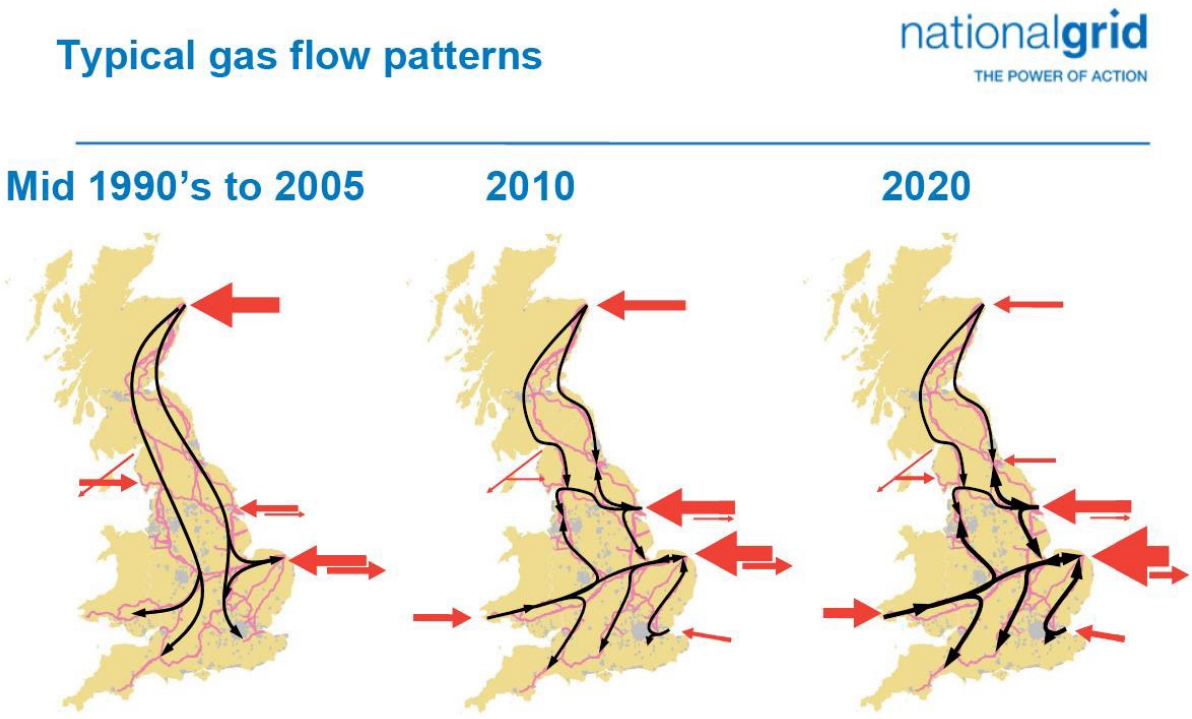
"As previously stated, establishing the zone of influence of Grain LNG was fundamental to this assessment as this directly determines the type of end users that might be affected. The Isle of Grain (IoG) LNG import terminal exports vaporised LNG, which has been ballasted with nitrogen, into the National Transmission System (NTS). Gas from IoG is supplied to Medway and Damhead Creek power stations prior to entering the main transmission system at Shorne. A schematic of this network is shown below.



Network Schematic of Isle of Grain Connection to the National Transmission System

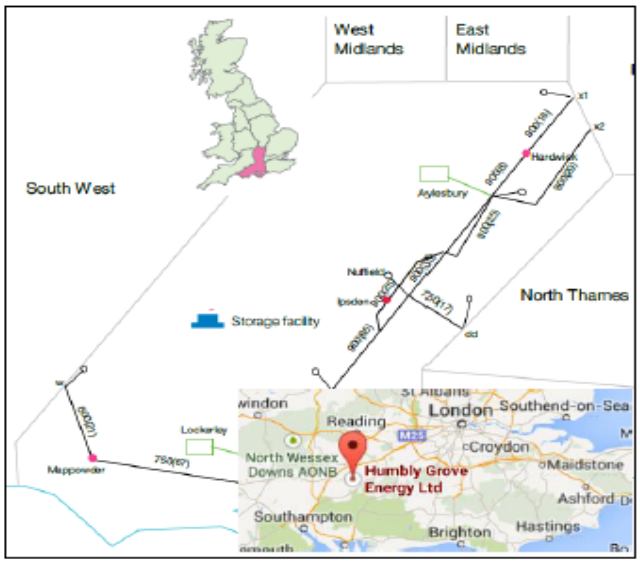
Network Schematic of Isle of Grain Connection to the National Transmission System
Under normal operation and gas demands gas flows south down Feeder 18 to supply the South East region. Under extreme conditions it is possible that transmitted gas could reach Avonmouth to the west however it is considered very unlikely, particularly with gas being supplied by South Hook and Dragon. If Bacton supplies were shut off due to maintenance or a major failure at Bacton terminal, it is possible that IoG gas could be transported north and exported via Interconnector to Europe. During the last 5 years IoG gas has been conveyed north along Feeder 5 to Horndon but has not been reported as far north as Yelverton, (approximately 30 miles south of Bacton). However network analysis on the previous five years revealed that the Exit Point may be in a position to export Isle of Grain originated gas to the continent on around 40 days per year. During the summer months, demand at the Exit Point for gas to reach the continent is higher. In order for the gas from Isle of Grain to reach the Exit Point, the Isle of Grain inputs in would have to be particularly high, as maybe the case as the IoG site is expanded. If flows from other entry points, for example Theddlethorpe and Easington, reduce then IoG gas may be more likely to be pushed further up the network.

At an IGEM seminar in 2010 National Grid presented the following diagram indicating typical flow pattern for periods up to 2020. [5] Confirming the possibly that IoG gas could flow North but that flows west, towards Avonmouth, are unexpected.



Typical Gas Flow patterns: IGEM Industrial Affiliates – Kegworth, 9th November 2010

The only other significant gas facility within the zone of influence is the Humbly Grove Underground Gas Storage site located at Alton, Hampshire. As shown on the map and transmission schematic below. It is considered highly likely that Humbly Grove will receive IoG gas as it has been recorded at Ispden. (Note; located in red on the figure below.)



Location of Humbly Grove Underground Storage facility

It is important to consider future developments that could impact on the operation of the network. For example expansion of the IoG could see significantly higher gas flows to Bacton and hence possible export to Zeebrugge via the IUK Interconnector. The risk of gas reaching Avonmouth will be removed when the site stops operations at the latest in 2018, but possibly as early as April 2016 [6].”

It should be noted that any further expansion at the Isle of Grain would be subject to approved modifications to the NEA, and also that the Avonmouth Storage site has now ceased operations.

Appendix 3 – Scotia Gas Networks' Assessment

The attached schematic diagram of the South East LDZ provides a representation of the Local Transmission System (LTS) and Intermediate Pressure (IP) networks operated by SGN.

It shows the NTS/LDZ Offtakes at Shorne, Farningham, Tatsfield and the Isle of Grain where gas can enter the LDZ. The Offtake at Winkfield is also shown but this is less likely to receive gas from the Isle of Grain. The degree to which the oxygenated gas could penetrate the network will vary throughout the year with periods of low demand, circa 6mcm/d, producing the highest level of penetration over the whole LDZ, with the exception of the zone of influence from Winkfield. As demand increases the penetration level into the LDZ reduces with the majority of gas being distributed in the London area. This is also very much influenced by the flow out of Grain into the NTS which could influence the whole LDZ or directly into the Distribution network.

However we do not consider that this would have a material impact as:

- We do not have any storage contributing to the supply; and
- The oxygenated gas would be mixed with the lower-content gas, thus dissipating within the network.