Non-Standard Gas Entry Conditions Assessment Report – Connection 2

What the analysis includes:

Assessment of the expected Oxygen content on the Network after the connection, and where any oxygen element is expected to reach in the NTS from the connection, and at what percentage, on a typical worst case demand level.

Limitations:

- Does not assess all potential network circumstances such as maintenance, or different supply patterns. For example, with maintenance, pipeline isolation, valve operations, and compressor configurations in the local area may lead to NGT exit points receiving concentrated biomethane; therefore, planned maintenance should be carefully assessed. Given the wide range of possible maintenance scenarios, NGT will make every effort to minimize impacts through specialized maintenance regimes. However, if sufficient blending cannot be maintained, NGT may require customers to reduce or temporarily suspend flow to ensure compliance with gas quality standards across the network.
- Is not a forward-looking statistical view i.e. how often gas will get to a location in the future given future predicted supply/demands.
- Cannot guarantee that any situation analysed will always be the case, and that unforeseen or unassessed scenarios may produce different results.

Site reference: Connection 2

Assumptions:

Assumed flow from site: Oxygen level from site:	0.036 mcm/d 0.2% mol
Potential sites impacted:	Nearest downstream sites, Great Wilbraham GDN Offtake (41km), Royston GDN Offtake (68 km), Matching Green GDN Offtake (100 km), Epping Green (Enfield Energy-AKA Brimsdown) PS (114 km)
Sensitive site assumptions:	Bacton BBL Interconnector (77km) Bacton IUK Interconnector (77km)
Blending assumption:	Existing NTS forecast supplies, north to south

Analysis:

Assessment Demand Range: ~139 mcm\d

Sites assessed: System wide, with focus on the South-East

Summary of analysis:

In total 16 days of scenario run on a ~139 mcm\d demand (Day 365 Average), the lowest demand day of the year (Summer Day, expected to be the worst case). This was chosen as it would demonstrate the greatest impact to the network

Results:

The assessment includes the currently connected Biomethane sites, as follows

Glentham: flowing at maximum as per Network Entry Agreement, with 0.2% of O2

Murrow: flowing at maximum as per Network Entry Agreement, with 0.2% of O2

The impact on Oxygen content on sensitive sites is as follows

Power stations:

Offtake Name	Region	Mol. % (Maximum)	PPM (Maximum)
Epping Green (Enfield Energy-AKA Brimsdown)	South East	0.00176	18
Peterborough (Peterborough Power Station)	East Midlands	0.00073	7
Saddle Bow (Kings Lynn)	East Midlands	0.00044	4
Weston Point (Rocksavage)	North West	0.00036	4
Didcot	South West	0.00035	4
Marchwood Power Station	South West	0.00035	4
Burton Point (Connahs Quay)	North West	0.00034	3
Langage Power Station	South West	0.00034	3
St. Neots (Little Barford)	South East	0.00034	3
Millbrook Power Station	South West	0.00034	3
Caldecott (Corby Power Station)	East Midlands	0.00033	3
Seabank (Seabank Power Station Phase II)	South West	0.00033	3
Abson (Seabank Power Station Phase I)	South West	0.00032	3
Stanford Le Hope (Coryton)	South East	0.00026	3
Thurrock PS	South East	0.00001	0
Rye House	South East	0	0
Grain Power Station	South East	0	0
Middle Stoke (Damhead Creek-AKA KingsNorth Power Station	South East	0	0
Medway (AKA Isle of Grain Power Station - Not Grain Power)	South East	0	0
West Burton Power Station	North East	0	0
Blyborough (Cottam)	North East	0	0
Eastoft (Keadby)	North East	0	0
Keadby 2 Power Station	North East	0	0
Eastoft (Keadby Blackstart)	North East	0	0
Blyborough (Brigg)	North East	0	0
Eggborough Power Station	North East	0	0
Stallingborough	North East	0	0
Thornton Curtis (Killingholme)	North East	0	0

Storage sites:

Offtake Name	Region	Mol. % (Maximum)	PPM (Maximum)
Barton Stacey Max Refill (Humbly Grove)	South West	0.00036	4
Holford	North West	0.00035	4
Hole House Max Refill	North West	0.00034	3
Hornsea Max Refill	North East	0	0
Garton (Max Refill) (Aldborough)	North East	0	0

Interconnector:

Offtake Name	Region	Mol. % (Maximum)	PPM (Maximum)
Bacton BBL Interconnector Export	East Midlands	0.00048	5
Bacton IUK Interconnector Export	East Midlands	0	0

Distribution Network (DN) Offtakes:

Offtake Name	Region	Mol. % (Maximum)	PPM (Maximum)
Great Wilbraham	South East	0.00334	33
Whitwell	South East	0.00234	23
Royston	South East	0.00226	23
Matching Green	South East	0.00178	18
Peters Green	South East	0.00158	16
Peters Green South Mimm	South East	0.00158	16
Hardwick	South West	0.00036	4
Ipsden	South West	0.00036	4
Braishfield A	South West	0.00036	4
Braishfield B	South West	0.00036	4
Mappowder	South West	0.00036	4
Maelor	North West	0.00036	4
Austrey	West Midlands	0.00036	4
Ilchester	South West	0.00035	4
Alrewas (EM)	East Midlands	0.00034	3
Alrewas (WM)	West Midlands	0.00034	3
Fiddington	South Wales	0.00033	3
Gilwern	South Wales	0.00033	3
Farningham	South East	0.00026	3
Farningham B	South East	0.00026	3
Warburton	North West	0.00002	0
Roudham Heath	South East	0	0
Luxborough Lane	South East	0	0
Horndon	South East	0	0
Shorne	South East	0	0
Tatsfield	South East	0	0
Thornton Curtis (DN)	North East	0	0
Walesby	North East	0	0
Salmesbury	North West	0	0
Dyffryn Clydach	South Wales	0	0
Dowlais	South Wales	0	0

The range of penetration into the Network from Connection 2 is as below, with the %X2Y number representing the percentage of gas at that site that has come from Connection 2:

The Worst case %: = 1.67% composition of the gas from Connection 2 at the Great Wilbraham DN Offtake. The table below shows % of gas at Exit points that has come from Connection 2

Offtake Name	%X2Y	Type	Region
Great Wilbraham	1.67084	GDN	South East
Whitwell	1.12998	GDN	South East
Royston	1.08501	GDN	South East
Epping Green (Enfield Energy-AKA Brimsdow	0.80205	PS	South East
Peters Green	0.71279	GDN	South East
Peters Green South Mimms	0.71279	GDN	South East
Matching Green	0.12599	GDN	South East
Stanford Le Hope (Coryton)	0.11586	PS	South East
Farningham	0.11549	GDN	South East
Farningham B	0.11549	GDN	South East
Thurrock PS	0.00499	PS	South East

Conclusion: This is acceptable.

Reasoning: The analysis showed that if a 0.2mol% specification for oxygen is agreed with Connection 2, no storage site is expected to receive gas with O2 concentration greater than 0.00036mol%, no power station O2 concentration greater than 0.00176mol%, and no interconnector O2 concentration greater than 0.00048mol%, which is well within GSMR and operational guidelines.