

Kiran Turner
Network Price Controls
Ofgem
10 South Colonnade
Canary Wharf
London
E14 4PU

Tony Nixon
Head of Gas Transmission,
Regulation
Tony.Nixon@nationalgrid.com
Direct tel +44 (0)1926 656345

Re: RIIO-T1 reopener consultation: One-off Asset Health Costs (Feeder 9)

Dear Kiran,

This response is submitted by National Grid Gas Transmission (NGGT). We own and operate the gas transmission assets in Great Britain (GB).

We do not support Ofgem's initial view to reject our funding application for costs associated with the tunnelled replacement of Feeder 9, for the following high level reasons;

- Clear demonstration, both qualitatively and quantitatively, of the need for the tunnelled replacement of Feeder 9: this is supported by our submission and the new information we have provided to Ofgem, covering operational impact to the GB energy market and on frond mattress performance.
- Ofgem made it clear within their consultation document that they will take into account all information received in reaching a final decision.

Feeder 9 is critical national infrastructure and if Ofgem have any doubts/further questions about the needs case following this response and those from other stakeholders, we request further dialogue with Ofgem before the final decision at the end of September.

In the sections below we address the operational impact, frond mattress performance and the quantitative assessment. This is followed by our response to Ofgem's assessment of the efficient costs of delivering the tunnelled solution. Within the appendix to this response we address each of Ofgem's questions and provide additional supporting information.

Operational Impact on GB energy market

Since our reopener submission, we have been discussing with Ofgem the main impacts that would be experienced by both the GB energy market and the wider UK economy following a situation where the Feeder 9 pipeline, which typically carries 20 per cent of GB's gas, would need to be isolated.

From the information below it is clear that the impact of an isolation of Feeder 9 on the GB energy market and the wider economy would be unprecedented and the consequences severe.

In the short term, the isolation of Feeder 9 would immediately and dramatically reduce East coast transmission capability and constrain Easington area entry flows (both the Easington

terminal and onshore storage sites) to approximately 75 mcm/d, which represents a 40% decrease from normal operating levels. Any such isolation process would require both significant market adjustment along with fast and substantial operational action by our Gas National Control Centre (GNCC), given Feeder 9 is the highest throughput feeder on the National Transmission System (NTS).

We have clear processes that must be followed to maintain safe operation and reduce risk to supplies. If isolation were to happen under winter conditions, it is very likely we would need to issue a Gas Deficit Warning, as well as undertake robust energy balancing and entry constraint management actions to secure additional supplies (predominantly LNG and interconnector importation) to support and maintain security of supply. Additionally, our portfolio of actions would likely include restrictions to non-firm offtake capacity to those large end users (namely power stations and large Industry), who do not have firm access rights – and this would introduce a consequential risk into the UK electricity market. This would be necessary to arrest the early phases of pressure degradation until the NTS could be stabilised and system balance restored. These scenarios would be highly dependent upon the potential timings of market and network configuration response and the number of days over which the initial phase of the incident occurs.

Over a longer period, we estimate that continued high levels of intervention by the GNCC would be needed to allow the market sufficient time to reposition and respond to the need to shift GB market supply. This includes the need to reduce intake from the North Sea and Norway and regularise supplies needed to support the network from southern sources. We estimate that it could take up to three weeks for the market to re-establish a sustainable supply pattern, creating considerable daily volatility in energy prices and a need for us to more proactively manage the system balance throughout this time.

For the entire duration of the event, our analysis suggests that GB will be dependent on competing for and accommodating LNG and interconnector supplies from global markets, with a likely case of needing prices to at least match Asian LNG Spot and interconnected supplies from mainland Europe. Gas supplies (and therefore line pack) would no longer be capable of being optimally distributed across the UK with such transmission route limitation, potentially requiring additional locational or within day balancing actions directed by NGGT. Furthermore, the combination of significantly reduced overall gas margin and the potential for other asset failures to occur, realistically heightens the likelihood of deeper interruptions to gas demands and the risk of having to invoke emergency actions and procedures.

Further context: The most recent and comparable experience of significant supply losses to the isolation of Feeder 9 occurred on 1 March 2018 this year (end of day deficit of 50 mcm/d), when additional supply volumes materialised across the market. We had to manage the event and drive adequate market response by issuing significant market notices, utilising reserve holdings and taking balancing actions at prices up to 499p/th, eight times the typical price earlier in the winter, before the system balanced through additional gas from LNG and the Continental Europe interconnection. This situation, however, contained significantly less network configuration risk and was much shorter in duration than we would expect to see for Feeder 9.

FronD Mattress Performance

Over many years, NGGT has consulted with leading marine engineering companies to determine the optimum remediation strategies for the erosion seen on the Feeder 9 pipeline. Their expertise has led to the deployment of frond mattresses, which they expect to have an operational life of 5-10 years. Intertek's energy and water consultancy service has extensive experience of assessing the results from site investigation and monitoring surveys. In their opinion, from their January 2018 report titled "Humber Estuary Feeder No. 9 Pipeline; Independent Review of Freespan Development and Remediation Planning":

"The results of the inspection surveys continue to be unpredictable, and the rate of development of adverse features is rapid and dramatic. The decommissioned No 1 Feeder is evidence of the destructive nature of the seabed environment in the Humber Estuary and despite extensive mattress protection programs the No 9 Feeder pipeline requires constant monitoring. There is no conclusive evidence that there will be an associated decrease of the risks to the pipeline integrity through sediment deposition and the management strategy should not rely on natural processes to improve the medium to long term outlook.

In addition, further remediation works required in an emergency situation would be challenging due to the difficult estuary conditions and time required to mobilise the specialist equipment and personnel required.

Therefore, it is Intertek's opinion that the pipeline is completely removed from the estuarine environment as part of a long-term strategy to ensure the security of gas supply."

The deployed remediation has up to now prevented further exposure and undermining of the pipeline. However, for over 500m of the ca. 750m remediation, the mattresses have not collected sufficient sediment and are still visible. This means they are not performing as intended and the depth of cover is still outside of recognised standards (Industry standards: IGEM/TD/1 and NGGT internal standards: T/SP/TR/18) and the requirements of the pipeline lease.

An option could be to wait until the frond mattresses fail or are proven to be ineffective in other parts of the estuary crossing. However due to the societal impact in terms of supply constraints, which could last up to six years being the time needed to replace the pipeline, this would not be in consumer interests. In addition, such an approach would in NGGT's opinion be in breach of section 9 of the Gas Act, which obliges NGGT as a gas transporter to develop and maintain an efficient and economical pipeline system for the conveyance of gas. Therefore, NGGT has pursued, in accordance with expert advice, the long-term replacement of the pipeline as expediently as possible.

Feeder 9 Cost Benefit Analysis

The Feeder 9 situation is a high impact low probability (HILP) event. We undertook an innovation project with Business Modelling Associates (BMA), who are experts at this type of analysis in a wide range of sectors including oil and gas. BMA developed a comprehensive model, which considered a multitude of parameters, with associated probability distributions

with both Monte Carlo and sensitivity analysis. The results of the model supported the investment decision.

In developing their initial view, Ofgem produced a simplified MS Excel model, termed a traditional CBA. We have reviewed Ofgem's traditional CBA and updated the assumptions below, based on the new information and clarifications we have provided.

- scour / freespan probabilities
- gas price impact
- electricity price impact
- constraint costs
- value of loss of load
- modelling logic of loss of lease and freespan impact

We have provided Ofgem with a separate document setting out these changes.

The table below shows Ofgem's original CBA results.

£m (09/10)	NPC to 2044 (£m)		NPC to 2072 (£m)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Tunnel 2012 Option	60.89	88.65	74.56	108.42
Mitigate	43.67	34.46	66.17	73.35
NPC Comparison	-17.22	-54.19	-8.39	-35.08
Option Favoured	Mitigate	Mitigate	Mitigate	Mitigate

With the updated assumptions, but retaining Ofgem's modelling approach, the following results are obtained:

£m (09/10)	NPC to 2044 (£m)		NPC to 2072 (£m)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Tunnel 2012 Option	384.19	191.10	397.86	210.87
Mitigate	829.50	304.72	850.54	342.71
NPC Comparison	445.31	113.62	452.67	131.84
Option Favoured	Tunnel	Tunnel	Tunnel	Tunnel

From the above table, based on the new information provided and included within the Ofgem's traditional CBA model, it is evident that due to the positive Net Present Cost of the tunnel option compared to the mitigate option under both scenarios, the tunnel is the preferred option.

Efficient Cost

The Feeder 9 project is unique, as recognised by Ofgem within their consultation document. It will be the longest pipeline within a tunnel in Europe. The Humber estuary is a RAMSAR¹ site and has many environmental protections afforded to it, in addition to being the third largest

¹ A site as set out in the Ramsar Convention (Convention on Wetlands of International Importance) (1971)

shipping complex in Great Britain. The main works contractor (MWC), selected following a competitive tendering exercise, consists of three companies within a JV, due to the need to bring together different expertise. Based on the project's unique characteristics to determine an efficient cost level for project management and risk, the areas subject to Ofgem's proposed disallowance, it is essential to undertake a project specific review. Within Final Proposals in relation to Feeder 9 it was stated *"we will assess the relevant costs upon NGGT having received the necessary permits and providing us with specific cost evidence"*.

Within our reopener submission, we provided a cost breakdown and significant detail on the risks underpinning our costs. In Ofgem's consultation document they draw on a report [confidential] produced by their advisers which according to Ofgem "provided an indicative estimate that implied a total risk allowance of [redacted due to commercial sensitivity] compared to NGGT's proposed [redacted due to commercial sensitivity]". The report behind this "indicative estimate" was not provided alongside the consultation.

Ofgem also used their experience of high value investment projects in the gas and electricity sector and state that a benchmark of 10% of total project costs would normally be a reasonable figure, but for the unique challenge of Feeder 9 a 15% allowance would seem appropriate. For project management they have grouped a number of activities together and then applied a 15% benchmark based on other large infrastructure projects in the gas and electricity sectors. For project management, no additional allowance was made for the unique nature of the project. In addition, for both high level benchmarks, no evidence or references are provided.

To better understand the validity of Ofgem's assessment, on 15 August, we requested additional information including any supporting reports to substantiate Ofgem's view. Ofgem's written response on 21 August referenced a specific Feeder 9 consultant's report, which was also provided, and their work and reports on Offshore Transmission Owner, Strategic Wider Works and Interconnector projects. However due to confidentiality, Ofgem were only able to provide links to six reports in the public domain.

Based on our assessment of the published sources Ofgem have used and that we are able to review, we believe that none of the references are applicable, other than in very general terms to the Feeder 9 cost assessment. Of the six reports, only the ACER report from 2015 reviews any gas transmission projects and this report only presents a single average figure for engineering and project management and states *"the indicators and the corresponding values should not be regarded as a substitute for the due diligence in each instance of an existing or planned investment"*. Therefore we believe for Ofgem to make an informed decision on the project costs, as it has done for other projects such as NEMO, NSL and Burbo Bank it must undertake a specific review of the Feeder 9 costs.

On 12 July 2018, Ofgem requested a consultant [confidential] to assess the probabilities contained within National Grid's risk register and the associated value of the impacts. Ofgem requested particular attention be placed on the assumed day rate of [redacted due to commercial sensitivity]. The consultant furnished Ofgem with a report six days later. No interaction with NGGT took place during the period. The consultant's concluding remark was *"The assessment and opinions detailed below have not been derived from detailed analysis or modelling, and are based on our review of a limited set of historical documents provided to us by OFGEM and our experience across a number of engineering sectors. They highlight areas where more evidence for the existing analysis would be useful in order to guide a discussion with NG."*

In reviewing the report we do not believe it is fair or accurate to represent the output as an indicative estimate as Ofgem assert. It was intended to aid a discussion with NGGT.

The report contains numerous basic errors and at times clearly shows that the consultant does not appreciate the scale and complexity of the project. For example in assessing the daily rate of [redacted due to commercial sensitivity], the consultant allocates the cost [redacted due to commercial sensitivity] to NGGT and [redacted due to commercial sensitivity] to the MWC. This is obviously the wrong way round and affects the further calculations. The consultant uses an extremely crude approach to determine a day rate of £13.5k, which is then subsequently used in the calculation of the impact of the individual risks. The day rate is calculated by averaging an assumed level of resource of 80, 60, 40 and 20 FTEs with an annual salary of £50k. In fact, the peak resource on the project has been ca. 300 FTEs and since April 2018 is averaging ca. 180 FTEs. Just correcting this basic error increases the average day rate from £13.5k to £48.7k, a 360% increase. The assessment importantly does not also take account of equipment hire costs or numerous other elements, such as utilities. Even a simple analysis of the annual breakdown of cost information provided to Ofgem would show a day rate ranging from £170k to £200k for all activities in the two main construction years.

In terms of risk analysis, only the top risks were reviewed which equate to [redacted due to commercial sensitivity]. However in reviewing the detail of the analysis the consultant has missed two risks, contained within the total, which had a P50 value of [redacted due to commercial sensitivity] and suggested moving a significant amount of costs [redacted due to commercial sensitivity] into the base contract value, which is then not reflected within Ofgem's consultation document. There are many other shortcomings in the analysis, which means that the report cannot be considered a robust basis on which to assess NGGT's risk allowance.

Considering both the specific report and the general public information, we do not consider that Ofgem have undertaken an appropriate assessment of the Feeder 9 costs as stipulated within Final Proposals. Without a more rigorous assessment we believe Ofgem have no basis on which to disallow any of NGGT's costs. In further support of our risk assessment and project management costs we have provided Ofgem with two independent project specific reports, within a confidential appendix, that support the proposed cost levels and the approach we have taken.

In addition, we would contend that Ofgem have not compared our actual risks and project management costs on a like for like basis with the high level industry benchmarks. NGGT's risk/contingency of [redacted due to commercial sensitivity] contained a significant proportion of costs related to scope change, which on other projects, as noted by Ofgem's consultants, are not included within the risk/contingency category. These scope changes have now been progressed with the MWC and have moved [redacted due to commercial sensitivity] of risk costs into base. We still hold a further [redacted due to commercial sensitivity] of scope change within our definition of risk/contingency. In terms of project management, Ofgem allocated two cost lines within our breakdown to this category. In our experience principal contractor duties / site supervision are not, and should not, be classed as project management. We have provided further information in appendix 3 on which costs we believe should be categorised as project management both within the MWC and NGGT. The table below summarises these changes in a form consistent with Ofgem's consultation.

Cost category	NGGT request per Ofgem categorisation	NGGT updated categorisation	Change (£M)	% of total project costs	Basis
Capital costs	[redacted due to commercial sensitivity]				
Risk Provision					
Contingency / unlet scope					
Project Management					
Total	£139.89	£139.89			

Summary

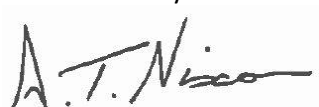
It is evident from the above and the information provided in our submission, during this consultation and to stakeholders over the last 8 years that there is a robust and evidenced needs case for the tunnelled replacement and that NGGT has and continues to follow the most economic and efficient solution to the resolution of the Feeder 9 situation.

In terms of the efficiency of delivery of the tunnelled solution there are significant deficiencies in terms of the analysis undertaken by Ofgem that mean the assessment is not robust. NGGT has demonstrated through its external procurement process and continual monitoring and challenge on costs that it is delivering the tunnelled solution in the most cost efficient manner.

Based on the information within our submission, and the additional information provided as part of this consultation, Ofgem should fund the project as per our submission.

We hope you find this response helpful. If you would like to discuss any of the above please do not hesitate to contact me.

Yours Sincerely



Tony Nixon
Head of Gas Transmission, Regulation

Appendix 1- Responses to Ofgem Questions

Section 2: Is Feeder 9 Required?

Question 1: Do you have any views on our assessment of the need for Feeder 9?

We agree that there is certainty on the need for Feeder 9 up until 2025, based on existing capacity bookings and forecast flows. In terms of capacity bookings, as recognised by Ofgem in a number of publications it is known that as the risk of network capacity constraints has decreased significantly, shippers have become less willing to buy long-term capacity products and have switched to much cheaper short-term alternatives, therefore we would not expect significant capacity bookings past 2025. When the investment decision was made in 2016, considering the longest forecast available to us, under three of the four Future Energy Scenarios, this showed a continuing need for the pipeline in the longer term. It should also be noted, that if Feeder 9 was not available, even in a scenario where it was not explicitly needed, it would adversely impact the overall resilience of the network.

Question 2: Do you have any views on the additional information provided by NGGT on the operational impact on the GB gas market of the loss of Feeder 9?

The new information we have provided, expanded upon in the main body of this response, should be fully taken into account in any reopener decision. The analysis of the impact of the loss of Feeder 9 on the GB gas and electricity markets further confirms that the replacement of the pipeline is in the best interests of UK consumers. In addition we have provided a more detailed confidential analysis and briefing to Ofgem.

Section 3: The Case for Replacing Feeder 9

Question 1: Do you have any views on our assessment of NGGT's case for the tunnelled replacement?

We disagree with Ofgem's qualitative assessment. National Grid has undertaken a robust option appraisal throughout the development of the Feeder 9 solution. This has been extensively reviewed by all relevant stakeholders as part of the Development Consent Order process, which culminated in the approval of the project by the Secretary of State in August 2016. The detail of this process is contained within our submission and available on-line². In reaching our Final Investment decision in April 2016, all credible ways forward were discussed at length over three senior governance meetings. Part of those discussions included continuing with frond mattresses, but, for the reasons stated in the main body of this response, this was not in consumer interests. For reference we attach in appendix 2 a high level briefing that was provided which succinctly summarises the key information that led to the Final Investment Decision taken in 2016. We therefore do not accept Ofgem's unfounded assertion "NGGT did not carry out a full assessment of all feasible options (including a CBA) before making its investment decision in April 2016, and seems to have discarded a key alternative to replacement (i.e. continued operation of the existing pipeline) for reasons that do not appear to us to be robust."

² Publicly available documentation: <https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/river-humber-gas-pipeline-replacement-project/?ipcsection=docs&stage=app>

In addition, Ofgem state within para 5.11 “Moreover, NGGT does not appear to have commissioned or reviewed updated technical reports in 2016 that looked at the condition of mattresses that were laid in previous rounds of mattressing (2010 and 2013).” This is factually incorrect and implies that NGGT is not fulfilling its duties as an economic and efficient pipeline operator. We have received regular survey reports throughout the period from 2013 to 2018 (currently bi-monthly) on the condition of the Feeder 9 pipeline and the associated frond mattresses. These reports are reviewed by our technical experts and appropriately acted upon.

It should be noted that the decision to proceed with a tunnelled solution is subject to review, if and when new information comes to light. In addition we continue to commission reports and studies to ensure that the actions we are taking are the most economic and efficient, for example the Project EVA work discussed in detail in our submission and the 2018 Intertek report.

Question 2: Are there any additional factors we should consider as part of our assessment?

In addition to the information contained in our submission, we have provided further information that needs to be fully taken account of both qualitatively and quantitatively in terms of the operational impacts to the GB energy markets.

Question 3: Do you consider there is a safety case for replacing Feeder 9?

The HSE report produced on behalf of Ofgem recognises that “all other reasonable business/commercial costs to National Grid as well as other costs to consumers should be taken into account”. We agree with the HSE report that safety in the immediate vicinity of the current Feeder 9 pipeline as a singular factor would not justify the tunnelled replacement of Feeder 9. However, the continued use of frond mattresses does not represent ALARP (As Low As Reasonably Practical) when taking into account safety in the immediate vicinity of the pipeline, wider safety implications consequent on the security of supply risks and the other relevant factors.

Question 4: What is your view of the risk from loss of lease?

The risk of the loss of the lease is contingent upon several factors, including the ongoing relationship with ABP, the health of the current Feeder 9 pipeline and estuary conditions. Due to these various factors, there is a credible risk of the loss of lease.

In terms of estuary conditions and considering current academic literature, there is a strong conclusion from the scientific community³ that there is increasing uncertainty in the next few decades of UK estuary conditions due to climate change, including potential physical changes such as increased flooding, tidal flows and erosion. Therefore, given this level of uncertainty, the risk of a loss of lease due to changes in the condition of the pipeline remain a real risk to NGGT.

³ Impact of Climate Change on UK Estuaries: A review of past trends and potential projections (2016) Robins, et al, Estuarine, Coastal and Shelf Science 169, 119-135. Available: <https://www.sciencedirect.com/science/article/pii/S0272771415301669>

Question 5: What is your view of the effectiveness of NGGT's mitigation approach?

While the mattresses seem to be effective at the moment, recent survey results show that the mattresses are still visible, which means that they are not performing as intended in terms of collecting sediment to protect the pipeline. Furthermore, they are unproven in others parts of the estuary crossing where the seabed is less firm and any replacement of the existing mattresses would represent a significant challenge. These points are covered in more detail within our submission. Therefore it is not a technique that NGGT should rely on for the long-term security and safety of the pipeline.

Section 4: Quantitative Analysis and Comparison of Options

Question 1: Do you agree with our assessment of NGGT's analysis?

We do not agree with Ofgem's assessment of our analysis. The Feeder 9 situation is a high impact low probability (HILP) event. Therefore, to undertake a robust CBA is extremely challenging, hence the innovation project we commissioned with BMA. The BMA analysis was extensive and considered a multitude of parameters, with associated probability distributions with Monte Carlo analysis, and undertook sensitivity analysis. The critique provided by Dr Robert Ritz for Ofgem is largely favourable to the use of the EVA model although we accept there are areas for improvement, including the use of additional methodologies. We therefore fundamentally disagree with Ofgem's conclusion on the use of the EVA tool, which appears counter to their own consultant's opinion.

In terms of Ofgem's specific points on the traditional CBA, that NGGT produced to help Ofgem understand the EVA modelling, our views are as follows:

- We disagree that the current pipeline would not last beyond 2044, we would anticipate that through a process of inspection we would revalidate the pipeline for continued use, as is the case for other pipelines and assets. Therefore it is appropriate to undertake the assessment for the period that customers would incur costs from the investment.
- In terms of sunk costs we have treated both the mitigation and tunnelled replacement options equally to ensure the investment decision is forward looking from the point that it was made in 2016. So long as the costs up to this point are treated in the same manner, either excluded or included we believe this would be appropriate. An alternative way of modelling would have been to only include revenues from the decision point forward.
- We believe it is appropriate to include routine frond mattress replacement costs, the information from external experts is that the mattresses should remain effective for between 5-10 years. Therefore we should make provision for routine replacement, which is separate to scour. Ofgem's comment "National Grid has not informed us about any routine mattressing carried out on Feeder 9 in the first 25 years of operation of the pipeline until 2009, when pipeline exposure was observed" appears to completely misunderstand the issue. The morphological change in the estuary only impacted the Feeder 9 pipeline in 2009 at which point frond mattresses were installed and they have a life of 5-10 years – so how could we have undertaken any routine replacement before this date?
- In terms of representation of loss of lease, in the simplified CBA we have included a basic calculation. In the EVA model where it is possible to build decision trees and assign probabilities to different branches a more robust evaluation is undertaken. Ofgem's

approach starts to follow a decision tree logic but has been applied inconsistently, appears to contain errors, and is difficult to follow due to a lack of transparency and the limitations of MS Excel.

- We disagree with Ofgem's assessment of scour and free-span probabilities. In terms of Ofgem's reference to *"our advisers shared our concerns that NGGT's assumptions appear pessimistic"*, it is worth noting from the same report Ofgem's advisers stated *"It should be recognised that the following commentary has not been derived from analysis or modelling, and is based on opinion and unvalidated judgement derived from reviewing a limited set of historical documents provided to us by Ofgem. Ofgem are therefore encouraged to develop their own view on appropriate estimates, depending on their intended use"*. The scour and freespan probabilities developed by National Grid and BMA and included within the EVA model are based on analysis of the available data with an appropriate distribution, which is intended to cover the significant uncertainty within the data.

Question 2: What are your views on our CBA model and assumptions?

We believe Ofgem's CBA modelling does not take into account the range of probabilities and uncertainties associated with the Feeder 9 investment case. The approach also does not follow the advice of Ofgem's own advisor, who recommends the use of multiple methodologies. There are a number of assumptions made that have a dramatic effect on the results. All of these assumptions appear to be based on internal Ofgem judgement and are not underpinned by external expertise. The most significant assumption is the probability of freespanning/scour, Ofgem utilise a range of 5.8% per annum (based on two events every 34 years) to 20% per annum (based on NGGT's statement that mattressing is likely to be effective for 5-10 years). The results from the CBA are repeated below:

£m (09/10)	NPC to 2044 (£m)		NPC to 2072 (£m)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Tunnel 2012 Option	60.89	88.65	74.56	108.42
Mitigate	43.67	34.46	66.17	73.35
NPC Comparison	-17.22	-54.19	-8.39	-35.08
Option Favoured	Mitigate	Mitigate	Mitigate	Mitigate

The minimum value used by Ofgem of 5.8% does not represent the actual information. The morphological change within the estuary of deposition to erosion occurred in approximately 1985, impacting Feeder 1 in 1999 (which was laid in a shallow trench) and Feeder 9 in 2009. Also as the investment decision was taken in 2016 the appropriate time period for assessment is seven years not 34 years. In addition although there have been two remediation exercises undertaken, there have been six separate pipeline exposures – all of which needed to be addressed. For efficiency, we addressed the six exposures in one remediation exercise. Therefore based on this very simple analysis the minimum value following Ofgem's approach would be 85% not 5.8%. Not changing any other factor (but applying the subsequent percentages), but now using Ofgem's maximum of 20% as the minimum and 85% as the maximum and applying this to Ofgem's CBA model, the following results are obtained.

£m (09/10)	NPC to 2044		NPC to 2072	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Tunnel 2012 Option	123.46	94.31	137.13	114.08
Mitigate	195.47	49.57	212.85	88.11
NPC Comparison	72.01	-44.74	75.72	-25.97
Option Favoured	Tunnel	Mitigate	Tunnel	Mitigate

Based on the correction of this factor without addressing any other modelling differences the tunnel is the favoured option under scenario 1. This clearly demonstrates the shortcomings in Ofgem's CBA approach and the conclusions upon which they have drawn. By adjusting only one parameter, a significantly different conclusion has been reached, which is why we utilised a Monte Carlo analysis model that allows a more comprehensive view by obtaining a range of potential outcomes using distributions.

We have worked with Ofgem to provide updated assumptions for scour / freespan probabilities, gas and electricity prices, constraint costs and the value of lost load that better reflect the investment case and underpin the tunnelled solution. However our concerns with regard to the simplistic modelling approach remain.

Section 5: NGGT's Decision- Making Process

Question 1: What are you views on our analysis of NGGT's decision-making process?

Please see our response to Section 3 Question 1.

Section 6: Assessment of Efficient Costs

Question 1: Do you have any views on our assessment of efficient costs? In particular, please provide your views on our approach to project management and risk contingency allowances.

As covered in the main body of NGGT's response, Ofgem's assessment of efficient costs is not appropriate or robust. Several material mistakes and severely wrong assumptions were found in the analysis of the project risks and the consideration of the project management costs were also weakly correlated to dissimilar projects. For other projects of this size Ofgem have undertaken bespoke cost assessments. It is significant that what are seemingly very similar projects produce different outcomes;

- NSL – developer project management cost of 5.9% (as a proportion of capex)
- NEMO – developer PM costs 1.6%
- Burbo Bank Extension – project management costs of 10% of value

We have provided additional reports to further substantiate our costs, and due to the lack of any meaningful assessment by Ofgem, we believe our costs should be allowed in full.

Section 7: Our Initial Views

Question 1: Do you agree with our initial view to reject NGGT's application for funding for the replacement Feeder 9 pipeline?

We do not support Ofgem's initial view for reasons stated within the main body and repeated below:

- Clear demonstration, both qualitatively and quantitatively, of the need for the tunnelled replacement of Feeder 9: this is supported by our submission and the new information we have provided to Ofgem, covering operational impact to the GB energy market and on frond mattress performance.
- Ofgem made it clear within their consultation document that they will take into account all information received in reaching a final decision.

Question 2: If we reject the needs case, do you have any views on the treatment of expenditure NGGT incurs on the tunnel for the purposes of the totex incentive mechanism (sharing factor)?

We see no grounds for Ofgem to over-ride the mechanistic sharing of actual expenditure through the efficiency incentive rate. National Grid has undertaken the project based on the unsuitability of frond mattresses as a long term protection measure combined with the severe consequences of a Feeder 9 isolation to the GB energy market. The investment decision is supported by a robust CBA specifically developed to model HILP events. To override the sharing mechanism would require Ofgem to demonstrate that there were exceptional circumstances and we had acted demonstrably inefficient or wasteful. We have seen no evidence in this consultation or any other information provided by Ofgem to suggest that this is the case.

Appendix 2

Investment Case – Feeder 9 Assessment

(separately appended)