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Email: rough.undertakings@cma.gsi.gov.uk

Dear Adrian,

**Centrica Storage Limited's response to the CMA's Review of the Rough Undertakings
– Statement of Issues**

Centrica Storage Limited (**CSL**) welcomes the opportunity to comment on the Competition and Markets Authority (**CMA**)'s initial issues statement).

CSL supports the CMA's view that the first task in this review should be addressing the implications on the capacity obligations in the existing Undertakings of the potential for increasing variability in the performance of the facility.

In this submission, CSL aims to demonstrate the case for varying the Undertakings to accommodate the impact of changes to the physical capabilities of the Rough Gas Storage Facility (the **Facility**). CSL also explains why it considers that the current monitoring and compliance arrangements included within the Undertakings are appropriate for achieving their intended objectives.

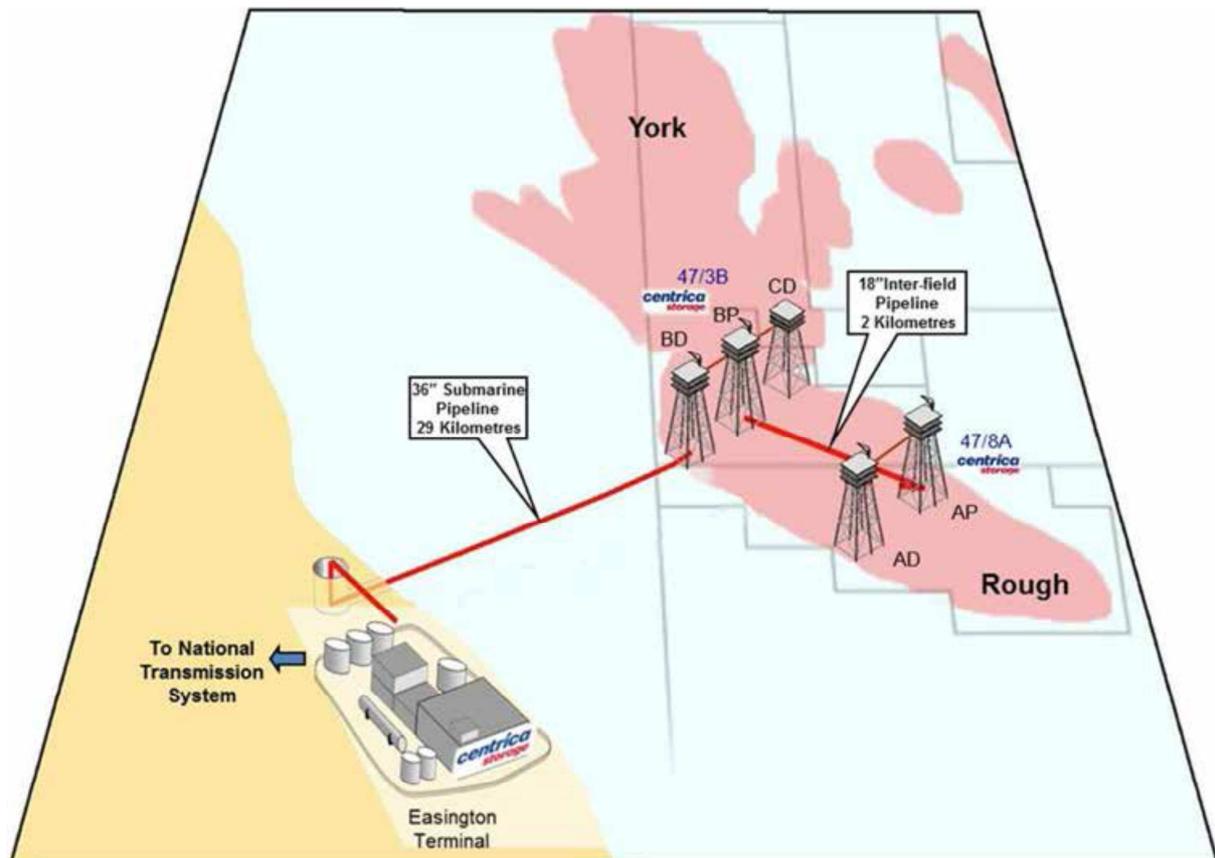
1. The case for varying the Undertakings to address changes in the Facility's physical capabilities

1.1 A brief background to the Facility

The Facility consists of the Rough reservoir, two (manned) offshore installations (47/8A and the 47/3B) and the Easington Terminal¹ (the **Terminal**), see Figure 1 below.

¹ More information regarding the Facility can be found in Rough Gas Storage Facility – An operational guide, available on CSL's website ([here](#)).

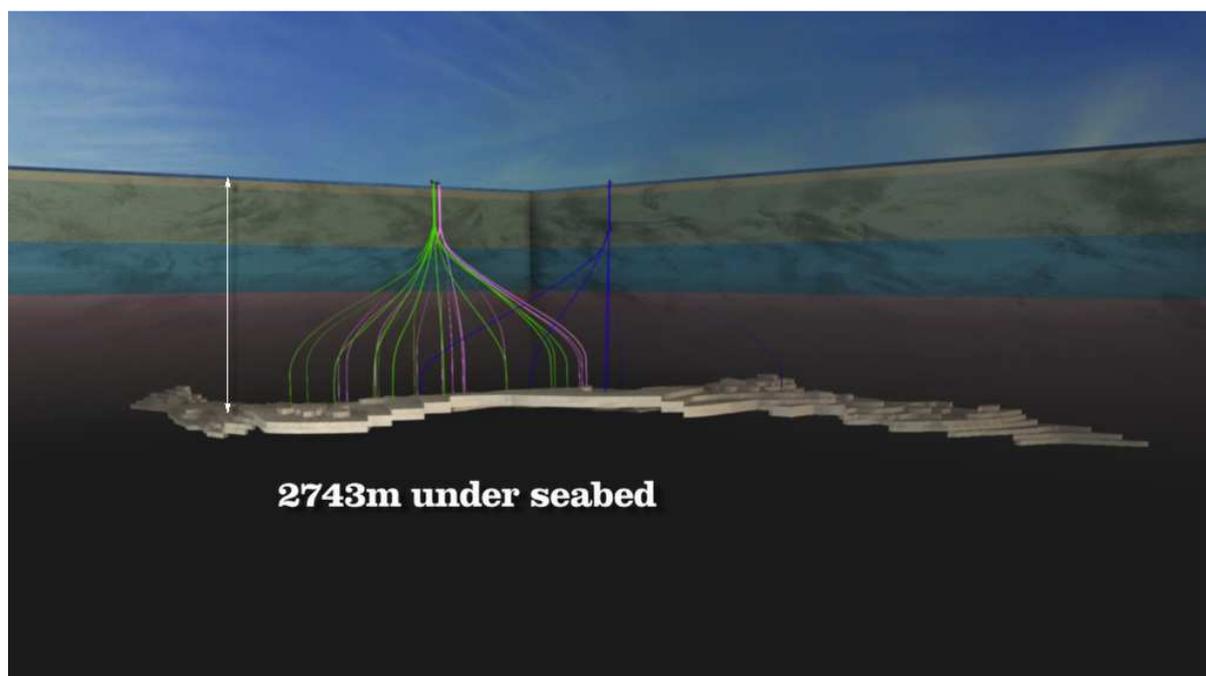
Figure 1. The Rough Gas Storage Facility



Licences for the Rough Field were given in 1964 and the first gas was brought ashore to the Terminal in 1975 from the 47/8A installation; the original production installation. In 1980 BG Corporation (which became British Gas plc in 1986 following privatisation) purchased the Rough Field with one third of reserves depleted to convert it into a gas storage facility. In 1985 the 47/3B installation was commissioned and Rough storage facility became operational.

The Rough reservoir is located 29 km offshore from Easington, spans an area of approximately 30 km² and is located approximately 2.7 km under the seabed. See Figure 2 below.

Figure 2. Schematic of the Rough reservoir, installations and wells



The two offshore installations are connected to Rough via 30 wells. The 24 wells connected to the 47/3B installation allow for the injection and withdrawal of gas from the reservoir, while the 6 wells connected to the 47/8A installation are only available for withdrawal². The two installations are connected via a 2 km long 18" inter-field pipeline.

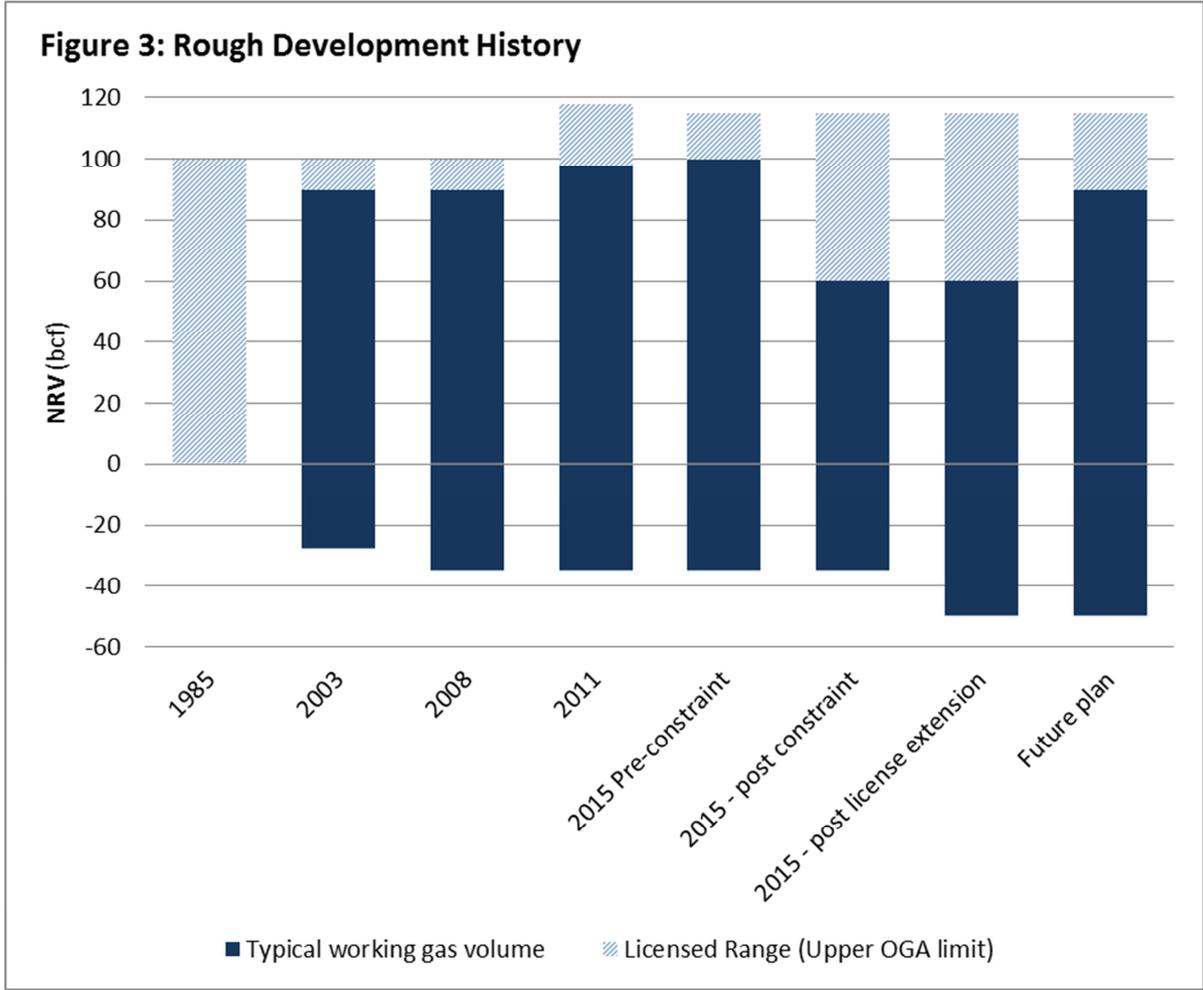
To inject gas into the reservoir, CSL must use compression units on the 47/3B installation. However, withdrawal is primarily a function of the prevailing reservoir pressure. Appendix 1 provides a more detailed explanation of injection and withdrawal and shows Rough's operating envelope (i.e. injection and withdrawal capabilities prior to, and following the reduction in the operating pressure). Unlike a normal gas production field the recycling of gas at pressure makes Rough unique.

The 47/3B installation is connected to the Terminal via a 36" Submarine Pipeline. The Terminal sends dry gas from the National Transmission System (NTS) to the platform for injection into the reservoir. The Terminal also processes gas withdrawn from the reservoir before being delivered to the NTS. CSL also processes gas from the York field at the Terminal.

1.2 Investment in the Facility

Since 2003, CSL has invested in the Facility in order to improve its availability and performance and increase its capabilities. As shown in Figure 3, CSL's investments have increased the working volume from c.118 billion cubic feet (**BCF**) (-28 BCF to 90 BCF) in 2003 to c.135 BCF (-35 BCF to 100 BCF) in 2015 (prior to the current pressure constraint).

² One of the 8A wells is out of operation. Further, the 47/8A platform is currently withdrawn from service until 1 March 2016 (see REMIT Bulletin 2015-67).



In order to place these figures in context, 135 BCF of gas would meet the annual gas requirements of approximately 2.9 million homes or 5% of total UK gas demand in 2014³.

CSL has consistently spent significant sums in maintaining the Facility and expanding its capabilities. For example, between 2006 and 2014 CSL spent an average of [£XX.X million per year, real⁴] on maintaining the offshore and onshore infrastructure⁵. In addition to increasing the working volume, CSL has successfully extended the Facility’s deliverability and increased the rate of injection which allows it to offer the increased working volume to the market.

CSL intends to spend an average of [£XX.X million] per year between 2015 and 2018 in part to achieve its short term goal to re-instate the higher operating pressures for Rough’s wells which would result in a working volume in the order of 140 to 150 BCF. This goal is subject

³ 135 BCF equates to approximately 41 TWh (with gas having a calorific value of 39.1). According to DECC’s Energy Consumption in the UK (2015) Report, temperature adjusted demand per household in 2014 was 14,263kWh.

⁴ Expenditure figures in this section include capital and operational expenditure (including payroll costs) for on-shore and off-shore maintenance. They exclude expenditure on information systems infrastructure, although some of this investment will support maintenance related activities. All historical data has been adjusted to be in 2015 terms using Retail Price Index.

⁵ A McKinsey’s & Company benchmarking exercise in 2012, which included 58 assets from 12 operators, found that Rough was a relatively complex asset (based on size, technology and complexity), and that CSL’s expenditure on asset maintenance was in the (upper) second quartile of industry standards when normalising for asset complexity.

to the results of the current well testing programme (see REMIT Bulletin 2015-33 revisions 1-5). Further, CSL is also investigating options for making process and infrastructure changes that would optimise Rough's operating envelope (i.e. maintain the balance between injection and withdrawal duration while maximising the volume of capacity that can be made available).⁶

In the longer term, CSL anticipates on-going maintenance expenditure in the region of [£XX.X million⁷] per annum between 2019 and 2024.

1.3 The current constraint on Rough's capabilities

On 18 March 2015, CSL issued a REMIT bulletin informing the market that it was limiting the maximum operating pressure of the Rough wells to 3,000psi. This limitation had the following effects:

- (i) limiting the maximum reservoir volume (the space into which gas can be injected) to between 29 and 32TWh (in 2014, the maximum reservoir volume was 41TWh); and
- (ii) decreasing injection performance (the rate at which CSL can transfer gas into the Facility).

The limitation was imposed as a result of a report from CSL's independent Wells Examiner, stating that the Maximum Allowable Annular Surface Pressure of the Rough wells had been calculated to be 3,000 psi.

In response to the pressure limitation, CSL has undertaken the following mitigation measures.

Firstly, following identification of the issue, CSL commenced a testing campaign which included calliper runs to assess the condition of the production tubing and pressure tests on the hangar seals. CSL expects that sufficient test data will not be available until the end of the summer 2016 injection season (between September and December 2016). During this further period of testing and verification works, the maximum permitted operating pressure of the Rough wells will remain at 3,000psi and, consequently, the upper constraint on the reservoir volume will remain (this has constrained the maximum fill level by c.12TWh).

Secondly, CSL submitted an application to the Oil and Gas Authority (OGA) to decrease the Lower OGA Consent from -35bcf to -50bcf. The OGA granted this consent on 20 July 2015. The upper OGA consent and the lower OGA consent set, for the purposes of CSL's gas storage licence, the permitted upper and lower limits on the Rough reservoir that can contain working gas for gas storage^{8, 9}. The decrease in the lower OGA limit by 15 BCF has created

⁶ Storage facilities are complex and dynamic systems; increasing the working volume (by going lower in the reservoir) impacts on both the injection and withdrawal profiles of the facility. Similarly, investing in either injection or withdrawal capacity can also have implications for the amount of space that can be made available. The variations to the Undertakings in 2012 recognised this to some extent by allowing CSL to apply to Ofgem to offer non Standard Bundled Units (SBUs) products from the Minimum Rough Capacity (MRC), as long as CSL offers at least the equivalent volume of unbundled capacity associated with the MRC.

⁷ Expenditure beyond 2019 is currently subject to the long term planning and budgetary review processes. The operational expenditure estimates for this period include inflation of 3% per annum.

⁸ The Oil and Gas Authority has now taken over some of DECC's responsibilities in relation to oil and gas production and storage licences. Consequently, in CSL's Operational Overview, these upper and lower limits are still referred to as the Upper DECC Consent and Lower DECC Consent respectively.

the conditions to allow the conversion of 4.62TWh of cushion gas into working gas volume that CSL will use to facilitate its storage operations.

For the 2015/2016 Storage Year, CSL intends to use some of this gas to meet customers' injection nominations in periods in which the Facility is physically constrained and it also provides CSL the gas it requires for operational support purposes in Winter.

1.4 Risks that affect the Facility's physical capabilities

The current pressure constraint demonstrates that the Facility's physical capabilities are at risk of changing and this has potential implications on CSL ability to meet its regulatory obligations.

The way in which Rough is operated is unique when compared to other offshore gas installations in Europe. This is because, unlike conventional gas producing infrastructure, the Facility is required to return to the original design specification (pressure) year after year. As the age of the Facility's infrastructure (wells, valves etc) increases the integrity degrades; this leads to an increase in the Facility's risk profile and hence the likelihood of failure. This creates potential risks which are unique to Rough and therefore difficult to test for and determine the consequences of.

There are a number of risks that can impact on the Facility's physical capabilities, many of which increase over time and as the asset ages.

Three areas of risk are set below.

(i) Process safety risks

Process safety risks include events such as loss of containment of natural gas, gas condensate or other hazardous chemical leaks which could occur as a result of undetected asset integrity issues (such as corrosion or other equipment degradation), damage to infrastructure or human error. Given the volumes and pressures of gas at the Facility, plant failures have the potential to result in significant gas release, fires or explosions which would likely lead to a significant loss of capacity potentially for many months if not permanently.

(ii) Operational risks

Operational risks relate to Rough's wells and reservoir integrity. CSL is undertaking well inspections and testing on a regular basis and is currently investigating options associated with ensuring the continued safe and reliable operation of the wells. However, should CSL identify fatigue issues with the well heads or cap-rock, it would be likely to have a significant impact on the Facility's technical capabilities and take a considerable time to address.

(iii) Regulatory risks

A further challenge for CSL is ensuring that the Facility can comply with evolving health, safety and environmental regulations. Given the age of the Facility, in some cases, CSL will need to make physical changes to the infrastructure to ensure that the equipment or

⁹ COUK's production licence and CSL's Storage Licence permit COUK to produce gas from Rough and CSL to operate gas storage in Rough within the parameters of the OGA consent (as amended from time to time). The current OGA consent expires on 19 July 2020 and will automatically end if production compromises well integrity or deliverability.

processes complies with the relevant requirements. There is a risk that, given the age of Rough, meeting the relevant requirements may require CSL to make changes to the Facility which may change its physical capabilities either for an extended duration or permanently.

There are also logistical event risks which are not related to the age and performance of the Facility.

The two offshore installations need to be serviced by ships and helicopters and this part of the British coastline is subject to high volumes of shipping traffic.

This creates the risk that the platforms, subsea infrastructure and pipelines could be damaged in a logistical event. For example, a ship hitting one of the Rough platforms (as was the case in 2002 when the fishing vessel *Marbella* struck the south-west leg of the 47/3B installation which resulted in the de-manning of the facility), or an anchor or sea debris damaging the subsea infrastructure.

A logistical event could result in a significant and prolonged outage, (e.g. if the single pipeline connecting the 47/3B platform to the Easington Terminal was damaged CSL would not have any injection or withdrawal capacity, potentially for many months).

An important element of CSL's preventative maintenance programme is its asset integrity works programme. In 2015, CSL will conduct 395 risk-based inspections of the critical pieces of equipment. These inspections allow CSL to monitor risk and take appropriate remedial actions to address issues. These inspections form part of the overall inspection and maintenance programme. In total, over 900 inspections have been completed in the first 10 months of 2015. These inspections have ranged in complexity from general visual inspections of structures such as beams and pipes through to measuring wall thickness of production critical vessels using specialised radioactive equipment.

CSL's investment in the Facility, summarised in section 1.2, together with its maintenance programme and other processes and procedures are designed to minimise the likelihood and impact of major events which may limit the physical capabilities of Rough. However, it is not possible to eliminate all risk when dealing with physical assets. Given this, and the age of the Rough infrastructure and consequently the unavoidably higher risk since 2003, CSL considers that it is prudent that the Undertakings provide some scope for the CMA and CSL to respond quickly and appropriately to manage the regulatory risks associated with an event which results in a significant change in Rough's physical capabilities.

1.5 *Aligning CSL's regulatory obligations with the Facility's physical capabilities*

As CSL set out in its letters to the CMA of 18 September 2015, in order to address the pressure constraint CSL had to enter both the storage market and wholesale market in order to manage the mismatch between CSL's contractual obligations associated with honouring the MRC and AS it had sold for the 2015/2016 Storage Year.

CSL has had to engage in both capacity buybacks from customers (initially space, then injection for the fourth quarter of 2015) and undertake a bespoke hedging programme to manage its exposure. Subsequently, it was also necessary to unwind some of those hedges

following the lowering of the OGA consent. In total, these activities have resulted additional costs to the business of [£X.X million¹⁰].

As a storage operator it is not efficient for CSL to be required to buy back capacity from its customers. Further, for Rough to continue to be utilised in line with price signals it is important that the services CSL offer are principally physically backed. In contrast, should CSL be expected to offer services that cannot predominately be met through the utilisation of the Facility's physical capabilities, then CSL will be required to enter the market more to cover the resulting exposure from customer entitlements not being aligned with what the asset can deliver. Perversely, this may create the situation where CSL has to compete to deliver the gas that its customers are nominating.

Centrica and CSL welcomed the CMA's decision on 22 September 2015, not to prioritise enforcement against them subject to CSL meeting a number of commitments regarding the sale of capacity. This decision has ensured that CSL should not need to undertake capacity buy backs, or hedging activities to the same extent as was necessary for the 2015/2016 Storage Year. However, as the CMA is aware, these arrangements do not provide complete certainty or protection for CSL, nor would such arrangements be sufficient in the case of an enduring constraint on the physical capabilities of the asset¹¹.

1.6 CSL's proposed amendments seek to address the impacts of changes in Rough's physical capabilities while providing safeguards to the market

The amendments CSL has proposed be made to the Undertakings (as set out in Attachment 1 of its 18 September 2015 application letter) seek to provide an appropriate balance in terms of managing significant changes to the Facility's physical capabilities while providing protections to the wholesale gas market.

This is because the CMA will be able to decrease (and increase) the Obligated Capacity¹² to align it with the physical capabilities of the Facility, which the CMA has acknowledged as an important characteristic of Rough. By capping the Obligated Capacity in line with the levels set in the 2003 Report, CSL will continue to have an incentive to invest in Rough to restore and potentially increase its physical capabilities. Further, by providing Ofgem with the power to change the amount of Obligated Capacity other parts of Centrica Group can purchase (the 'Specified Capacity') the market has a safeguard against a reduction in Rough's physical capabilities having a disproportionate impact on Centrica's competitors being able to gain access to the Obligated Capacity.

2. Monitoring and Compliance

CSL considers that the current monitoring and compliance requirements within the Undertakings remain appropriate for meeting their objectives (as summarised below). CSL is

¹⁰ In the 18 September 2015 letters CSL reported a cost of [£X.X million]. Since then, the lowering of the OGA consent has allowed CSL to unwind some of the hedges costs (off-setting [£X.X million]). However, CSL has incurred costs of [£X.X million] to manage the injection capacity exposure created by the MRC in Q4 of 2015, resulting in a net reduction in total costs of [£X.X million].

¹¹ For example, under the prevailing arrangements, CSL will technically be in breach of the Undertakings if it does not sell the Minimum Rough Capacity and Additional Space, or auction any unsold MRC or AS capacity ahead of the 2016/2017 Storage Year.

¹² The Obligated Capacity refers to the 455m SBU's of MRC and at least 1.5 TWh of Additional Space that the Undertakings oblige CSL to sell before start of the Storage Year.

committed to complying with the Undertakings and other relevant legislation and accordingly has implemented a range of measures which are intended to mitigate the risk of non-compliance (see below). Further, CSL has demonstrated that when potential compliance issues have been identified, that it proactively engages with Ofgem to explain the relevant matter and that the measures it has designed minimise the risk of breaching the relevant legislation or requirement.

Before commenting on the measures CSL has taken to strengthen its monitoring and compliance programme it is important to consider the objectives of the monitoring and compliance provisions of the Undertakings. Based on the 2003 Report, the three key objectives of the monitoring and compliance provisions were to:

- (i) remove the incentive that Centrica would engage in price discrimination in order to harm its downstream competitors (paragraph 2.134);
- (ii) prevent Centrica from providing information about how its competitors use their storage capacity in order to provide its trading business with a benefit and allow it to create competitive tactics vis-à-vis its downstream rivals (paragraph 2.145); and
- (iii) prevent Centrica's trading and supply businesses from gaining access to information about Rough's operations which would provide its downstream business with significant advantage over its downstream competitors (paragraph 2.150).

CSL has implemented a number of measures in order to strengthen its monitoring and compliance arrangements. The most significant of these is its compliance refresh programme. CSL commenced this programme in 2014 specifically to enhance its compliance with the relevant requirements associated of the Undertakings; the Gas Act 1986; the EU Gas Regulation; and the Regulation on Wholesale Energy Market Integrity and Transparency (REMIT). CSL commenced this review in order to re-energise the existing Undertakings compliance, and to address the risks associated with the significant increase in regulatory requirements on the business following the implementation of the Third Energy Package and other legislation such as REMIT.

The aims of this work stream were to:

- (i) ensure that monitoring resources are targeted to higher risk activities;
- (ii) redesign tests to focus on the inherent risk;
- (iii) streamline the monitoring programme to reduce duplication;
- (iv) improve internal reporting of compliance to management; and
- (v) improve the efficiency of the assurance programme undertaken by the external auditor¹³.

In terms of realising the above aims CSL has:

¹³ The external auditor is appointed by Centrica Plc's Audit Committee. The objective of external auditor is to assist Centrica Plc with evaluating, testing and reporting on the adequacy, reliability and effectiveness of the design and operations of systems and controls relevant to compliance with the Undertakings. The auditor undertakes site visits to both CSL and Centrica offices on a quarterly basis.

- (i) continued to refine, and where possible combine its compliance controls, so that the relevant tests are more accurate, reliable and supported with documentary evidence¹⁴;
- (ii) clearer, standardised reports provided to CSL's internal governance bodies (for example, the Business Risk Management Committee);
- (iii) both internal and external monitoring of recorded lines to identify leakage of Commercially Sensitive Information; and
- (iv) restructured the terms of engagement for the external auditor so that the assurance regime ensures that compliance risks are monitored and updated and specific core testing and monitoring activities are addressed each quarter. Further, each quarter, the auditor now provides a detailed report on the results of its testing.

In addition to the above, CSL has also implemented a range of other changes that reduce the risk of non-compliance. For example, in April 2015 CSL has improved the IS infrastructure for recording and monitoring recorded lines so that it is easier to extract and review calls. In 2014, CSL also made changes to the Storage Service Contract (SSC) to include term sheets as within its Annexes. This means that the provisions of the term sheets cannot be changed without CSL undertaking a formal consultation of the SSC. Further, CSL amended its General Trading System (IS infrastructure which records CSL sales and gas trading activity) so that these Term Sheets are generated by the system and only allows for the volume, term and price to be altered.

Finally, CSL continues to demonstrate its commitment to operate in an open and transparent way by keeping Ofgem abreast of its commercial and physical operations as part of its voluntary, quarterly meeting programme. CSL also uses these meetings to discuss regulatory and compliance issues. Where CSL has identified particular compliance challenges or concerns, CSL has found this forum useful for raising the relevant issue with Ofgem and working through proposals for mitigating the risk and/or impact on the market.

In conclusion, CSL considers that the current monitoring and compliance requirements of the Undertakings are sufficient to provide assurance that potential breaches will be identified and reported. CSL believes that this provides the requisite assurance that Centrica will not engage in price discrimination, misuse customer information, or misuse of information about asset operations. Additionally, changes to the information transparency requirements introduced since the 2003 Report, such as real-time flow reporting and REMIT, ensure that the market is kept aware of Rough's operational performance. This increased scrutiny provides yet another check to ensure that CSL does not misuse information about Rough's physical operations. The steps CSL has implemented to further enhance its monitoring and compliance programme should provide the CMA (and Ofgem) with confidence that CSL is committed to complying with the Undertakings and reduce the likelihood that CSL is seeking to operate Rough as to provide Centrica with a competitive advantage in the wholesale or downstream markets. Given this, CSL considers that amending the current monitoring and

¹⁴ CSL uses a software program (ARIS), which requires relevant individuals to complete the relevant test by a specified date, including uploading relevant evidence. Relevant managers must review and confirm that the tests have been successfully completed.

compliance requirements of the Undertakings is unlikely to deliver a material benefit to the wholesale gas market and thereby end consumers.

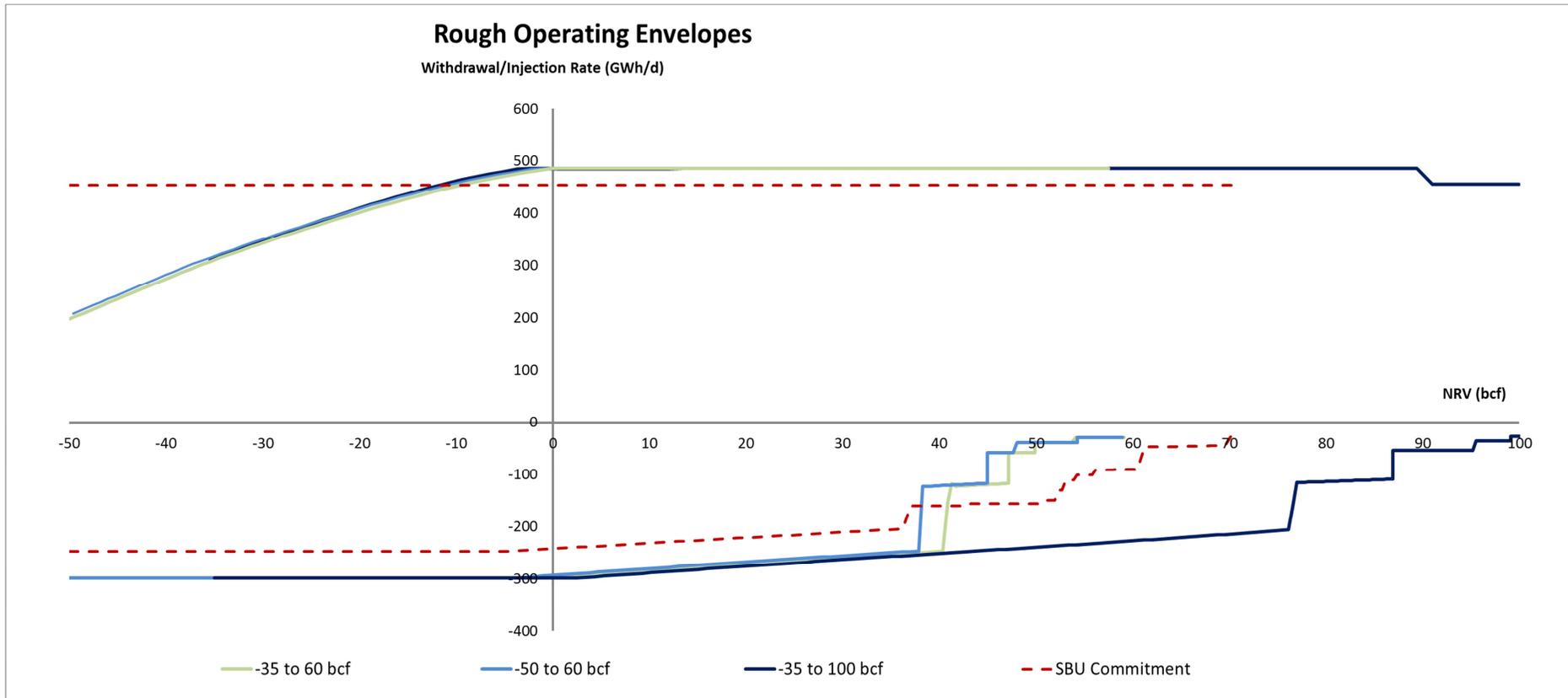
I look forward to discussing the information provided in this submission with the Panel members and representatives of the CMA at the Easington Terminal site visit in December. In the interim, should you have any questions regarding the content of this submission, please direct them to Antony Miller.

Yours sincerely

Grant Dawson
Chairman, Centrica Storage Limited

Appendix 1: Rough's operating envelope pre and post MAASP

Figure A.1. The reduction in Rough's physical capabilities due to the reduction in well pressure to 3000psi pre and post the decrease to the Lower OGA consent (i.e. -35 BCF and -50 BCF)



Injection

The maximum injection rate is a function of reservoir pressure which can be approximated by total reservoir stock as shown in the Injection Capability graph. However, actual rates achieved are also influenced by a number of factors including, historic injection rates, atmospheric temperature and pressure conditions, the calorific value of gas, the pressure of gas on the NTS in the vicinity of Easington and well and compressor performance (typical error is around 10%). Injection rates may be higher than indicated if there is a period of reduced nominations allowing the reservoir to relax.

Injection has three possible operation modes which are driven by the pressure in the reservoir:

1. "Two train" where both compressors on the 47/3B are in operation
2. "Single train" where one compressor on the 47/3B is in operation
3. "Stop/start" where one compressor on the 47/3B is run for a period and then the reservoir is allowed to relax for a period (up to 48 hours depending on fullness).

Under two train operations, the maximum technical capability of Rough to inject is generally 305 GWhs/day (but this could be higher if additional NTS exit capacity is available at Easington). Injection rates decline as the reservoir fills due to pressure increase in the reservoir.

Once the reservoir reaches a critical pressure level, it is only possible to inject using a single train (compressor). By default, in the standard operating mode, the move to single train operations is expected to occur around a stock level of 34 TWh (assuming 100% injection utilisation) to 38 TWh (assuming 50% injection utilisation) (c.76 BCF in Figure 1, dark blue line). Under REMIT 2015-33 operating mode, the move to single train operations is expected to occur around a stock level of 26 TWh to 28 TWh (38 BCF, light blue line). Significant periods of relaxation (e.g. the annual maintenance) in the reservoir will also impact the stock level at which single train operation applies. CSL will generally make a market announcement on the expected date of the switch to single train operation.

As the reservoir pressure rises further, at a certain point in time CSL may need to operate injection on a non-continuous 'stop-start' operation. By default, in the standard operating mode, the move to stop/start operations is expected to occur around stock levels above 37 TWh with the precise level dependent on reservoir pressure. Under REMIT 2015-33 operating mode, the move to stop/start operations is expected to occur around stock levels above 29 TWh (c. 45 BCF). Typically, injection is run on single train operation for 24 hours and then the reservoir is allowed to relax for 24 hours with the relaxation time increasing at higher reservoir pressures. The injection rates shown in the graph below show the average rate – actual rates will be around 10mcm/d during "start" and zero during "stop". CSL will generally make a market announcement on the expected date of the switch to "start/stop" operations.

Recent investment in Rough means that injection can remain in continuous single train operation for longer duration, potentially until the end of the injection season. Performance during the injection season will be reported via REMIT bulletins on the Centrica Storage website. The Injection Capability graph, Chart 3: Injection curve (Maximum rate vs. Stock), may be updated during the injection season based upon actual reservoir performance.

Withdrawal

Gas compression is not used for withdrawal from the Rough gas facility. The indicative withdrawal rate is a function of total reservoir stock. However, actual rates achieved are also influenced by a number of factors including ambient conditions, well performance and the pressure of gas on the NTS in the vicinity of Easington. The capability curve assumes constant withdrawal rates from the reservoir. Rates could be increased at a given stock level if there have been significant periods of relaxation.

The maximum technical capability of Rough to withdraw is up to 485 GWhs/day (Withdrawal rate of 44.7mcm/day). However, the 47/8A installation is unable to withdraw at high reservoir levels due to the high reservoir pressure. As set out in REMIT bulletin 2015-67, production

from 47/8A is currently suspended until 1 March 2016, which, based on current operations, is anticipated to have a maximum impact of reducing Rough withdrawal by 3.3 mcm/d (C. 35 GWh/d or 0.12 BCF/d) – which will decline as reservoir pressure declines. Note that the withdrawal curves in Figure 1 assume that 47/8A is operational – refer to the Operational Guide for the current withdrawal curve which excludes 47/8A).

Withdrawal rates decline as the reservoir empties due to the reducing pressure in the reservoir and the potential for sand production.