









	<p>At what stage is this document in the process?</p>
<h1>UNC 0843:</h1> <h2>Establishing the Independent Shrinkage Charge and the Independent Shrinkage Expert</h2>	
<p><b>Purpose of Modification:</b></p> <p>To incentivise the reduction of greenhouse gas emissions and customer bills, this Modification introduces the role of the Independent Shrinkage Expert (ISE) who will establish:</p> <ul style="list-style-type: none"> <li>• the Independent Shrinkage Model (ISM),</li> <li>• the Independent Shrinkage Model Methodology (ISMM),</li> <li>• <del>the Independent Shrinkage Multiplication Factor (ISMF),</del> and</li> <li>• the Independent Shrinkage Charge (ISC).</li> </ul>	
<p><b>Next Steps:</b></p> <p>The Proposer recommends that this Modification should be:</p> <ul style="list-style-type: none"> <li>• considered a material change and not subject to Self-Governance</li> <li>• assessed by a Workgroup</li> </ul> <p>This Modification will be presented by the Proposer to the Panel on <b>20 April 2023</b>. The Panel will consider the Proposer’s recommendation and determine the appropriate route.</p>	
<p><b>Impacted Parties:</b></p> <p>High: Consumers</p> <p>Medium: Distribution Networks Operators, Shippers, Suppliers</p>	
<p><b>Impacted Codes:</b></p> <p>UNC, Independent Gas Transporters UNC</p>	

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<b>Timetable</b>		 0330 303 5063
<b>Modification timetable:</b>		Transporter: <b>David Mitchell Scotia Gas Networks</b>
Pre-Modification Discussed	23 March 2023	
Date Modification Raised	03 April 2023	 <a href="mailto:david.mitchell@scotia.co.uk">david.mitchell@scotia.co.uk</a>
New Modification to be considered by Panel	20 April 2023	
First Workgroup Meeting	27 April 2023	
Workgroup Report to be presented to Panel	20 July 2023	 07799 343 082
Draft Modification Report issued for consultation	20 July 2023	Systems Provider: <b>Xoserve</b>
Consultation Close-out for representations	10 August 2023	
Final Modification Report available for Panel	14 August	

	2023	
Modification Panel decision	21 September 2023	

## 1. Summary

### What

Shrinkage consists of Own Use Gas, Theft of Gas, and gas leaks.

The purpose of this Modification is to enable the more accurate allocation of Shrinkage to Gas Distribution Networks (GDN).

As Shrinkage currently contributes to 1% of the UK's total greenhouse gas emissions, inaccuracies in the Shrinkage and Leakage Model (SLM) damage the environment.<sup>1</sup>

The Revenue = Incentives + Innovation + Outputs (RIIO) incentivises Shrinkage reduction off the back of Shrinkage volumes that GDNs self-report to Ofgem. If the self-reporting of Shrinkage is wrong, RIIO is undermined.

Currently, for the leakage element, the SLM uses set leakage rates and multiplies these across the lengths of pipes that are in the ground, along with temperature and pressure data. This estimation method is shown to have flaws.

Numerous studies show that Shrinkage volumes are understated.<sup>2</sup> For example, Imperial College London's study using direct air measurement shows that the leakage element of the SLM is currently 30-35% understated.<sup>3</sup>

Furthermore, for Formula Year 2023/24 Allocation of Unidentified Gas Statement has allocated UIG 8,497 GWh of the forecasted 11,713 GWhs of UIG to contributors. It is arguable that some or all of the 3,216 GWh of unaccounted-for gas is attributable to under-reported Shrinkage levels.<sup>4</sup> 3,216 GWhs is over double the volume of Shrinkage that is currently self-reported by GDNs.

Underestimating Shrinkage causes increases in Unidentified Gas (UIG). This has the direct impact of inflating customer bills, as UIG is a line item in the price cap set by Ofgem.

Making changes to the SLM is problematic, as it is written into GDN's licence conditions, and attempts to change the SLM are staunchly resisted by the GDNs. To get around such resistance, this Modification does not propose to change the SLM. The SLM will continue to be managed by the GDNs and they can continue to self-report Shrinkage volumes.

Instead, it creates a new charge to manage any manifest error.

### Why

This Modification should be made to lower greenhouse gas emissions and customer bills. We are currently in a climate emergency, and as such also signed up to the COP 26's Global Methane Pledge to reduce the output of methane by 30%.<sup>5</sup>

<sup>1</sup> [https://www.gasgovernance.co.uk/sites/default/files/ggf/book/2022-02/2021-22%20Shrinkage%20and%20Leakage%20Model%20Review\\_Consultation%20FINAL.pdf](https://www.gasgovernance.co.uk/sites/default/files/ggf/book/2022-02/2021-22%20Shrinkage%20and%20Leakage%20Model%20Review_Consultation%20FINAL.pdf)

<sup>2</sup> See appendix 1

<sup>3</sup> [Continuous CH4 and δ13 CH4 measurements in London demonstrate under-reported natural gas leakage](#); see also [London produces up to a third more methane than estimates suggest | Imperial News](#). <sup>4</sup> [AUG](#)

[statement 23/24](#)

<sup>5</sup> [Global Methane Pledge](#)

If Daily Metered and Non-Daily Metered volumes are substituted from Total LDZ throughput, there are currently two mechanisms that are used to account for any gas that is missing: Shrinkage and Unidentified Gas (UIG). First Shrinkage is removed from any missing gas and the rest is deemed to be UIG. UIG is then distributed amongst Shippers by the independent Allocation of an Unidentified Gas Expert (AUGE). If GDNs under-report Shrinkage the extra cost is ultimately fed through to the customer via the Shipper/Supplier relationship. GDNs will also be under-incentivised to find and fix gas leaks.

Making changes to the SLM is also met with resistance by GDNs – see Shrinkage Forum throughout the years - who are protective over their calculation. If GDNs were obliged to purchase 3 TWhs of natural gas as it is found to be due to gas leaks the financial impact would be significant.

At a price cap of £0.13 per kWh, 3 Twhs equates to £390,000,000.

Around 12 TWh of UIG are currently paid for by Shippers.

Throughout the years, constant efforts to amend the SLM by Shippers have been shot down by the GDNs. This has meant that the majority of Shippers no longer attend the Shipper Forum. The argument against amending the SLM is usually that it is set in the licence and unalterable. Other arguments are based on the cost of making a change to the SLM being too expensive.

This Modification seeks to navigate around any licence concerns by creating a new mechanism that sits alongside the SLM.

## How

To tackle the issue of Shrinkage error, this Modification will create the role of Independent Shrinkage Expert (ISE).

The ISE will use methodologies to create an Independent Shrinkage Model (ISM) via which to estimate an independent account of Shrinkage.

Where there is a difference between the LDZ Shrinkage Quantities estimated by the SLM and the Independent LDZ Shrinkage Quantities estimated by the ISM, the ISE will recommend to the Authority, [via the publication of the Independent Shrinkage Statement](#), the approval of the [Independent Shrinkage Model Multiplication Factor \(ISMF\)](#) and the Independent Shrinkage Charge (ISC).

The ~~ISC ISMF~~ will be calculated by [subtracting](#) ~~dividing~~ LDZ Shrinkage Quantities [from by](#) Independent LDZ Shrinkage Quantities. E.g. if LDZ Shrinkage Quantities = 10 GWh and Independent LDZ Shrinkage Quantities = 12 GWh, ~~the ISMF would be 1.2 and~~ the ISC would be 2 GWhs.

If approved by the Authority, Transporters will be obliged to purchase volumes of natural gas to cover the ISC.

As with LDZ Shrinkage Quantities, the ISC will be subtracted from missing gas prior to UIG being apportioned to Shippers.

This will lower bills, [as UIG is a line item in the price cap](#), and, [by virtue of accurate cost allocation](#), incentivise GDNs to fix sources of Shrinkage.

The Modification also proposes to introduce the Framework for the Appointment of an Independent Shrinkage Expert. Like the AUG Framework, the CDSP will be used to procure the ISE.

It will also apply to IGTs.

## 2. Governance

### Justification for Authority Direction

The Modification:

- (i) is likely to have a material effect on:
- (aa) existing or future gas consumers; and
  - (bb) competition in the shipping, transportation or supply of gas conveyed through pipes or any commercial activities connected with the shipping, transportation or supply of gas conveyed through pipes; and
  - (cc) the operation of one or more pipe-line system(s); and
  - (dd) matters relating to sustainable development, safety or security of supply, or the management of market or network emergencies; and
  - (ee) the uniform network code governance procedures or the network code Modification procedures; and
- (ii) is unlikely to discriminate between different classes of parties to the uniform network code/relevant gas transporters, gas shippers or DN operators.

### Requested Next Steps

This Modification should be considered a material change and not subject to Self-Governance.

This Modification is likely to have a material impact on existing and future gas consumers, by more accurately allocating Shrinkage.

Any delay in the implementation of this Modification will negatively impact the environment and customer bills, as detailed above.

### 3. Why Change?

Greenhouse gasses (GHG) pose an existential threat. This is recognised by the UK government in their [Net Zero Strategy](#):

*"We are at a crossroads in our history. As we recover from the impact of the pandemic on our lives and livelihoods, we know that it will not be enough to go back to the way things were before. The science is clear, we know that human activity is changing our climate and that this will have a devastating impact on human lives, the economy, and the natural world – ranging from the extinction of some species and the melting of ice caps to extreme weather patterns threatening our homes, businesses, and communities."*

Methane is widely accepted to be 84x more potent than CO<sub>2</sub> as a greenhouse gas. 16 TWh of methane that enters the gas distribution network is currently unaccounted for. Current rates of methane leaks are estimated off the back of the National Leakage Tests performed in 2002, which have been shown to be inaccurate. Inaccuracies in this test lead to the deficient application of RIIO-GD2. This change seeks to remedy that deficiency.

### 4. Code Specific Matters

#### Reference Documents

The AUGE currently exists under the AUG Framework. Work has been undertaken within 0828R to establish what an ISE Framework would look like. The ISE Framework should be based on principles of impartiality, environmentalism, and best outcomes for end-consumers.

### 5. Solution

1. The ISE will be procured via tender by CDSP under a Framework such as that which was used to procure the AUGE and managed by the UNCC
2. The ISE will be led by principles of impartiality, environmentalism, and best outcomes for end-consumers
3. The ISE will use methodologies to create an Independent Shrinkage Model (ISM) via which to estimate an

- independent account of Shrinkage.
4. Where there is a difference between the LDZ Shrinkage Quantities estimated by the SLM and the Independent LDZ Shrinkage Quantities estimated by the ISM, the ISE will recommend to the Authority the approval of ~~the Independent Shrinkage Model Multiplication Factor (ISMF) and~~ the Independent Shrinkage Charge (ISC).
  5. The ~~ISC~~ ISMF will be calculated by ~~subtracting~~ ~~dividing~~ LDZ Shrinkage Quantities ~~from by~~ Independent LDZ Shrinkage Quantities.
  6. Eg if LDZ Shrinkage Quantities = 10 GWh and Independent LDZ Shrinkage Quantities = 12 GWh, the ~~ISC~~ ISMF would be ~~1.2 and the ISC would be 2~~ GWhs.
  7. If approved by the Authority, Transporters will be obliged to purchase volumes of natural gas to cover the ISC. The same mechanism to purchase gas for Shrinkage will be employed here.
  8. As with LDZ Shrinkage Quantities, the ISC will be subtracted from missing gas before UIG is apportioned to Shippers.
  9. The ISE will review the ISM on an annual basis, as per timetable set out in the Framework.
  10. The ISE will be able to request data from UNC Parties and UNC Parties will not be able to unreasonably withhold that data. Non-compliances can be escalated to the UNCC and Authority
  11. The ISE will enable engagement with their activity via the Shrinkage ~~Sub-Committee~~ Forum
  12. ~~The ISE shall specify that the ISC are applied locationally if they deem that it is appropriate to do so. Such regions should be no less granular than LDZ to enable the ISC to be deducted from UIG.~~
  - ~~13.~~ ~~It is not intended for Transmission Shrinkage to be in scope. Transmission already accounts for all Shrinkage and does not use UIG as a balancing mechanism. It can therefore be appropriately incentivised by Ofgem without additional analysis.~~
  14. The AUGE may wish to consider the outputs of the ISE. This is not to say that the scope of the AUGE or ISE should be fettered in any way - any determination of what constitutes a contributor to the ISC or UIG should be the purview of the respective roles.
  - ~~15.~~ ~~UNC Parties may appeal the decision to implement the ISC~~ via Ofgem.
  - ~~16.~~ ~~The ISE shall also consider IGT Shrinkage and apply the Independent Shrinkage Charge to IGT as it sees fit. A mirror mod shall be raised to ensure that the IGTs comply with any determinations made by the ISE.~~
  - ~~17.~~ ~~The ISE will adhere to the timetable set out in the framework.~~
  - ~~18.~~ ~~The ISE shall develop the Independent Shrinkage Statement.~~
  - ~~19.~~ ~~The ISE shall take part in the Independent Shrinkage Technical Workgroup.~~
  - ~~20.~~ ~~The ISE shall deliver the Independent Shrinkage Statement to the Authority so that the ISC may be considered at the same time as Shrinkage volumes as estimated by the GDNs~~
  - ~~21.~~ ~~Further business rules are detailed within the Draft Framework for the Appointment of the Independent Shrinkage Expert, which can be found in Appendix 2.~~

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## 6. Impacts & Other Considerations

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

No

#### Consumer Impacts

Consumers: Reducing gas leaks will reduce greenhouse gas emissions. Reducing methane emissions facilitates Net Zero. As less gas would be lost to the atmosphere, wholesale gas costs, Shrinkage costs, and UIG costs will be reduced, ultimately lowering bills.

This aligns with Ofgem's strategic vision:

- facilitating net zero
- energy consumers receiving good value energy services
- minimise costs

- a data-enabled energy sector.

### What is the current consumer experience and what would the new consumer experience be?

Direct bill costs: all consumer groups (Domestic Consumers; Small non-domestic Consumers; Large non domestic Consumers; Very Large Consumers) currently pay for gas leaks at a rate that could be 35% higher than is currently incentivised under RII0-GD2. This mod would ensure that GDNs are appropriately incentivised, thereby reducing consumer costs and increasing confidence in the reliability of energy infrastructure.

Environmental cost: the environmental impact of gas leaks on all consumer groups is higher. The knock-on impacts of greenhouse gases on the climate crisis are much higher. This mod would ensure that GDNs are appropriately incentivised, thereby reducing the environmental impact of natural gas leaks in the UK.

Impact of the change on Consumer Benefit Areas:	
Area	Identified impact
<p><b>Improved safety and reliability</b></p> <p>This change would mean that the energy system can operate more safely and reliably in the future in a way that benefits end consumers. Gas leaks are dangerous - as this Modification would reduce gas leaks, it would also reduce the inherent danger of gas leaks.</p>	Positive
<p><b>Lower bills than would otherwise be the case</b></p> <p>Better incentivisation, will reduce costs attributable to gas lost from the system and knock on environmental costs. This will lower bills and help protect the environment.</p>	Positive
<p><b>Reduced environmental damage</b></p> <p>This will reduce greenhouse gas emissions by reducing natural gas leaks, supporting the journey to net zero. Natural gas is a potent greenhouse gas that is 84x more potent than CO2. Approximately 16 TWh of natural gas were lost from the total system in 2021/22. It will support the decoupling of leak estimation from party bias. Via accurate calculation of the environmental impact of gas leaks, it will support decisions on how to move away from GHG-intensive energy supply in the UK.</p>	Positive
<p><b>Improved quality of service</b></p> <p>Increases confidence in customers that our gas system is operated efficiently</p>	Positive

<p>Benefits for society as a whole</p> <p>As above: this Modification would lower bills and GHG emissions. The economic impacts of climate change are detailed within the <a href="#">linked government webpage</a>.</p>	<p>Positive</p>
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### Cross-Code Impacts

IGTs may need to have an equivalent Modification. 19 GWh of IGT Shrinkage is currently purchased by Shippers via UIG, as detailed in the AUG Statement.

### EU Code Impacts

N/a

### Central Systems Impacts

The new charge to cover ISE costs may need to be considered.

Impact of the Modification on the Transporters' Relevant Objectives:	
Relevant Objective Identified impact	
) a) Efficient and economic operation of the pipe-line system.	Positive
) 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.	Positive
) c) Efficient discharge of the licensee's obligations.	Positive
) 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.	Neutral
) 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.	Positive
) f) Promotion of efficiency in the implementation and administration of the Code.	Neutral



)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.	Positive
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“Efficient and economic operation of the pipe-line system” - this mod will incentivise the reduction of gas leaks leading to efficiency in the operation of the pipe-line system. It will also lead to economic improvements via the accurate allocation of costs for the operation of the pipe-line system. “Efficient discharge of the licensee’s obligations” this is positive as licensees are obliged to ensure that the environment is not negatively impacted and that accuracy in data is maintained and assured independently. “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.” Via lowering UIG, this will be achieved by making the price cap more accurately reflective of actual costs. “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” - facilitates net zero.

<b>Impact of the Modification on the Transporters’ Relevant Charging Methodology Objectives:</b>	
Relevant Objective Identified impact	
) a) Save in so far as paragraphs (aa) or (d) apply, that compliance with the charging methodology results in charges which reflect the costs incurred by the licensee in its transportation business;	Positive
) aa) That, in so far as prices in respect of transportation arrangements are established by auction, either: <ul style="list-style-type: none"> <li>1. no reserve price is applied, or</li> <li>2. that reserve price is set at a level -</li> </ul> (I) best calculated to promote efficiency and avoid undue preference in the supply of transportation services; and (II) best calculated to promote competition between gas suppliers and between gas shippers;	Positive
) b) That, so far as is consistent with sub-paragraph (a), the charging methodology properly takes account of developments in the transportation business;	Positive
) c) That, so far as is consistent with sub-paragraphs (a) and (b), compliance with the charging methodology facilitates effective competition between gas shippers and between gas suppliers; and	Positive
) d) That the charging methodology reflects any alternative arrangements put in place in accordance with a determination made by the Secretary of State under paragraph 2A(a) of Standard Special Condition A27 (Disposal of Assets).	Positive

e) 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.	Positive
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## 7. Implementation

Implementation should be as soon as possible after approval by the Authority.

## 8. Legal Text

See the Framework for the Appointment of an Independent Shrinkage Expert for suggested text. It is also expected that legal text within Section N of the TPD amongst other areas will need to be updated.

## 9. Recommendations

### Proposer's Recommendation to Panel

Panel is asked to:

- Agree that Authority Direction should apply

#### Appendix 1 - Literature Review – methane measurement - academic papers

<https://acp.copernicus.org/articles/22/3595/2022/acp-22-3595-2022-discussion.html>

<https://acp.copernicus.org/articles/22/3595/2022/acp-22-3595-2022-discussion.html>

Long-term methane stable isotope analysis coupled with mole fraction measurement has been used to link isotopic signature to gas leaks in London, UK.

Location: Imperial College London, Huxley roof

Method:  $\delta^{13}\text{CH}_4$  values were made using a Picarro G2201-i isotopic analyser beginning in early 2018; 2 years continuous measurements 2018 - 2020. Simulations completed with UK Met Office Lagrangian dispersion model NAME.

Results: Isotopic source values revealed a predominance of natural gas  $\text{CH}_4$  with source values higher than -45 ‰ in ~74-80 % of the afternoon data. In contrast, simulated sectoral contributions using UK NAEI and EDGAR inventories showed the largest fractions from waste sectors, leading to a simulated underestimation of observed  $\delta^{13}\text{CH}_4$ .

These results suggest that natural gas leaks in London are under-reported in both inventories. The underestimation of mole fractions in the NAEI-25km and NAEI-2km might be accounted for by missing natural gas emissions in the NAEI inventory for London.

UK NAEI emissions are approximately 2.5 times smaller than the EDGAR emissions for the London area, but 8 % smaller than the EDGAR emissions across the UK.

Subtracting the 25 km NAEI emissions from the 25 km EDGAR emissions shows largest differences between inventories were in: London, Birmingham and the Leeds-Sheffield area, which have higher emissions in the EDGAR inventory.

**(2022) Street-level methane emissions of Bucharest, Romania and the dominance of urban wastewater**

<https://doi.org/10.1016/j.aeaoa.2022.100153>

An example of a city-level study that explores the source apportionment of methane emissions. (A paper similar to this one for London is soon to be published.)

**Abstract:** "Mobile surveys were conducted in the urban areas of Bucharest while continuously measuring CH<sub>4</sub> and C<sub>2</sub>H<sub>6</sub> for locating enhanced CH<sub>4</sub> mole fractions above local atmospheric background, which are referred to as a leak indication (LI). The flux rates were determined for identified clusters of LIs. An annual city-wide total emission estimate was calculated by scaling up the flux rates. Multiple locations, where CH<sub>4</sub> exceeded the daily atmospheric background mole fractions, were measured for  $\delta^{13}\text{CCH}_4$ ,  $\delta^2\text{HCH}_4$ , and C<sub>2</sub>:C<sub>1</sub> ratios for tracing contributing CH<sub>4</sub> sources. As Europe seeks to cut urban emissions, studies like this will be useful for identifying targets for mitigating emissions and for assessing future governmental regulation of greenhouse gas (GHG) emissions."

1

**(2019) Environmental baseline monitoring for shale gas development in the UK: Identification and geochemical characterisation of local source emissions of methane to atmosphere**

<https://doi.org/10.1016/j.scitotenv.2019.134600>

**Abstract:** "Baseline mobile surveys of methane sources using vehicle-mounted instruments have been performed in the Fylde and Ryedale regions of Northern England over the 2016–19 period around proposed unconventional (shale) gas extraction sites. The aim was to identify and characterise methane sources ahead of hydraulically fractured shale gas extraction in the area around drilling sites. This allows a potential additional source of emissions to atmosphere to be readily distinguished from adjacent sources, should gas production take place.

The surveys have used ethane : methane (C<sub>2</sub>:C<sub>1</sub>) ratios to separate combustion, thermogenic gas and biogenic sources. Sample collection of source plumes followed by high precision  $\delta^{13}\text{C}$  analysis of methane, to separate and isotopically characterise sources, adds additional biogenic source distinction between active and closed landfills, and ruminant eructations from manure.

The surveys show that both drill sites and adjacent fixed monitoring sites have cow barns and gas network pipeline leaks as sources of methane within a 1 km range. These two sources are readily separated by isotopes ( $\delta^{13}\text{C}$  of -67 to -58‰ for barns, compared to -43 to -39‰ for gas leaks), and ethane : methane ratios (<0.001 for barns, compared to >0.05 for gas leaks). Under a well mixed daytime atmospheric boundary layer these sources are generally detectable as above baseline elevations up to 100 m downwind for gas leaks and up to 500 m downwind for populated cow barns. It is considered that careful analysis of these proxies for unconventional production gas, if and when available, will allow any fugitive emissions from operations to be distinguished from surrounding sources."

**(2019) Assessing London CO<sub>2</sub>, CH<sub>4</sub> and CO emissions using aircraft measurements and dispersion modelling**

<https://doi.org/10.5194/acp-19-8931-2019>

Pitt, J. R., Allen, G., Bauguitte, S. J.-B., Gallagher, M. W., Lee, J. D., Drysdale, W., Nelson, B., Manning,

A. J., and Palmer, P. I.: Atmos. Chem. Phys., 19, 8931–8945.

**Abstract:** “We present a new modelling approach for assessing atmospheric emissions from a city, using an aircraft measurement sampling strategy similar to that employed by previous mass balance studies. Unlike conventional mass balance methods, our approach does not assume that city-scale emissions are confined to a well-defined urban area and that peri-urban emissions are negligible. We apply our new approach to a case study conducted in March 2016, investigating CO, CH<sub>4</sub> and CO<sub>2</sub> emissions from a region focussed around Greater London using aircraft sampling of the downwind plume. For each species, we simulate the flux per unit area that would be observed at the aircraft sampling locations based on emissions from the UK national inventory, transported using a Lagrangian dispersion model. To reconcile this simulation with the measured flux per unit area, assuming the transport model is not biased, we require that inventory values of CO, CH<sub>4</sub> and CO<sub>2</sub> are scaled by 1.03, 0.71 and 1.61, respectively. However, our result for CO<sub>2</sub> should not be considered a direct comparison with the inventory which only includes anthropogenic fluxes.”

2

**(2017) Characterization of interferences to in situ observations of  $\delta^{13}\text{CCH}_4$  and C<sub>2</sub>H<sub>6</sub> when using a cavity ring-down spectrometer at industrial sites**

<https://doi.org/10.5194/amt-10-2077-2017>

“An example study conducted on a UK compressor station, carried out by the LSCE Paris group a few years ago now and linked with an NPL survey of the site. This was from the early days of the laser based instruments and there were difficulties in extracting good ethane data.” (Dave Lowry, RHUL)

**(2017) Evaluating methane inventories by isotopic analysis in the London**

**region** <https://www.nature.com/articles/s41598-017-04802-6>

**Abstract:** “A thorough understanding of methane sources is necessary to accomplish methane reduction targets. Urban environments, where a large variety of methane sources coexist, are one of the most complex areas to investigate. Methane sources are characterised by specific  $\delta^{13}\text{C-CH}_4$  signatures, so high precision stable isotope analysis of atmospheric methane can be used to give a better understanding of urban sources and their partition in a source mix. Diurnal measurements of methane and carbon dioxide mole fraction, and isotopic values at King’s College London, enabled assessment of the isotopic signal of the source mix in central London. Surveys with a mobile measurement system in the London region were also carried out for detection of methane plumes at near ground level, in order to evaluate the spatial allocation of sources suggested by the inventories. The measured isotopic signal in central London ( $-45.7 \pm 0.5\%$ ) was more than 2‰ higher than the isotopic value calculated using emission inventories and updated  $\delta^{13}\text{C-CH}_4$  signatures. Besides, during the mobile surveys, many gas leaks were identified that are not included in the inventories. This suggests that a revision of the source distribution given by the emission inventories is needed.”

**(2017) Origins and trends in ethane and propane in the United Kingdom from 1993 to**

**2012** <https://www.sciencedirect.com/science/article/pii/S1352231017301103>

**Abstract:** “Continuous, high frequency in situ observations of ethane and propane began in the United Kingdom in 1993 and have continued through to the present day at a range of kerbside, urban background and rural locations. Whilst other monitored C<sub>2</sub> – C<sub>8</sub> hydrocarbons have shown dramatic declines in concentrations by close to or over an order of magnitude, ethane and propane levels have

remained at or close to their 1993 values. Urban ethane sources appear to be dominated by natural gas leakage. Background levels of ethane associated with long range transport are rising. However, natural gas leakage is not the sole source of urban propane. Oil and gas operations lead to elevated propane levels in urban centres when important refinery operations are located nearby. Weekend versus weekday average diurnal curves for ethane and propane at an urban background site in London show the importance of natural gas leakage for both ethane and propane, and road traffic sources for propane. The road traffic source of propane was tentatively identified as arising from petrol-engine motor vehicle refuelling and showed a strong downwards trend at the long-running urban background and rural sites. **The natural gas leakage source of ethane and propane in the observations exhibits an upwards trend whereas that in the UK emission inventory trends downwards. Also, inventory emissions for natural gas leakage appeared to be significantly underestimated compared with the observations. In addition, the observed ethane to propane ratio found here for natural gas leakage strongly disagreed with the inventory ratio.**

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#### **(2016) Spatial and temporal variability of urban fluxes of methane, carbon monoxide and carbon dioxide above London, UK**

<https://acp.copernicus.org/articles/16/10543/2016/acp-16-10543-2016-discussion.html> Long-term (3-year) measurements on methane fluxes in London.

Results: The wintertime increase above background in CH<sub>4</sub> concentrations and the accompanying enrichment in  $\delta^{13}\text{C}$  were consistent with North Sea natural gas and attributed to losses of CH<sub>4</sub> from over-pressurized pipelines in response to (or anticipation of) an increase in demand and to incomplete combustion upon boiler ignition.

Annual CH<sub>4</sub> emissions (72 tons km<sup>-2</sup>) were more than double the LAEI value suggesting that sources are not as well characterized by the inventory. A shortfall in inventoried CH<sub>4</sub> emissions can be explained by the existence of temperature-dependent sources related to natural gas usage and perhaps also of biogenic origin (e.g. sewage).

#### **(2017) Natural gas and climate change**

[https://pure.manchester.ac.uk/ws/portalfiles/portal/60994617/Natural\\_Gas\\_and\\_Climate\\_Change\\_Anderson\\_Broderick\\_FOR\\_DISTRIBUTION.pdf](https://pure.manchester.ac.uk/ws/portalfiles/portal/60994617/Natural_Gas_and_Climate_Change_Anderson_Broderick_FOR_DISTRIBUTION.pdf)

Policy support paper that covers many aspects of natural gas and climate change, concluding that: *“By 2035 the substantial use of fossil fuels, including natural gas, within the EU’s energy system will be incompatible with the temperature commitments enshrined in the Paris Agreement.”*

The paper cites uncertainty in methane leakage (*from across the full supply chain, not specific to downstream distribution networks*) as critical in understanding the role that natural gas may play as a viable bridging fuel in the transition to a low carbon economy:

*“In order to quantify the maximum level of EU natural gas consumption compatible with existing EU targets and the Paris Agreement, the relative lifecycle carbon intensity of a range of potential natural gas sources must be more fully understood, particularly methane leakage.”*

The research alludes to the challenge of super-emitter sources and the difficulty in identifying and assessing them:

*“The production and distribution of natural gas releases methane both deliberately and*

*inadvertently. The exact amount varies widely across locations and production technologies, and through time at a given location. Close monitoring shows that in most supply chains a small number of sites, or pieces of equipment, are responsible for a large proportion of methane emissions, however, they are difficult to identify a priori. Leakage rates affect the relative contribution of methane to the climate change impact of natural gas supply chains."*

**(2015) Plume mapping and isotopic characterisation of anthropogenic methane**

**sources** <https://www.sciencedirect.com/science/article/abs/pii/S1352231015002538>

Methane stable isotope analysis coupled with mole fraction measurement has been used to link isotopic signature to methane emissions from landfill sites, coal mines and gas leaks in UK.

Location: London and SE England

Method: Targeted areas, when the methane plume was intercepted, air samples were collected and analysed using  $\delta^{13}\text{C}-\text{CH}_4$  isotopic analysis by CF-GC-IRMS (high precision method).

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Results: Methane from landfill isotope signatures  $-60.2 \pm 1.4$  to  $-55.2 \pm 0.6\text{‰}$ . Methane of constant origin for the methane of  $-36.3 \pm 0.3\text{‰}$  consistent with a dominantly thermogenic North Sea gas source. It suggests that there are other leaks in the gas distribution system along with the storage tank ("gasometer") that is located in the middle of the transect. 24 ppm north of Bacton where pipelines bring all southern and much northern North Sea Norwegian gas onshore, as well as gas from the interconnector pipeline to Belgium. Samples collected had  $^{13}\text{C}$  signatures of  $36.3 \pm 0.3\text{‰}$  and  $-35.7 \pm 1.2\text{‰}$ .

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## Framework for the Appointment of an Independent Shrinkage Expert

### Document Control

Version	Date	Reason for Change
0.1	10/01/2023	First Draft
0.2	13/02/2023	Suggestions from 0828R meeting 2
0.3	22/02/2023	Suggestions from 0828R meeting 3
0.4	21/03/2023	Suggestions from 0828R meeting 4

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**Appendix** 10 1 Text to be added to Section N of the UNC's Transportation Principle Document 10

### Preamble

## 1. Development of Rules

The requirement to have in place a "Shrinkage and Leakage Model" (SLM) is specified in the Special Standard Conditions of the Transporter Licence. The Framework for the Appointment of an Independent Shrinkage Expert (hereafter the "Framework") will detail how the Independent Shrinkage Expert (ISE) will annually develop the Independent Shrinkage Model (ISM), Independent Shrinkage Model Methodology (ISMM) to create an accurate account of Shrinkage. Where there is a difference between the quantity of Shrinkage that is calculated via the SLM and ISM, the ISE will recommend to Transporters and Ofgem that [the Independent Shrinkage Multiplication Factor](#) and Independent Shrinkage Charge (ISC) is used. If approved by Ofgem, Transporters will be obliged to purchase gas to cover the ISC. This will enable Transporters to accurately purchase gas to cover any losses.

## 2. Modifications

Should a Shipper or Transporter wish to propose modifications to any of the Framework, such proposed modifications shall be submitted to the Uniform Network Code Committee and considered by the Uniform Network Code Committee or any relevant sub-committee where the Uniform Network Code Committee so decide by majority vote.

## 3. Approved Modifications

In the event that a proposed modification is approved by a majority vote of the Uniform Network Code Committee, the modification shall be implemented.

Where the Uniform Network Code Committee fails to achieve majority approval the proposed modification shall be considered in accordance with the provisions set out in Section 7 of the Uniform Network Code Modification Rules unless the Uniform Network Code Committee determines otherwise

Each revised version of a Document shall be version controlled and retained by the Joint Office on their website.

## Main body

### 1. Definitions

1.1 Unless otherwise stated, terms in this "Independent Shrinkage Expert Document" ("this Framework") shall have the meanings given to them in the Uniform Network Code. Such terms will be capitalised within quotation marks where first used in the Framework.

1.2 In this Framework:

- "The Committee" - The Uniform Network Code Committee (UNCC), or an authorised technical workstream or sub committee appointed by the UNCC to administer the Independent Shrinkage Expert process.
- "Code Parties" – signatories to the Uniform Network Code
- "Generic Terms of Reference" – the standard terms of reference to be applied as basis of the contracts between the Gas Transporters and the ISE for the maintenance of the Shrinkage Model
- ~~"Independent Shrinkage Multiplication Factor" – a multiplier that accounts for any under or over estimation made by Transporters when estimating the amounts of Shrinkage via the Shrinkage and Leakage Model. This must be used by Transporters to accurately account for Shrinkage where so directed by the Authority. For example, if the Transporter estimates 10 GWh of natural gas have been lost to Shrinkage and the ISE estimates that 13.5 GWh of natural gas have been lost to Shrinkage, the Independent Shrinkage Multiplication Factor will be 1.35.~~
- "Stakeholder Evaluation Panel" – a group of interested parties (including the CDSP), drawn from or nominated by The Committee, who will participate in the development of procurement materials (including terms and conditions) and the selection of a preferred tenderer for the role of ISE.

### 2. The Framework

The process described here sets out:

- ISE appointment;
- Publication of the Independent Shrinkage Model (ISM) and Independent Shrinkage Model Methodology (ISMM);
- High level process for the maintenance and development of the ISM and the ISMM;
- ISE principles
  - In any and all activity undertaken by the ISE, including updating or replacing the National Leakage Tests (NLT) (if deemed appropriate by the ISE) through innovation, shall be administered via the principles of:
    - impartiality,
    - emissions reduction,
    - accuracy, and
    - best outcomes for end-consumers.

### 3. Responsibilities under the tender process for the position of ISE

3.0 The Committee may delegate its obligations for the definition of criteria for appointment and for overseeing the selection process to the Stakeholder Evaluation Panel (this should be made up of as equal as possible variance of parties to ensure impartiality).

3.1 The CDSP, on behalf of the The Committee, will:

- 3.1.1 Produce a clear set of criteria for the appointment of the ISE detailing (without limitation): (a) the ability of the ISE to produce the ISM and the ISMM which shall be in line with the Generic Terms of Reference, contained in this Framework plus any other criteria agreed by The Committee;
  - (b) the evaluation of the cost of undertaking the role of the ISE over the period stated in the tender document;
  - (c) the consideration of the relevant knowledge and expertise of the candidates; and (d) ability of the prospective ISE to follow and take into account relevant industry developments.
- 3.1.2 The CDSP can review this Framework and submit for approval to the UNCC any proposed amendments.

3.2 The CDSP will:

- 3.2.1 use the criteria developed under 3.1 to assess each submitted tender bid; 3.2.2 where more than one prospective candidate responds to the tender for the position of ISE ("the Interested Parties") the Stakeholder Evaluation Panel shall:
  - (a) Assess the Interested Parties from the criteria specified in the tender document; (b) Select and appoint the appropriate Interested Party as the "Prospective ISE". 3.2.3 identify any improvements that may be made to the tender process, and detail those improvement to The Committee;
- 3.2.4 organise any meetings held in relation to the ISE appointment;
- 3.2.5 provide legal resource to prepare a tender document;
- 3.2.6 organise the advertisement of the tender to all Interested Parties, in accordance with national and European legislation;
- 3.2.7 communicate to Code Parties the progress and outcome of the tender process;
- 3.2.8 invite the Prospective ISE to take up the appointment;
- 3.2.9 where the selected ISE does not accept the appointment, invite the next most favoured ISE in turn; and
- 3.2.10 upon acceptance of appointment, establish the contract with the Prospective ISE, in accordance with the Generic Terms of Reference.

3.3 The Gas Transporters and Shippers will require the ISE:

- 3.3.1 to act with all due skill, care and diligence when performing its duties as the ISE and shall be impartial when undertaking the function of the ISE, ensuring that any values derived will be equitable in their treatment of Code Parties.
- 3.3.2 to compile the ISM and ISMM and calculate the Independent Shrinkage Multiplication Factor in accordance with this Framework

### 4. Tendering process

4.1 This section details the processes undertaken by the CDSP, to appoint an ISE using a tender process.

- 4.1.1 The CDSP will prepare a tender document to be sent when required to all Interested Parties.
- 4.1.2 The tender will detail:
  - (a) that the aim of the tender is to appoint a Party, the ISE, to compile a publicly available ISM and ISMM that is used in the creation of the ISM;
  - (b) that the ISE will create a methodology, an ISMM, to populate the ISM annually (the cadence of the production of the ISMM ~~and the ISM, and the Independent Shrinkage Multiplication Factor~~ may need to change cadence if appropriate);
  - (c) that the ISE must provide the necessary information to Code Parties in good time to allow the update of the ISM by the 1<sup>st</sup> July each year or a date(s) as deemed appropriate; (d) the ISE must hold a public consultation to provide an opportunity to allow Code Parties to discuss the ISM and ISMM, in accordance with the timetable contained within this Framework;
  - (e) the requirement to allow Code Parties to submit representations and queries with regard to the ISM in accordance with the timetable contained within this Framework; (f) that the ISE must consider adjusting ISM and/or the ISMM in response to those representations;
  - (g) that the ISE must adhere to the Generic Terms of Reference contained within this Framework, as well as any other criteria The Committee notifies to the CDSP prior to the tender document being issued; and
  - (h) that the ISE maintains good relations with The Committee and the CDSP to be available for discussion on any relevant issues, and to answer any general queries promptly.
- 4.1.3 When issued, the tender will be for an initial term as agreed with the CDSP, with an option to extend. Tenure shall be less than [2] years.
- 4.1.4 The CDSP will administer the tender process and will conduct it in accordance with all relevant legislation and generally accepted best practice.
- 4.1.5 Each tender response will in particular detail:

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- (a) how the prospective ISE will comply with the Generic Terms of Reference and any other criteria agreed prior to the tender;
- (b) an outline of the method to be used by the prospective ISE, and why such a proposed solution would be suitable;
- (c) an outline of the data that would need to be collated for such use, and the methods to be used for acquiring such data;
- (d) the likely time for such work to be carried out;
- (e) the cost of performing the services;
- (f) contact details that a Code Party may use to query any aspect of the tender or the ISM, ISMM and Independent Shrinkage Multiplication Factor when produced. The ISE shall confirm to the CDSP before their appointment that they do not hold any interest or duty which would or potentially would conflict with the performance of their duties under their contract with the CDSP;
- (g) their independence and impartiality, and their process for identifying and managing conflicts of interest during the lifetime of the contract.

4.1.6 Once all tenders have been received the CDSP will select in accordance with the evaluation criteria the top-ranked tender for appointment.

4.1.7 Once the tender process has been completed the CDSP will use reasonable endeavours to contract with the highest ranked acceptable party that wishes to become the ISE by the 1st August. CDSP will consider contracting with the next highest ranked party if they fail to reach agreement with the immediately previous higher ranked party.

4.1.8 In the event that the 1<sup>st</sup> August deadline is not met, The Committee will decide by a majority vote on whether to:

- (a) maintain the current ISM, ISMM and the Independent Shrinkage and Leakage Model Multiplication Factor for another year; or
- (b) grant additional time to the ISE on the understanding that any additional time granted will not jeopardise the publication of the ISM and ISMM.

4.1.9 Alternatively, by unanimous vote, to apply an ISM and ISMM that The Committee decides as appropriate;

4.1.10 Once the tender process has been completed and the CDSP have contracted with an interested party to be the ISE, the Stakeholder Evaluation Panel in agreement with the UNCC will review the tender process, and incorporate any updates that are believed are required to this document.

## 5. Generic Terms of Reference for Appointed ISE

5.1 This section will include the main principles the ISE will operate under, once appointed. 5.1.1 The ISE will create the ISM by developing appropriate, detailed methodologies (the ISMM) and collecting necessary data.

5.1.1.1 where reasonably required, Code Parties must comply the ISE's requests for data made under 5.1.1

5.1.1.2 non-compliance with 5.1.1 will be escalated to the UNCC, who in turn can escalate to the Authority

5.1.2 The decision as to the most appropriate methodologies and data will rest solely with the ISE taking account of any issues raised by any stakeholders during the development and compilation of the ISM.

5.1.3 The ISE will determine what data is required from Code Parties (and other parties as appropriate) in order to ensure appropriate data supports the creation of the ISM.

5.1.4 The ISE will determine what data is available from parties in order to ensure appropriate data supports the creation of ISM, if deemed appropriate by the ISE, and parties should provide data where requested.

5.1.5 The ISE will determine what relevant questions should be submitted to Code Parties, and any other parties as deemed appropriate by ISE, in order to ensure appropriate methodologies and data are used in the creation of ISM.

5.1.6 The ISE will use the latest data available where appropriate.

5.1.7 Where multiple data sources exist the ISE will evaluate the data to obtain the most statistically sound solution, will document the alternative options and provide an explanation for its decision.

5.1.8 Where data is open to interpretation the ISE will evaluate the most appropriate methodology and provide an explanation for the use of this methodology.

5.1.9 Where the ISE considers using data collected or derived through the use of sampling techniques, then the ISE will consider the most appropriate sampling technique and/or the viability of the sampling technique used.

5.1.9.1 The ISE will either procure services for the collection of data or collect their own data,

5.1.9.2 Procurement activity for 5.1.9 will be managed via UNCC

5.1.9.3 Approval for costs above and beyond the original scope should be approved by the UNCC.

5.1.10 The ISE will present the ISM in draft form (the "Draft ISM"), to Code Parties seeking views and will review all the issues identified and submitted in response.

5.1.11 The ISE will provide the Draft and final ISM to relevant stakeholders for publication. 5.1.12 The Authority's final determination in this process shall be binding.

5.1.13 The ISE will undertake to ensure that all data that is provided to it by parties will not be passed on to any other organisation, or used for any purpose other than the creation of the ISM, and ensure that they are following GDPR and taking consideration of commercial sensitivities and intellectual Property.

5.1.14 Intellectual property is managed by CDSP

5.1.14.1 the intellectual property should reside with the ISE, but be transferred to the new ISE on appointment. This stipulation can be amended by contractual arrangements decided in the tender process.

~~5.1.15 The ISE will calculate the Independent Shrinkage Multiplication Factor. The Independent Shrinkage Multiplication Factor is a multiplier that accounts for any under or over estimation~~

**Commented [1]:** Need to add text which will anchor to the uncc

**Commented [2]:** Add text to section N of the TPD: "6. Independent Shrinkage Expert: 6.1 Parties must adhere to the stipulations of the Framework for the Appointment of an Independent Shrinkage Expert.

6.2 Where requested to by the Independent Shrinkage Expert, all parties must comply with the Authority if appropriate". requests for data. Any non-compliances will be escalated to the UNCC who may escalate made by Transporters when estimating the amounts of Shrinkage via the Shrinkage Model. The Independent Shrinkage ~~Charge Multiplication Factor~~ must be used by Transporters to accurately account for Shrinkage where so directed by the Authority. ~~For example, if the Transporter estimates via the SLM that 10 GWhs of natural gas have been lost to Shrinkage and the ISE estimates via the ISM that 13.5 GWh of natural gas have been lost to Shrinkage, the Independent Shrinkage Multiplication Factor will be 1.35.~~

5.1.16 where reasonably requested to provide data to the Performance Assurance Committee, the ISE shall comply with such requests

## 6. Responsibilities for the creation of the ISE

### 6.1 CDSP

At the end of each ISE year, regardless of any ISM outcome, the UNCC shall decide on whether the CDSP shall seek feedback from the industry, including the ISE, on the activities and performance of the ISE and industry for the creation of the ISM.

The CDSP shall produce a report for The Committee

### 6.2 Code Parties provision of data or information to the ISE

Where, the ISE requests data from Code Parties for the purpose of preparing the ISM and ISMM, the Code Parties shall use reasonable endeavors to provide the information requested within the timescales requested. Such timescales having being previously notified to the Code Parties.

Non-compliance with requests shall be escalated to the Committee/Authority.

### 6.3 Code Parties Raising issues for consideration during the consultation period.

Code Parties may submit topic areas for consideration by the ISE during the consultation process. The submission must include a clear explanation of the topic, the reasons why this topic is relevant to the ISM, any accompanying data or suggestions as to how the data may be obtained by the ISE. Each topic submitted by a Code Party will be published (including the details of the Code Party) to the industry as part of the ISE's consultation response.

The ISE will provide a response to the topic detailing whether it is in or out of the scope of work and the rationale to support this.

### 6.4 Code Parties Raising issues for consideration outside of the consultation period.

Code Parties may submit topic areas for consideration by the ISE outside the consultation process. The submission must include a clear explanation of the topic, the reasons why this topic is relevant to the ISE, any accompanying data or suggestions as to how the data may be obtained by the ISE. Each topic submitted by a Code Party will be published (including the details of the Code Party) to the industry as part of the ISE's consultation response.

The ISE will log the topic and will consider it during the development of the next applicable ISM and ISMM

### 6.5 Provision of and publication of data

A copy of all data and information requests from the ISE will be published to the industry as and when the request is made e.g. date, information request, request made to, data required by.

A record of all responses by organisation name (not anonymised), will be maintained and published. The report will show the response as one of "provided", "not provided" (i.e. request acknowledged but reason for no provision provided), or "no response to request".

Where applicable, a copy of the data provided to the ISE by the Gas Transporters and Shippers will be provided to the industry, in a suitable format. Where data is confidential or commercially sensitive, the fact that the data had been provided will be published, an organisation may request a copy of the information pertaining to them from the Gas Transporters and Shippers.

### 6.6 Gas Distribution Networks will fund the role of the ISE and related activity as detailed within the Framework

## 7. Creation of ISMM

7.1 This section covers the activities and timescales for the creation, submission to The Committee and publication of the ISMM by the ISE.

7.1.1 The ISE will use appropriate methodologies (ISMM) for the calculation of the ISM 7.1.2 The ISE will justify the appropriateness of these methodologies within the ISMM 7.1.3 The draft ISMM will be published on [date] so that Code Parties are able to provide commentary

and consult

7.1.4 methodologies will be lead by principles of:

- impartiality,
- emissions reduction,
- accuracy, and
- best outcomes for end-consumers.

7.1.5 costs for methodologies will justified

- 7.1.5.1 Cost Benefit Analysis will be undertaken and consulted within the Committee
- 7.1.5.2 The cost of creating the ISMM will be considered as part of the tender process

## 8. Creation of ISM

8.1 This section covers the activities and timescales for the creation, submission to The Committee and publication of the ISM by the ISE.

8.1.1 The ISE must provide a Draft ISM, including the methodology, to the Joint Office for presentation and publication no later than 1st Feb each year. This date can be amended by the ISE as appropriate, and agreed with the Committee via a consultation.

8.1.2 The Draft ISM and presentation must detail:

- (a) How the ISE has adhered to the Generic Terms of Reference and to any other relevant provisions within its contract;
- (b) The methodology used by the ISE, and why such a process was suitable;
- (c) The data has been collated so far for such use, and the methods to be used for acquiring any further data; and
- ~~(d) Draft data and methodology for use in populating the ISM.~~

8.1.3 Once published, any representations made in relation to the draft ISM must be received ISE within [28] calendar days.

8.1.4 The ISE will consider any submissions made, and will provide feedback for discussion at the meeting, which is to be held as soon as possible after the [\[see timetable\]](#).

8.1.5 The ISE will review the ISM in light of any comments (received in 7.1.3 & 7.1.4), and will adjust the ISM where it believes appropriate.

8.1.6 The Draft ISM document, as revised by the ISE in accordance with 7.1.4, will be republished by the [\[see timetable\]](#) on the Joint Office of Gas Transporters website.

8.1.7 The ISE will arrange a meeting to discuss the Draft ISM (as revised), along with any changes made, to be held as soon as possible after the Draft SLM.

8.1.8 Once the Draft ISM (as revised) document has been published, the Gas Transporters and Shippers will organise a meeting with The Committee and the ISE for approval of the final document before the [see timetable](#). The Committee shall approve the Draft ISM, in the form presented by the ISE, unless they unanimously agree changes to any part of the document. Any changes directed by The Committee in this fashion will be implemented by the ISE immediately. The approved Draft ISM will be treated as the Final ISM.

8.1.9 the Final ISM will issued to Gas Transporters, Shippers, the UNCC, and the Authority for consideration on whether it is more accurate that the SLM by [\[see timetable\]](#).

## 9. The application of the Independent Shrinkage ~~Charge Multiplication Factor~~

9.1 where there is a difference between LDZ shrinkage, as estimated by the Transporters, and LDZ shrinkage, as estimated by the ISE, the ISE will [calculate publish](#) the Independent Shrinkage ~~Charge Multiplication Factor~~ to Transporters, Users, and the Authority

9.2 where the Authority has reviewed the Independent Shrinkage ~~Charge Multiplication Factor~~ together with all associated information as appropriate, and so validated that it provides a more accurate estimation, the Authority shall approve the Independent Shrinkage ~~Charge Multiplication Faeter~~ for use by the Transporters;

~~9.3 for the purpose of 9.2, Transporters must multiply the value of gas that they have estimated to have been lost, as per their calculations under 3.3 of Section N of the Transportation Principle~~

[Document, by the Independent Shrinkage Multiplication Factor](#)

9.43 Transporters must use the value derived under 9.3 to accurately purchase gas and report this to the Authority and Users

9.45 To avoid conflating gas purchased under 9.34 with the volumes of gas that are recouped via the SLM by the GNDs as normal, this gas shall be known as ISM Variation Gas (IVG).

9.56 For the purpose of calculating Unidentified Gas (UIG) volumes, IVG shall be added to Shrinkage, daily-metered allocations and non-daily-metered estimates prior to deducting from the total gas input into the system.

## **10. Creation of Independent Shrinkage Statement**

10.1 This section covers the activities and timescales for the creation, submission to The Authority and publication of the Independent Statement (ISS) by the ISE.

<i>Step</i>	<i>Requirement</i>	<i>Responsible Party</i>	<i>Latest date for delivery</i>
<u>1</u>	<u>Establish a timetable for the coming ISE Year: book meeting dates for all key industry meetings for the year, and communicate those to the industry.</u>	<u>Code Administrator in conjunction with CDSP</u>	<u>31 May</u>
<u>2</u>	<u>Present an overview of the approach to developing the ISS for the coming year at an <b>Introductory Meeting</b> with the Independent Shrinkage Technical Workgroup, including (but not limited to):</u> <ul style="list-style-type: none"><li><u>• Overview of high level approach to the assignment for coming year:</u></li><li><u>• Overview of proposed changes to methodology since the previous year:</u></li><li><u>• Summary of Industry issues and key changes (e.g. UNC Mods) since previous year and impact on methodology</u></li><li><u>• Update on the log of items carried over from the previous year</u></li><li><u>• Proposed data sources for all causes of Shrinkage to be included in the methodology</u></li></ul> <u>Industry parties may provide feedback on the approach and the data sources, for consideration by the ISE.</u>	<u>ISE</u>	<u>Late June/early July</u>
<u>3</u>	<u>Provide the industry with monthly updates on progress with the development of the ISS, including availability of data, new topics identified and any key issues which may impact on the Methodology</u>	<u>ISE</u>	<u>Monthly from July to March</u>

<u>Step</u>	<u>Requirement</u>	<u>Responsible Party</u>	<u>Latest date for delivery</u>
4	<p><u>Present an update on the development of the ISS for the coming year at an <b>Early Engagement Meeting</b> with the <b>Independent Shrinkage Technical Workgroup</b>, including (but not limited to):</u></p> <ul style="list-style-type: none"> <li>• <u>latest view of data sources for all topics and availability of data</u></li> <li>• <u>update on development of the ISS for the coming year, including any new items to be added to the Methodology for the coming year.</u></li> </ul> <p><u>Industry parties may provide feedback on the proposed data sources and outline of the approach.</u></p>	ISE	<u>Late September/ early October</u>
5	<p><u>Provide a proposed ISS to the CDSP for presentation and publication. The proposed ISS and presentation must detail:</u></p> <ol style="list-style-type: none"> <li><u>a) How the ISE has adhered to the Generic Terms of Reference</u></li> <li><u>b) The methodology to be used by the ISE, and why such a process is considered to be the most appropriate approach;</u></li> <li><u>c) The data has been collated so far for such use, and the methods to be used for acquiring any further data; and</u></li> <li><u>e) Any specific matters the ISE wishes to draw to the industry's attention</u></li> </ol>	ISE	<u>1st January</u>
6	<p><u>At a meeting of the Independent Shrinkage Technical Workgroup, present and discuss the proposed ISS to be held as soon as possible after the proposed ISS document has been published.</u></p>	ISE	<u>7 Jan</u>

<u>Step</u>	<u>Requirement</u>	<u>Responsible Party</u>	<u>Latest date for delivery</u>
7	<u>Once the proposed ISS has been published, any responses to the ISE on the proposed ISS must be received by the CDSP within 21 calendar days. The CDSP will then provide these responses to the ISE as they are received or no later than 1 working day after submission.</u>	<u>Code Parties</u>	<u>10 January</u>
8	<u>The ISE will consider any responses made, and will provide feedback for discussion at a meeting of the Independent Shrinkage Technical Workgroup.</u>	<u>ISE</u>	<u>1 Feb</u>
9	<u>The ISE will review the Independent Shrinkage Statement in light of any comments (received in Steps 7 and 8), and will adjust the Statement where it believes appropriate. The proposed Independent Shrinkage Statement document, as modified by the ISE in accordance with this Step, will be republished on the Joint Office of Gas Transporters website.</u>	<u>ISE</u>	<u>15 Feb</u>
10	<u>At a meeting of the Independent Shrinkage Technical Workgroup, present and discuss the modified Independent Shrinkage Statement, along with any changes made, after the modified Independent Shrinkage Statement document has been published.</u>	<u>ISE</u>	<u>1 March</u>
11	<u>The Independent Shrinkage Expert will review the Independent Shrinkage Statement in light of any comments raised in the meeting referred to in Step 10 and will adjust the Independent Shrinkage Statement where it believes appropriate. For the avoidance of doubt changes can only be made to address specific concerns raised.</u>	<u>ISE</u>	<u>15 March</u>

<u>Step</u>	<u>Requirement</u>	<u>Responsible Party</u>	<u>Latest date for delivery</u>
12	<u>The Independent Shrinkage Expert will provide the final Independent Shrinkage Statement (as updated as described in Step 11, if appropriate) to the Authority and the Joint Office of Gas Transporters for publication.</u>	ISE	15 March
13	<u>The Authority will consider the final Independent Shrinkage Statement at its next scheduled meeting. The Authority shall approve the final Independent Shrinkage Statement, in the form presented by the Independent Shrinkage Expert, unless it agrees changes to any part of the document. The approved Independent Shrinkage Statement will be treated as the final Independent Shrinkage Statement.</u>	Authority	April

10.2 The Authority's final determination in this process shall be binding on Code Parties.

10.3 The Authority may determine that the ISC shall not be applied. In such circumstances, the Authority shall determine whether to roll over the ISC from the previous year, to not approve the ISC and not roll over the ISC from the previous year, or any other action that it deems appropriate.

10.4 The Code Parties may appeal the Authority's final determination.

10.5 At the end of each Independent Shrinkage Year, regardless of any Independent Shrinkage Statement outcome, the CDSP shall seek feedback from the industry, including the Independent Shrinkage Expert, on the activities and performance of the Independent Shrinkage Expert and industry for the creation of the Independent Shrinkage Statement. The CDSP shall produce a report for the UNCC and the Authority, and it shall be published on the Joint Office website.

## Appendix

### 1 Text to be suggested to be added to Section N of the UNC's Transportation Principle Document

The following text will be added to section N of the TPD to ensure that parties comply with ISE in the production of the ISM and ISMM

#### 3.5

Not later than 31 July in each Formula Year, the ISE will provide a report setting out in respect of the Preceding Formula Year:

(a) values (for the whole year and/or on an average daily basis) of assessed LDZ shrinkage, as estimated in the Independent Shrinkage Model via the Independent Shrinkage Model Methodology, for each relevant LDZ together with a summary of the statistics and information from which such values were derived;

(b) a comparison of such assessed values with the values of LDZ shrinkage estimated by the Transporters;

(c) where there is a difference between LDZ shrinkage, as estimated by the Transporters, and LDZ shrinkage, as estimated by the ISE, the ISE will publish the Independent Shrinkage Multiplication Factor to Transporters, Users, and the Authority;

(d) where the Authority has reviewed the Independent Shrinkage Multiplication Factor together with all associated information as appropriate, and so validated that it provides a more accurate estimation, the Authority shall approve the Independent Shrinkage Multiplication Factor for use by the Transporters;

(e) for the purpose of 3.5(d), Transporters must multiply the value of gas that they have estimated to have been lost as per their calculations under 3.3 by the Independent Shrinkage Multiplication Factor; and

(f) Transporters must use the value derived under 3.5(e) to accurately purchase gas and report this to the Authority and Users.

3.6 For the purpose of calculating an independent estimate of shrinkage, as detailed within 3.5, the CDSP, on behalf of the UNCC and in line with the Framework for the Appointment of the independent Shrinkage Expert document, shall procure the role of the Independent Shrinkage Expert."

*"6. Independent Shrinkage Expert: 6.1 Parties must adhere to the stipulations of the Framework for the Appointment of an Independent Shrinkage Expert.  
6.2 Where requested to by the Independent Shrinkage Expert, all parties must comply with requests for data. Any non-compliances will be escalated to the UNCC who may escalate to the Authority as appropriate". Deleted: if*