Gas Market Settlement Risk Assessment

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Executive Summary

This report documents the settlement risks identified following analysis of the Project Nexus Business Requirements Documents, the Uniform Network Code, UNC modification 432 and 434, and information from other relevant UNC workgroups. The analysis has identified risks to settlement data input, rules based risks to accurate allocation and shipper performance based risks.

We will use the dynamic model, being built during the second phase of the independent study, to evaluate and quantify the performance-based risks identified in this report. Eight settlement data input risks have been identified these will affect the standing data accuracy. Where appropriate we will incorporate these risks in the dynamic model.

The report identifies twenty-one shipper based performance risks and two transporter performance risks. These risks are discrete but can be categorised as follows:

- Transporter performance risks to accurate LDZ throughput being used in settlement allocation;
- Shipper performance risks to the meter reading process;
- Shipper performance risk to the management of AQs where corrective action is required; and
- Shipper performance risks to reconciliation that reflects true consumption.

The rules based risks that we have identified have been documented for completeness but cannot be address using a performance assurance framework.

This report explains each risk, the consequence of each risk occurring and the type of risk. A summary of all risks and their classification has been included as a reference.

Document Control

Authorities

Version	Issue Date	Author	Comments
0.1	14th November	Naomi Anderson	Initial draft for Ofgem and PAW review
Version	**Issue Date**	**Authorisation**	**Comments**
0.1	14th November	Richard Cullen/John Peters	Further consideration should be given to the risk of meter points being in the wrong product category before finalising the document.

Distribution

To be sent to Jon Dixon, Ofgem Project Manager and for circulation and review by Performance Assurance Workgroup (PAW).

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1 Background

1.1 Introduction

This report is the first deliverable of the independent study commissioned by Ofgem and the Performance Assurance Workgroup (PAW) into gas market settlement risk.

The PAW is a Uniform Network Code (UNC) Sub-Committee set up in 2013 to develop an industry wide gas performance assurance framework. The performance assurance framework aims to incentivise individual parties to manage accurately their portfolio so no party gains a settlement advantage. The group aim to implement a performance assurance framework following the rollout of Project Nexus on 1st October 2015, and considers that risk based performance targets need to be developed to ensure that the energy allocation process operates as intended. In order to develop appropriate risk based incentives this independent study has been commissioned. There are three deliverables, which are as follows;

1. Identify risks which impact accurate settlement allocation;
2. Build a dynamic model of the market which can be used by the PAW to establish a level of performance risk that is acceptable; and
3. Evaluate the likelihood and financial impact of each performance risk identified.

The Project Nexus package of change will replace the UK Link system and change the gas settlement process. The aim is to better allocate energy and transportation costs to the parties that have incurred the cost. Currently the annual quantity (AQ) dictates where settlement allocates energy for the forthcoming gas year. Shippers spend time and resource analysing the proposed annual quantity during the AQ review window each summer. Settlement splits the market into daily-metered and non-daily metered (NDM) sites, and further splits the NDM part into large supply points (LSP) and small supply points (SSP). LSPs are reconciled individually whereas SSPs are subject to a reconciliation by difference regime.

The new regime will introduce a rolling AQ to operate in conjunction with individual meter point reconciliation for all meter points, irrespective of size. This will incentivise Shippers to maximise data quality and ensure they obtain meter readings frequently and accurately. From 1st October 2015, the settlement processes will transition away from the current regime of individual meter point reconciliation for LSPs and reconciliation by difference for small supply points. Shippers will elect a Product Category for Supply Points that are reconciled at an individual Meter Point level. The product categories are as follows;

- Product 1 – Mandatory daily metered sites;
- Product 2 – Daily Metered sites, non-time critical;
- Product 3 – Sites with smart/advanced meters submitting batched daily reads; and
- Product 4 – Sites submitting meter reads periodically.

Initially, Xoserve anticipated that there will be approximately 1,000 daily-metered sites in product 1 and the remaining population of meters will be in Product 4. Xoserve anticipate that this will change as meter points transition into product 3 with the uptake of smart metering, and be reconciled exactly to batched daily reads.

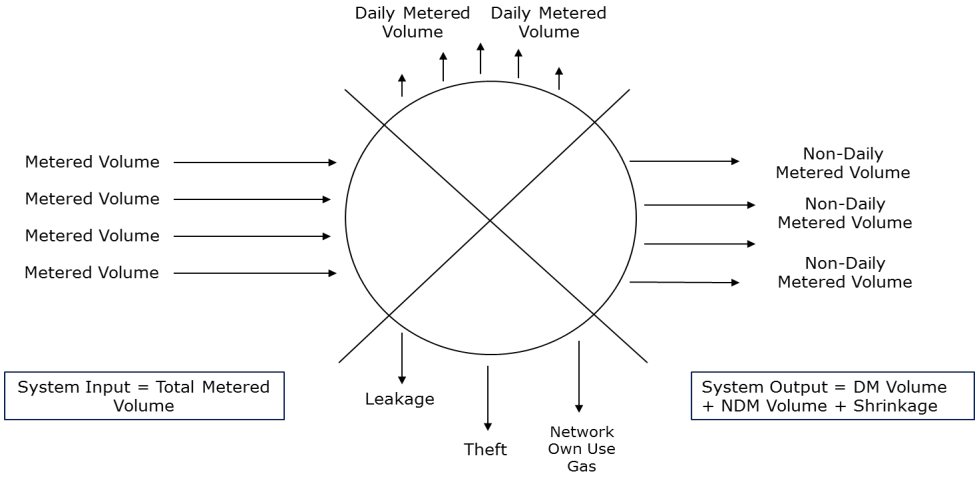
1.2 Scope of the Report

This report focuses on identifying risks to accurate settlement allocation, where volume allocation does not reflect true consumption following the implementation of Project Nexus. As

Project Nexus documents the change to current processes it is necessary to identify current settlement risks and how these develop following the introduction of new settlement rules, systems and processes.

We have considered whether the total settled volume accurately reflects the true amount of gas passing through each Local Distribution Zone (LDZ). The report identifies risks that may inhibit fair allocation of gas between market participants.

The diagram below illustrates the elements of the gas allocation process considered within this report.

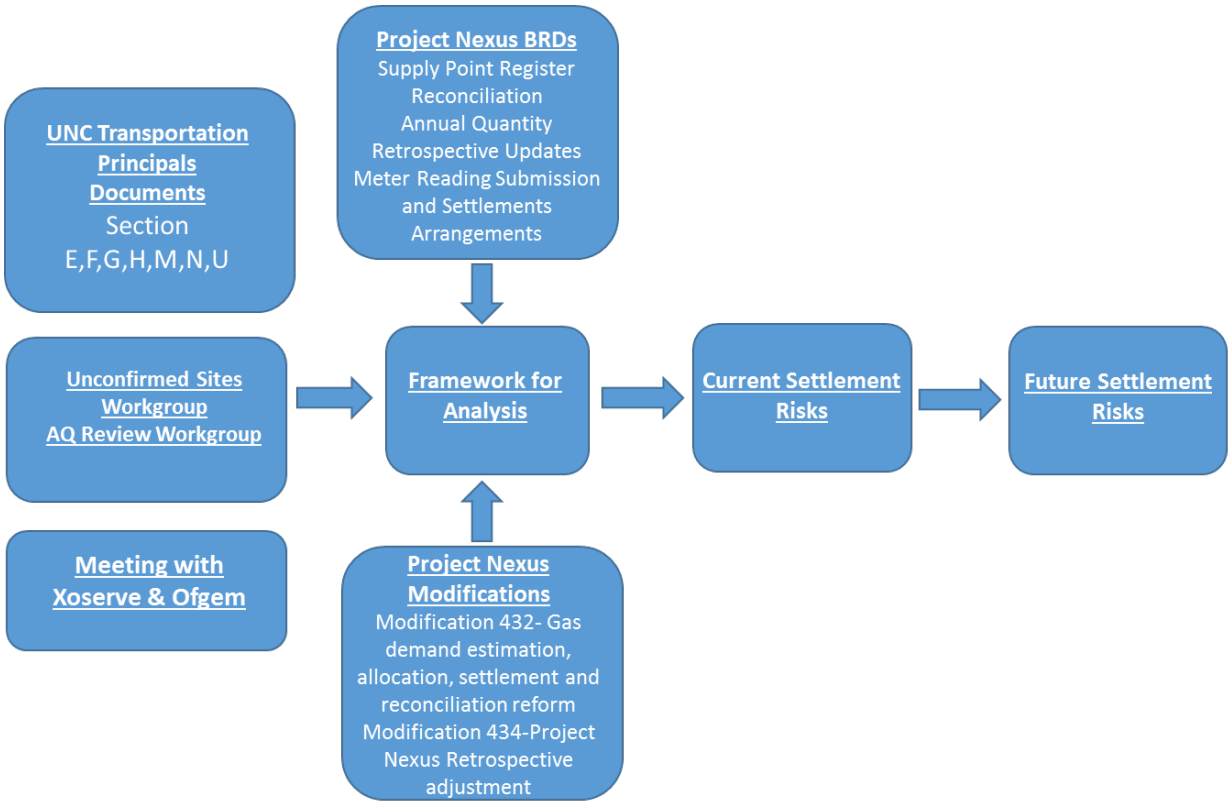


This report provides a list of inputs variables for the dynamic model and performance risks to be evaluated using in the dynamic model, deliverable 2 of the independent study.

2 Background to analysis

Project Nexus documents provide detail of the change to current processes, so in order to complete an analysis it has been necessary to develop a baseline of the current settlement processes and risks. The UNC Transportation Principals documents the majority of the settlement processes. We have taken further information from the Measurement Offtake workgroup, Project Nexus modifications, yearly allocation of unidentified gas expert (AUGE) process, unconfirmed sites workgroup, and the AQ review workgroup.

As the Business Requirements Documents (BRD) provide detail of the change to current processes, each settlement risk has been documented and the BRD analysed to establish whether the risks will change. We have documented new risks identified as a result of Project Nexus implementation. We have fed each input through the framework for analysis documented in section 3. The diagram below illustrates the approach to the analysis.



We have documented all the risks identified, in the Appendix. The matrix provides detail of the type of risk. Risks are categorised as settlement data input risks, settlement rules based risk, and shipper or transporter performance based risks.

Settlement data input risks are those that affect the total energy measured so that it does not reflect reality. This will cause a systemic error through the settlements process, but is not a direct impact of a shipper or transporter failing to complying with their obligations. This type of error is inherent within the process and a performance assurance framework alone cannot address them.

Settlements rules risks are those where the current or future rules create a risk that settlement may not equitably allocate energy to the shipper or groups of shippers that incurred the cost. We have highlighted these risk but will not be evaluated them within the dynamic model.

Performance based risks are where a shipper or transporter has affected the settlement data by being not being compliant with their obligations. We will evaluate these risks using the dynamic model built in the second phase of the project.

3 Analysis

3.1 Framework for Analysis

We have developed a framework to analyse the current settlement arrangements and the Project Nexus business requirements documents (BRDs). The base case has been analysed which considers the current settlements arrangements, developed since the opening of market competition. The framework for assessment shown below, divides the settlements processes into four areas for analysis.

Base Case Settlement Today Post Nexus Implementation	**Offtake Metered Volume**	Pre Event Controls	Post Event Controls	**Meter Read**	Pre Event Controls	Post Event Controls	**Initial Volume Allocation**	Pre Event Controls	Post Event Controls	**Final Volume at 36-48 months**	Pre Event Controls	Post Event Controls

The first stage identifies risks to the accuracy of gas measured entering the LDZ. The second stage identifies risks affecting acquisition or accuracy of meter reads from individual meter points within each LDZ. Lack of up to date meter reading information and history causes settlements risk to allocation and reconciliation. The third stage of the analysis identifies risks to the correct AQ and subsequently initial allocation. The fourth stage of the analysis considers risk to allocation during and following the settlement reconciliation window, which is set at between 36 and 48 months.

Identified risks will create the potential for transient or crystallised errors. Transient errors are errors in allocation that the reconciliation process corrects (or changes). These create short-term cash flow and credit cover risks but do not affect allocation following reconciliation close out.

We will prioritise risks that create crystallised errors. These will materially affect the correct allocation of gas, potentially leading to a party that did not create the risk incurring the costs. The type of risk is categorised in the Appendix.

3.2 Assumptions

We have made the following assumptions when completing the analysis;

- Gas flowing through the National Transmission System (NTS) is correctly measured;
- The UK Link replacement system operates in accordance to the design specified within the BRDs;
- A high number of read submissions or AQ corrections will not impact system performance;
- Where the BRDs provide detail of several options it is assumed the preferred option in the BRD will be built;
- A significant number of supply points will be elected into product 2 and 3 as a result of the mandated smart and AMR rollout;
- Independent Gas Transporters (IGTs) are assumed to follow the same process as directly connected sites; and

- Risks have been considered following the full and complete operation of the UK Link replacement system.

3.2.1 Transition to Project Nexus

This report identifies new risks arising from the Project Nexus settlements arrangements and risks that new arrangements inherit from the current arrangements.

The Project Nexus BRDs do not document significant detail to enable a full analysis of the transitional settlements regime between 1st October 2015 and 30th September 2016. Consequently, there may be additional risks arising through uncertainty that have not been considered within this analysis.

We anticipate the initial effectiveness will depend on the development of further transition rules and modifications. In order to rollout successfully the Project Nexus changes there is risk that Xoserve will have to implement a number of manual workarounds. There is also a risk that there is insufficient time to document all the required transitional operational arrangements. The additional rules may be inconsistent with the enduring Project Nexus rules. This work is currently ongoing and is being completed as part of the Project Nexus workgroup.

Co-operation between transporters, shippers and Xoserve will be necessary to improve data quality and ensure a smooth transition, and wherever possible the effective allocation of gas. When all the transitional rules are fully documented, some basic controls could be implemented through a performance assurance framework to facilitate an orderly transition to Nexus settlement arrangements. Any transitional controls will be outside the scope of this study due to the rules and process uncertainty.

3.2.2 Treatment of Meter Points Connected to Independent Gas Transporters

For the purpose of the gas market settlement risk assessment, IGTs will be treated as if they follow exactly the same settlements allocation processes as directly connected sites. Following Project Nexus implementation, when the new system is operational, we anticipate all allocation processes for meter points on Connected System Exit Points (CSEP) and direct connections will be aligned.

Currently, Xoserve hold information about IGT sites at logical meter number (LMN) within the CSEP database. For SSP sites, this contains information of the number of sites and the total AQ that each shipper is responsible for, but not individual meter point details on each CSEP. Large supply points have individual LMNs allocated to them. The LMN drives the shipper allocation of energy.

The following processes have historically led to a misalignment of data between IGT and directly connected sites:

- Offline LSP reconciliation completed using the CSEP database;
- Meter readings sent and accepted by 5 different IGT systems in accordance with the IGT UNC and individual network codes;
- Manually intensive AQ review process completed in accordance to the IGT UNC and individual network codes;
- Inconsistency in approaches to within-year amendments;
- Different registration processes;
- Inconsistencies in reconciliation at CSEP level with some CSEPs metered and others remaining unmetered;
- Assumption of no shrinkage on CSEPs due to the use of more plastic pipework;

- Inconsistencies between the data held on the CSEP database and information held by IGTs;
- Delays caused by CSEP database not accepting LMN updates from IGTs for approximately two weeks during September; and
- New build properties are more likely to be built on IGT networks and be allocated the default CSEP AQ.

Xoserve will take on the responsibility of the IGTs agent and will hold all IGT sites within the supply point register at meter point level. The allocation of gas to IGT sites will be more transparent and information about IGT sites will need to be sent through the Information Exchange using standard UK Link file formats. As this report focuses on the enduring settlement arrangements, we have assumed that any misallocation will diminish over time.

4 Offtake Volume

4.1 Overview

Each Distribution Network Operator is responsible for measuring and determining the volume of energy entering their network. They are also responsible for establishing the volume of LDZ shrinkage and own use gas that may cause the volume of gas delivered to end users to fluctuate.

There are currently 187[1] offtake and inter-LDZ meters measuring throughput of gas into LDZs. Measuring the correct daily volume of gas entering into each LDZ is a critical first step to ensuring that shippers incur a fair allocation of gas costs. The offtake meters are either ultrasonic, turbine or orifice meters, with varying degrees of accuracy and reliability.

4.2 Offtake Meter Errors

There have been 124[11] offtake measurement errors identified since September 2008. These have resulted in significant adjustments; settlement has initially allocated these, according to the current settlement rules, to small supply point shippers through the reconciliation by difference process. Since the introduction of the AUGE into the UNC, settlement has allocated part of this energy to the large supply point market. The offtake arrangements UNC committee appoint an independent expert to investigate meter errors greater than 50GWh. Following the implementation of Project Nexus, the assessment of metering errors will remain unchanged; however, the allocation of energy will be part of unidentified gas reconciliation. This will ensure that all shippers are allocated a share of the costs in accordance to the last 12 months aggregate AQ. It is the responsibility of the transporter to ensure the offtake metering equipment functions correctly. The majority of offtake points do not have a check or back up meter.

4.2.1 Risk

1. When an offtake meter is found to have measured gas throughput inaccurately the Distribution Network Operator evaluates the difference in throughput measured and estimated actual throughput. Where this is >50GWh an independent expert has to quantify the difference. This creates a risk that the total measured volume consumed by the LDZ on a given day is inaccurate. There is a greater risk when the measurement error remains undetected for an extended period of time.

   Currently, settlement allocates this inaccuracy to domestic shippers through the RbD mechanism and subsequently adjusts it following the annual AUGE process. Following Project Nexus implementation, it will apportion the energy to all shippers through the unidentified gas reconciliation adjustment in accordance to their AQ market share.

   This risk creates a settlement data input error; however, fair energy allocation amongst shippers is not affected. This risk could be minimised by performance monitoring the DNOs.

4.2.2 Controls

The network operator should maintain each offtake meter in accordance with the UNC Offtake Arrangements Document (Section G2.5.) and the Measuring Instruments Directive (MID).

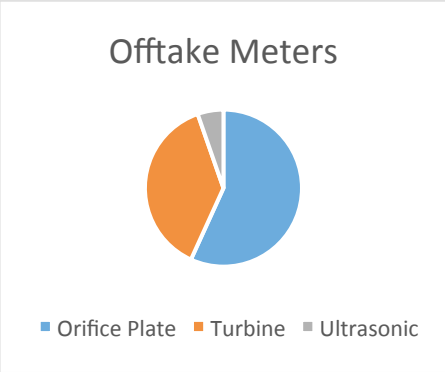
[1] http://www.gasgovernance.co.uk/MER

In March 2012, Scotia documented a Six Point Plan to minimise the likelihood of material risks occurring and ensure best practise when working on offtake meters.

The quantification of offtake meter errors by an independent expert acts as the main post event controls, which aims to correct any misallocation.

4.3 Offtake Meter Accuracy

There are currently 96 orifice meters, 64 turbine meters and 9 ultrasonic meters at offtakes from the National Transmission System or located between connecting LDZs.



Meter Type	Accuracy
Orifice Plate	0.75 – 1.5%
Turbine	0.5 – 1%
Ultrasonic	0.3%

Orifice meters contain a measurement plate and a differential pressure transmitter that measures the pressure across the plate. Under ideal conditions, the orifice plate can be accurate to 0.75-1.5% of total throughput; however, the total performance depends on the quality of the plate and its installation and poor condition meters can cause inaccuracies of greater than 1.5%.

4.3.1 Risks

2. Systemic offtake meter inaccuracies that fall within the tolerances set out in the measuring instruments directive are likely to continue as the meter will remain in place. Any inaccuracy in the offtake meter measurements creates a settlement data input inaccuracy.

   Currently, settlement apportions any inaccuracy to total measured throughput volume to domestic shippers through RbD and it adjusts that as part of the annual AUGE process. Going forward, the unidentified gas reconciliation scaling adjustment will address this inaccuracy.

   When offtake meters are inaccurate, the settlement data input will be inaccurate; however, this is not a performance-based risk.

4.3.2 Controls

The UNC Offtake Arrangements Document provides a set of rules for meter accuracy. All meters should also adhere to the European measuring instruments directive[2], which sets out maximum permissible error for different meter types.

[2] https://www.gov.uk/mid-approved-gas-and-electricity-meters

4.4 LDZ Daily Shrinkage Quantity

The distribution network operators are responsible for forecasting an annual shrinkage quantity which consists of a forecast for leakage, theft of gas and own use gas. Each distribution network operator publishes a report no later than 31st July each year containing information about LDZ shrinkage quantity for the forthcoming formula year April-March. The most significant element of LDZ shrinkage (over 90%) is leakage, which includes leakage from distribution mains and above ground installations as well as damaged mains. The DNOs use the output of the National Leakage Testing programmed completed in 2002/2003 and a series of inputs including forecast mains pipework population, pressure of each network, concentration of a join treatment chemical and any leakage factors to determine the appropriate leakage.

The remaining components make up a small proportion of the overall shrinkage volume. Typically, networks use an estimate of 0.0113% own use gas, which accounts for gas used for pre-heating at compressors. GL Noble Denton published this figure in a report completed in 2002 following the National Leakage testing programme. The proportion of theft of gas attributed to each transporter is determined to be 0.02%, a small proportion of shrinkage quantity.

In 2009 the methodology for calculating shrinkage through low pressure pipes was updated to reflect the changes to leakage a result of the metallic to plastic mains replacement work. As part of the modification process an independent expert from GL Nobel Denton established that the revised leakage calculation would result in the amount of gas allocated to service leakage being reduced by on average 0.54%.

Total LDZ shrinkage forecast is approximately 3,000GWh[3] per annum. Actual input parameters subsequently update the shrinkage calculation; however, the percentages of own use gas and transporter responsible gas theft remains the same.

4.4.1 Risk

3. The shrinkage value is determined using a methodology unchanged since GL Noble Denton set it out in 2002/2003. There is a risk that the method is flawed or out of date and that initial and final shrinkage volumes determined using the model are inaccurate. Settlement allocates errors in shrinkage values to domestic customers via RbD; subsequently the AUGE process will reapportion some of the error.

   Following Nexus go-live any inaccuracy in the shrinkage calculation will be part of the unidentified gas reconciliation scaling adjustment. This creates a risk that settlement data input will be inaccurate.

4.4.2 Controls

The forecast and re-evaluation of shrinkage volume ensures each network calculation uses the most accurate input parameters. The shrinkage rules are set out in UNC Transportation Principals Document Section N. Modifications to these rules have been raised, approved and implemented using the UNC modification process. Additionally, the UNC Shrinkage forum provides an opportunity for interested parties to discuss LDZ shrinkage.

[3] http://www.gasgovernance.co.uk/sf/14-15final

5 Meter Reads

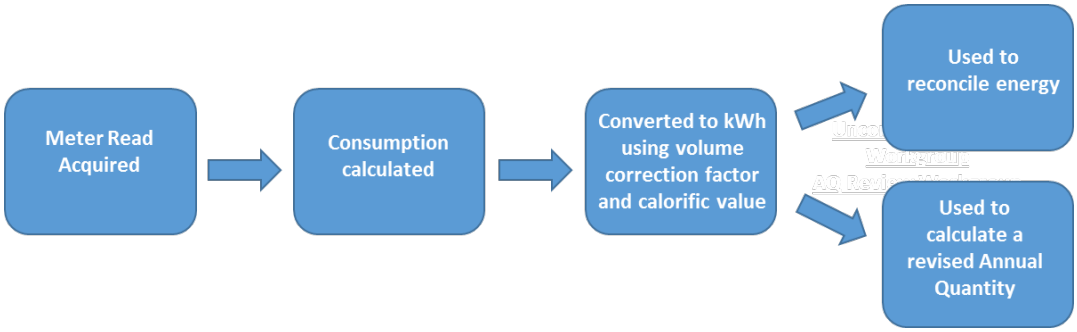
5.1 Overview

Meter readings are the measurements of gas in the system. Accurate meter reads accepted and held on Xoserve's central system are critical to ensuring that AQs closely reflect actual consumption. However, sometimes meter readings have errors, human translation errors when reading the meter are the typical cause, but they can also arise from a variety of processing and data errors.

When a meter reading has been obtained, the next stage of processing will be to determine the meter advance; this is the amount of energy measured since the previous reading. During this process, there are checks to determine if a round the clock indicator is required.

The crucial part of validation is a comparison of the reading (and advance) against an expected value derived from the current AQ and/or SOQ. Two tolerance levels will be applied both with an upper and lower percentages. Both individual shipper and Xoserve's validation then accepts or rejects readings depending on them being consistent or not with the expected values.

Following Project Nexus implementation, all eligible meter reads accepted by Xoserve will instigate individual meter point reconciliation. Those that meet the AQ calculation criteria will be used to generate an AQ reflective of consumption and used in the allocation algorithm from 1st of the following month. The diagram below shows the meter reading lifecycle.



Current UNC processes, Supply Point Register BRD and Meter Read Submission Processing and Settlement Arrangements BRD have provided the basis for the following analysis and risk identification. The table below shows a summary of the Project Nexus meter reading rules below which is documented in the Meter Read Submission Processing and Settlement Arrangement BRD.

Product – Description	Day Ahead Gas Nomination	Process for initial Allocation	Process for Energy Balancing close-out	Read Submission Timescales	Type of Read Submission	Read Submission Performance Target	Read Submission Deadline	Maximum Read Submission	Must Read Trigger	Check Read Obligation
1 – Daily Metered Time Critical Readings	Shipper nominates (singly or in aggregations)	Uses daily read	Uses daily read	By 11am on GFD+1	All reads daily on GFD+1	97.5% daily target	5 calendar days following the read date	N/A	N/A	12 months
2 - Daily Metered not Time Critical Readings	Shipper nominates (singly or in aggregations)	Transporter estimate unless read received before 11.00 am	Uses daily read	By end of GFD+1 (05.59 am)	All reads daily by end of GFD+1	97.5% daily target	5 calendar days following the read date	N/A	4 consecutive months	12 months
3 – Batched Daily Readings	GT Nominates	Allocation processes	Allocation processes	Daily Reads in batches	All reads in batches to an agreed frequency	90% monthly target	Month + 10 calendar days	Daily	4 consecutive months	12 months
4 – Periodic Readings	GT Nominates	Allocation processes	Allocation processes	Periodic	Periodic reads to an agreed frequency	Monthly MRF: 90% per calendar month SSP Annual: 70% in 12 month period LSP Annual: 90% in 12 month period	25 calendar days following the read date	Monthly MRF: 7 days Larger Annual MRF 14 days: Smaller Annual MRF: 25 days	Monthly MRF: 4 consecutive months Annual MRF: 24 consecutive months	12 months for monthly MRF, 24 months for annual MRF

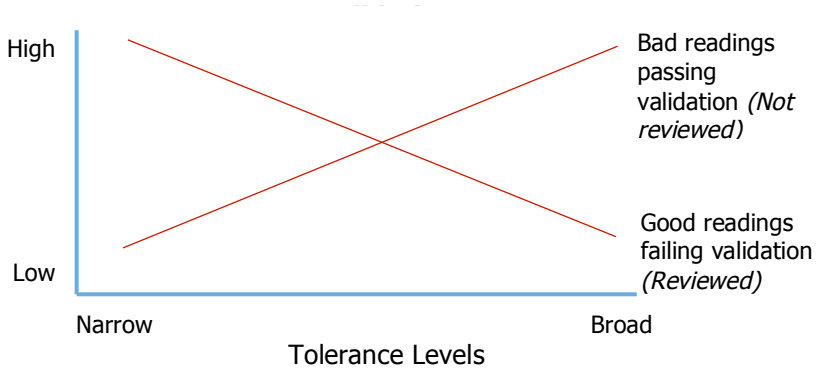
The current supplier is obligated to provide meter readings to Xoserve; however, the supplier discharges the obligation. In most cases, the shipper and supplier will be the same entity. Where they are different entities, the shipper should contractually obtain meter readings from the supplier and nominate the meter points into the relevant product categories. Some of the controls identified are the responsibility of the shipper and others are the responsibility of the supplier, we have not made a distinction between shipper and supplier controls when completing this analysis.

5.2 Meter Reading Validation

Shippers are obligated to validate meter reads obtained in accordance with Uniform Network Code Validation Rules V12. Shippers should not submit readings that fail its own validation. However, where shippers do submit readings that fail, Xoserve validation it should investigate them to determine the cause of the failure and make any necessary corrections.

The level of the tolerances has a material effect on the quality of the validation. If the tolerance is too high, too many poor readings will get into gas settlement whereas if it is too low, too many good readings fail to get into gas settlement. The diagram below illustrates the importance of appropriate read validation tolerances;

Impact of tolerance on Meter Reading



Post Nexus go-live, the read validation tolerances will be changed from one to two levels of meter read validation. The inner tolerance will be a function of the meter point's SOQ. Shippers are required to validate meter readings obtained against this inner tolerance. Where a shipper identifies a meter reading that falls outside this tolerance level but considers it correct, the shipper can flag the read as acceptable. Xoserve will apply market breaker validation to readings the shipper has flagged as acceptable. This market breaker validation uses a percentage of the meter point SOQ as the outer tolerance level. These new meter read tolerances will be based on the meter point SOQ and AQ. Xoserve will replicate the shippers own meter read validation and where reads have been submitted that don't pass these tolerance levels they will reject the read.

When a meter point is in a vacant property and the AQ is set to 1 kWh to reflect zero consumption. It is currently not clear how a suitable read validation tolerance will be applied. When the meter point begins to consume gas again the meter reading will not correlate to an AQ of 1kWh. Currently, there is little incentive for shippers to review meter points with an AQ of 1kWh.

Where a shipper identifies that a meter read has failed validation due to an inaccurate AQ/SOQ held by Xoserve on the supply point register, then it should complete an AQ correction and resubmit the read.

5.2.1 Risk

4. Where inaccurate reads are submitted to Xoserve there is a risk that read validation tolerance levels will allow erroneous reads into the settlement process. This creates an error to final allocation if it is not identified and corrected.

   Where Settlement accepts erroneous reads, unidentified gas reconciliation adjustment will be artificially inflated or deflated. Where shippers submit incorrect reads that have a positive financial impact to their individual NDM allocation, there is less incentive for them to replace the reads than if the financial impact were negative. An inconsistent approach to reading replacement will result in a shipper performance risk.

5. Where the shipper obtains and submits accurate readings that are outside tolerance, there is a risk that settlement will reject these readings. Where the reading fails baseline tolerance checks, the shipper should work through the read rejection file and resubmit the read with a market breaker flag. If the shipper does not resubmit the read, there is a risk that the correct read will not flow through into settlement and a higher risk that subsequent reads will also fail. There are some occasions where the read will fail both levels of tolerance. This is more significant where there is a change in consumption or the AQ is set to 1, where the shipper should complete an AQ correction before resubmitting the read. When correct reads are held by the shipper and not by Xoserve the AQ and allocation will not reflect current consumption.

   An inconsistent approach to working read rejection files will result in a shipper performance risk.

6. The meter read submission rules set out in the BRDs do not prohibit shippers from flagging all reads as exempt from the first level of meter read validation by checking the market breaker flag. This action would make the Xoserve first validation level obsolete and increase the risk of erroneous reads reaching settlement. This would increase the likelihood of performance risk 4 occurring. An inconsistent approach to use of the market breaker flag could be monitored to reduce this shipper performance risk.

7. For daily-metered sites in product 1 and 2, the SOQ and AQ can be set independently. There may be situations where settlement does not accept legitimate daily reads because the SOQ is incorrect and instead settlement uses an estimate reading in place of the actual reading. There is a risk that settlement uses an estimate in place of a legitimate reading. Where a read is not corrected by gas flow day +5 then a consumption adjustment should be processed. Where this causes a financial benefit to the shipper at an individual meter point level there is little incentive to complete a manual consumption adjustment.

   Where settlement uses estimated reads at daily-read sites, this creates a shipper performance risk to energy allocation.

5.2.2 Control

Some shippers and Xoserve have completed analysis to identify appropriate new meter read validation tolerances and a market breaker tolerance. These tolerances continue to be refined to ensure that the maximum number of accurate reads are accepted. Xoserve and shippers are yet to decide on the best tolerances to ensure meter reads for meter points with an AQ of 1 are accepted.

More sophisticated meter-reading validation that considers sets of readings together to identify consistent sets and outlier can improve the validation of meter readings. Shippers should consider such algorithms for their meter reading validation.

5.3 Meter Reading Frequency

From the implementation of Project Nexus, the read frequency will change, with the maximum meter read submissions increasing, dependent on product type. Shippers must submit daily meter reads for products 1 and 2 to Xoserve before 11am. Shippers must send one batch of daily reads each month to Xoserve for any MPRN in product 3. Where reads within this batch are missing then an estimate will be generated which cannot be updated.

Shippers with meter points in product 4 will continue to elect the meter read frequency as monthly or annually. Annually read meter points in product 4 with an AQ <73,200 kWh can submit one meter read once every 25 calendar days. Annually read meter points with an AQ >73,200kWh in product 4 can submit a meter read every 14 days. Monthly read sites in product 4 can submit a read every seven calendar days. Characteristics of each product category are shown in the table in section 5.1

5.3.1 Risk

8. Each product category will result in shippers submitting meter readings at different frequencies. This will result in AQs being recalculated between once per month and once every two years. The variation of meter reading frequency creates a risk that AQs reflect actual consumption to different levels of accuracy. Meter points in product 3 will have an AQ recalculated monthly using reads which are 9 months apart which should be the most accurate reflection of consumption.

   This will create a risk that allocation for meter points in product 4 will less accurately reflect consumption. This creates a settlement rules base risk, which a performance framework cannot address.

9. The Project Nexus rules set out minimum submission frequencies. For annually read meter points in product 4, Shippers must read 70% of sites in 12 months. There is a risk that the 30% of meter points that the shipper does not read continue to be unread year on year. This results in a risk that some meter points do not obtain a read within

the settlement window and reconciliation periods crystallise. Where reconciliation periods crystallise on an estimate the final allocation will not reflect true consumption. This creates a shipper performance risk.

5.3.2 Control

A must read process ensures that the network operator obtains a read where the shipper has failed to for large supply points. Additional Project Nexus controls includes the requirement for shippers to complete check reads on all sites. Whilst regulation is in place to facilitate meter reads at least every two years there are occasions when time between reads is longer. There are currently no penalties where either the transporter or shipper fail to obtain a read in the appropriate timescale. A performance target could be implemented to support this control.

Shippers must continue to adhere to the minimum meter read submission timelines set out in UNC Section M, for annually read sites every 2 years, and monthly read sites every 4 months. Section M sets out the minimum percentage of sites that must have a meter read submitted.

5.4 Maintenance of the Supply Point Register

Xoserve maintain the supply point register on behalf of the large transporters that contains information about all registered meter points. It is the responsibility of both the transporter and the shipper to ensure that the supply point register has correct details of supply points. The supply point register must include the following data items; MPRN, meter postcode, market sector code, product category, supply point registration number and other detailed recorded in the UKLink Manual.

Project Nexus will consolidate information held within the supply point register, adding information about IGT supply points and will remove the need for separate systems to be maintained.

The connections and disconnections (C&D) store contains information submitted by any shipper not only registered user in the prescribed format.

5.4.1 Risk

10. The shipper should update the supply point register using UKLink files so that it contains the latest information about a supply point. There is a risk that the supply point register gets to hold incorrect data. Where the register holds incorrect meter details, meter readings could be treated incorrectly resulting in missing or erroneous data in settlement. This could will result in reconciliation not being processed and AQ not be reflective of consumption.

    Incorrect asset information on the supply point register is principally a shipper performance risk. Where the transporter identifies that there is an error to the supply point register they must liaise with the responsible shipper to ensure it is corrected.

5.4.2 Control

The UNC requires the shipper to update the supply point register within six supply point business days of becoming aware of a change to a meter point. The transporter has a responsibility to inform the registered shipper that an update is required; where the shipper takes no action, the transporter should update the supply point register within five supply point business days. This should ensure that where the shipper or transporter know the correct information, records are kept up to date.

5.5 Temporary and Complex Metering Arrangements

The UNC includes a provision for complex metering. Whilst following Nexus go-live all supply points will be single metered supply points, there will still be provision for temporary meters, meters with bypasses as well as the continuation of existing sub and prime meters.

When a shipper needs to fit a meter by-pass with permission from the gas transporter, it is not possible to establish how much gas the bypass has carried. Bypasses are installed to meter points which cannot have their supply interrupted e.g. hospitals following a meter failure or to facilitate scheduled maintenance. If the bypass is opened, an estimate is provided of the amount of gas which has not been measured.

Sub deduct arrangements are being phased out; however, the historical arrangements will be in place until 1st October 2015. The gas transporter will continue to be responsible for reading prime and sub-meters on behalf of shippers. They should obtain meter readings yearly in and within 5 days of each other on the metering configuration. Following Nexus go-live, the shipper should elect the same product type for sub and prime meters as other meter points within the same configuration.

5.5.1 Risk

11. Where a bypass is fitted to a meter point and opened, it is not possible to determine the exact amount of gas consumed. This creates a risk that allocation to the meter point is does not reflect true consumption. Settlement treats any difference in true consumption within the unidentified gas reconciliation adjustment. This creates a settlement rules based risk to allocation.

12. Transporters must read sub and prime meters must be read within 5 days of each other. This means that the read frequently may be lower than other meters. Also, where one meter is not accessible reconciliation cannot be completed for the complete configuration and an updated AQ will not be calculated. There is a rules based risk that sub and prime meters will have an aged AQ that will not reflect actual consumption. There is a risk that sub and prime meters will remain unreconciled for an extended period of time. This risk could be minimised by the implementation of a transporter performance assurance target.

5.5.2 Control

Project Nexus implementation will disaggregated sub meters and they will become single metered supply points. This will simplify the settlements processes and increase the chance of accurate individual meter point reconciliation for complex meters.

As transporters are responsible for the collection of meter reads for sub and prime meters it would be advisable to incentivise gas transporters to ensure that reads are acquired within the Nexus timescales.

5.6 Change of Supply and Opening Meter Reads

During the change of supplier process the incoming shipper should submit a meter read to Xoserve within the window of 11 supply point business days, 5 before and 6 after the registration date. Currently, this read does not need to pass validation to be used as the closing and opening read.

From 1st October 2015, the shipper should continue to obtain a read during the change of supply window; however, it will be subject to the standard meter read validation rules based on the current AQ and SOQ. The change of supply process is currently documented in the UNC

section, Supply Point Administration Agreement and the gas supply license. If the shipper does not obtain a read within the window, they should produce an estimated read for the transfer date. Where the shipper fails to provide any reading, the transporter will provide an estimate 16 supply point business days following the transfer date. Settlement cannot accept subsequent meter readings until a meter read has been loaded for the transfer date. The shipper should elect a product category and meter read frequency for each MPRN on change of supply.

The shipper agreed reads (SAR) process will continue post Project Nexus implementation which should be used when an estimated transfer read has been loaded and is subsequently found to be inaccurate. Both the incoming and outgoing shipper should agree a read replacement that the incoming shipper should submit. Currently, Xoserve reject a high proportion of SARs; however, due to the reconciliation by difference mechanism there is no material impact to settlement. It is unclear following Project Nexus implementation whether Xoserve will reject SARs when the shipper submits subsequent reads. At present only LSP transfer reads have the potential to create an energy misallocation between shippers. The I&C CoP is currently in place to provide a mechanism for shippers to claim incorrectly reconciled energy back from other I&C shippers.

5.6.1 Risk

13. Where a change of supply is completed using an estimate transfer read, the closed reconciliation period of the previous supplier will end on an estimate. The new reconciliation period will begin on an estimate. An estimated meter reading could be used because no actual reading was obtained or the actual transfer read was rejected due to data discrepancies or because it failed validation tolerances due to an incorrect AQ.

    The transfer read may not reflect reality and the final allocation of energy to each shipper may be incorrect which has a higher impact if billing systems do not align with this. The misallocation will be between the two shippers who have been responsible for the meter point. In order to correct the misallocation, the shippers should agree a SAR for the incoming shipper to submit. Xoserve should accept this SAR. It is a shipper performance risk that the incoming supplier does not send in the revised meter reading. There is a rules based risk that Xoserve does not accept the SARs.

    Erroneous transfers will cause a risk that energy will not be allocated to the correct shipper who is billing the customers. This risk is extended from the current arrangements as a settlement misallocation is created where the shipper settling energy for a meter point does not match the shipper billing the customer.

5.6.2 Control

The rules and regulations governing the change of supply process are set out in the UNC, SPAA and supply license. Where there are settlements discrepancies for I&C sites created by this process they can be resolved through the Industrial and Commercial Code of Practise.

Where settlement has accepted incorrect reads, shippers can use the SARs process to correct the change of supplier reading and any subsequent reconciliation of energy.

5.7 New Meter Points, Isolations and Meter Exchanges, Opening and closing meter reads.

New Meter Points

New meter points are added to the gas network as they are created. Domestic properties are allocated an AQ that is taken from the CSEP Nexa table according to property size. Following registration new sites should have a subsequent read 1-12 months following registration date. This read can only be used in the AQ calculation if it shows nine months consumption. It is likely that consumption will fluctuate during the building and selling phase of a development, following registration. The accurate tracking of meter assets and their corresponding reads impacts the initial allocation process. Individual meter point reconciliations will ensure that the total volume of energy reconciled is correct; however, for new meter points in product 4 the volume of energy will not be profiled accurately as the profile is unlikely to follow a typical household consumption. I&C sites are likely to have more frequent reads submitted and an increased reconciliation profile.

Isolations

At the end of a meter point lifecycle, the isolation and withdrawal process should be completed where a gas supply is no longer required. Isolation of a meter point will change the property status from live to dead and settlement will no longer allocate energy to the meter point. When a meter point is isolated, the registered shipper should obtain a meter reading and the meter point status should move from live to dead.

Meter Exchanges

The Project Nexus settlement regime relies on holding a complete consumption history for meter points. When a meter exchange takes place, it is important that the shipper obtains the correct closing and opening readings and submits them to Xoserve for use within the reconciliation process. The closing reading can be used to recalculate the AQ.

5.7.1 Risk

14. As new meter points are unlikely to follow a typical consumption profile, there is a risk that meter points in Product 4 will not have energy allocated to the correct day. Any under or over allocation will be absorbed by the unidentified gas reconciliation adjustment. This causes a settlement data input risk that the both the initial allocation and subsequent reconciliation will be inaccurately allocated.

15. Changes to supply point meters and statuses must be updated on the supply point register. Where the shipper does not update the status, the total aggregate shipper AQ will not be correct. Also a risk that sites resume consuming gas while being classified as 'isolated'. This will cause the initial allocation to be incorrect and will make it difficult for settlement reconciliation volume to flow automatically.

    This creates a shipper based performance risk that energy allocation will not be correct.

16. When a meter exchange occurs, it is necessary that the opening and closing meter reads are updated on the supply point register. If the shipper does not obtain the correct opening and closing reads or Xoserve does not accept them, then the reconciliation and AQ calculations will not be correct. The allocation of energy between shippers will not be correct. This creates a shipper performance based risk.

Control

UNC procedures are in place to ensure meter points are correctly registered and de-registered. Where meter readings and meter point statuses are not set correctly there is a corresponding impact on energy allocation.

5.8 Check Reads and Resynchronisation

Currently the distribution network operator completes check reads at daily-metered sites every 12 months and they are advisable at a change of supply. Check reads are required to establish whether metering drift has occurred (i.e. the meter's clock has drifted). Settlement will profile errors in energy measure resulting from metering drift in accordance with its consumption profile.

From 1st October 2015, there will be a new obligation on shippers to complete check reads for all sites with the following frequency;

- Product 1,2,3 – 12 monthly check reads
- Monthly read product 4 - every 12 months
- Annually read product 4 - every 24 months

The existing profiling process will be extended to cover all product and meter types. Drift will be profiled over the period since the last check read.

5.8.1 Risk

17. Check reads will establish whether there is any metering drift. It cannot establish when metering drift started. Settlement will profile any energy correction needed using standard consumption profile, between the check read and the current date and therefore there is a risk that the profile of energy will be inaccurate. Any over or under allocation following volume reconciliation will be picked up in the unidentified gas reconciliation adjustment. This creates a settlement data input risk.

18. It is the shipper's responsibility to ensure that check reads are completed on time. Late check reads may cause an extended period of inaccurate initial allocation and any drift will be allocated over an extended period. This creates a performance-based risk.

5.8.2 Control

The gas transporter will notify the relevant shipper that a check read is required one month before the due date. A performance-based target could be implemented to provide additional assurance that shippers carry out check reads within the timescales set out in the BRDs.

5.9 Meter Read Revision

Currently, shippers may replace readings for LSP sites where they are the current shipper. Shippers can replace daily-metered readings following an estimate for up to five days after the gas flow day. Replacement reads would be required where the daily metering telemetry equipment or AMR device has failed.

Replacement read rules are documented in the "Meter Read Submission Processing and Settlement arrangement" and in the "Retrospective updates" BRDs. From 1st October 2015, Shippers can replace readings for daily-read sites in product 1 and 2 up to five days following the consumption date, after which they must process consumption adjustments. The UNC permits Product 3 and product 4 read replacements for actual reads, re-syncs, transfer reads,

meter installations, isolations, or removal reads. Where the shipper fail to label replacement readings correctly, Xoserve will reject them as a duplicate reading.

5.9.1 Risk

19. If a consumption adjustment is required for a meter point in product 1 or 2 and the volume adjusted is not favourable to the shipper, there is a disincentive to complete the manual adjustment. This creates a risk that consumption periods remain inaccurate where more up to date information is available. Shipper allocation inaccuracy would cause unidentified gas reconciliation adjustment to be inaccurate. Estimated daily reads cause an allocation inaccuracy that is a shipper performance risk. The number of daily estimates used by shippers could be minimised through performance targets.

20. For meter points in product 3, reads cannot be inserted in reconciled periods to correct misallocation between days. It is possible for a batch of daily reads to be submitted and two reads to be submitted, the reads submitted would be used to generate daily estimates over a typical profile. There is a risk that the profile used did not reflect the consumption of the meter point and allocation between days would not be correct. Any misallocation between days would be absorbed in the unidentified gas reconciliation adjustment. Which would affect the accuracy of the profile. This would create a rules based risk.

5.9.2 Control

Xoserve will use logic checks to approve consumption adjustments.

5.10 Shipperless and Unregistered Sites

Meter points can remain unread for an extended period due being shipperless or unregistered. Where there is no shipper responsible for a meter point no metering agent will be appointed.

The UNC unconfirmed sites workgroup investigate shipperless and unregistered sites. The unconfirmed sites workgroup has identified that there are approximately 22,200 shipperless and unregistered sites that they suspected are taking gas. A further 75k sites have been withdrawn from or are new connections and so are deemed to be legitimately unregistered meter points.

Currently, settlement rules allocate this energy to RbD shippers and an adjustment is processed through the AUGE. From 1st October, settlement rules will allocate the energy using the unallocated gas reconciliation adjustment to the whole market in accordance to a shipper's market share over the last 12 months.

5.10.1 Risk

21. Meter points not held on the supply point register will not have an AQ for settlement purposes and therefore no gas consumption allocated. This creates a risk that settlement rules allocate any energy consumed by these meter points to all shippers according to their market share in the last 12 months via the unidentified gas reconciliation adjustment. There is a performance risk that a shipper fails to register a meter point and the meter point becomes shipperless or unregistered. This risk also affects the settlement data input accuracy.

5.10.2 Control

The UNC unconfirmed sites workgroup works to minimise the number of new shipperless and unregistered sites. This provides monitoring of the industry situation; however, performance based monitoring could be implemented to provide assurance that the code is being upheld.

5.11 Meter Reading Accuracy

Meter readings from consumer meter points can be inaccurate due to theft, faulty meters, or general systemic calibration of the meter. Currently, the RbD reconciliation mechanism picks up theft of gas at meter point level, initially allocating it to SSP shippers and reallocating using the AUGE adjustment. From 1st October 2015, settlement rules will allocate it to the unidentified gas scaling adjustment.

Systemic meter calibration error will vary dependent on meter type. Typically, a meter will be at its most accurate when the throughput is at the average of the capacity of the meter. Throughput that is significantly lower or higher than the intended capacity of the meter will be the most inaccurate, and should a shipper not upgrade their meter to match the consumption of the customer the throughput is likely to be inaccurate. The Measuring Instrument Directive allows for the meter to measure with an inaccuracy of +/-3%.

5.11.1 Risk

22. There is a risk that domestic and I&C meters do not all read to the same level of accuracy. Where a shipper's portfolio has a systemic meter inaccuracy, which is higher or lower than average accuracy, the inaccuracy will be absorbed by the unidentified gas reconciliation adjustment. There is a risk to accurate allocation amongst shippers if the error in metering equipment is more prevalent in one shipper's portfolio. This will create a settlements data input risk.

23. Where theft of gas occurs, the meter readings will be inaccurate. The amount of gas stolen will not be identified and will be allocated to the unidentified gas reconciliation adjustment. The energy will be allocated evenly across all market segments, which may not reflect the market segment or product category where the theft occurred. Shippers are not incentivised to identify instances of theft of gas and could be incentivised through a performance regime to optimise theft of gas detection.

24. From time to time meters become faulty. Where a meter is faulty, the measured consumption is inaccurate. When a shipper identified a meter as faulty, it must populate the faulty meter flag within the supply point register and it will be exempt from reconciliation. When the meter is repaired or replaced the supply point register must be updated again. There is a risk that the supply point register is not updated with information about faulty meters. This will create a risk that reconciliation volume and AQ calculations will not be accurate and any inaccuracy will be allocated to the unidentified gas reconciliation adjustment. The shipper with the faulty meter will be under or over allocated energy and the opposite cost will be allocated to all shippers in accordance to their AQ market share. This creates a shipper performance risk that a performance metric could manage.

5.11.2 Control

All meters should be compliant with the Measuring Instruments Directive. The Measuring Instruments Directive includes an in service testing procedure that shippers should be follow. As part of the MID the National Measurements Office requires asset owners to provide test samples to ensure that meters perform to the accepted standards.

A theft of gas risk assessment service (TRAS) will be established in 2016 that will further incentivise shippers to identify and tackle theft and aims to reduce the impact of theft of gas on the industry.

5.12 Accuracy of the Volume Correction Factor

Gas in the UK system is measured in volume (M^3) and converted into energy (kWh). At domestic and I&C meter points gas volume is converted into kWh using a volume correction factor and calorific value (CV). These factors take into account temperature and pressure to determine volume changes and the energy content of the gas. Calorific value is set daily for each LDZ. There is currently one averaged national volume correction factor which is used for all meter points with an annual quantity of <732,000kWh. Meter points with a consumption greater than 732,000 kWh have a unique volume correction factor, taking into account temperature and pressure at the location of the supply point.

Ofgem recently commissioned a study[4] to assess the impacts of using a national volume correction factor on domestic customers rather than a site-specific volume correction factor. The study concluded that the accuracy of the volume correction factor is broadly in line with the accuracy of meters themselves. However, it did highlight that there is an acceptable systemic average error of -0.238%, meaning that the majority of sites with an AQ<732,000 kWh are under billed.

With the current settlement arrangements this average under billing of gas, flows through into RbD and is subsequently allocated to supply points with an AQ <73,200kWh. This creates an under allocation of -0.238% to most sites with an AQ between 73,200kWh and 732,000kWh.

5.12.1 Risk

Pre Nexus

There is an under-billing of all supply points that have an AQ of between 73,200kWh-732,000kWh; this changes following Project Nexus implementation.

Post Nexus

25. There is a risk that the average under billing of meter points with an AQ <732,000kWh results in an additional 0.238% of energy falling into the unidentified gas reconciliation scaling adjustment. As this percentage is averaged under billing, some meter points will be over or correctly billed. This energy will be spread equally across all meter points resulting in meter points with and AQ >732,000kWh being over allocated a proportion of the energy which shouldn't be attributed to this market segment. This creates an accepted rules based input error.

5.12.2 Controls

Thermal energy regulations provide the control to minimise any impact of misallocation. Ofgem ensure that this risk kept to a tolerable level.

[4] Ofgem report on volume correction factor and CV https://www.ofgem.gov.uk/ofgem-publications/89465/cvopenletter210814.pdf

6 Energy Allocation

6.1 Overview

Currently, settlement splits initial allocation by the daily metered and non-daily metered markets. For the daily-metered meter points, nominations are required to be recorded in Gemini, National Grid's demand system. Transporters gain meter readings for all daily read sites before 10am following the gas flow day. So these sites can have the exact amount of consumed energy allocated to them the NDM market allocation uses the following formula;

Supply Point Demand= ((AQ/365) x ALP) x (1+[WCF x DAF] x SF

Where;

ALP = Annual load profile

WCF = weather correction factor

DAF = Daily adjustment factor

SF = Scaling factor

The scaling factor is determined on a daily basis in order to make sure the algorithm is consistent with the total throughput.

Following Nexus go-live, the initial allocation process will change. Nexus implements a new NDM allocation algorithm that will not use a scaling factor. The UNC Demand Estimation Sub-Committee is designing this new algorithm. Any algorithm inaccuracy currently picked up through the scaling factor will be incorporated into the unidentified gas reconciliation adjustment.

For meter points in product 1 and 2 initial meter read acceptance between the end of the gas day and gas flow day +5 will be used to determine settlement allocation. AQs, daily adjustment factors, and weather correction factor will be used to determine the daily supply point demand for meter points in products 3 and 4. Initial settlement allocation will be most accurate where the AQ is most reflective of meter point consumption.

Following the acceptance of a meter reading and provided reads are 9 months apart the following formula determines to determine the meter point AQ:

$AQ = RMQ \times (365 / SUM (ALP_t \times (1+DAF_t \times EWCF_t))$

Where;

RMQ = relative metered quantity

ALP_t = Annual Load Profile

DAF_t = Daily adjustment factor

$EWCF_t$ = Estimated weather correction factor

6.2 Annual Quantity

Following Nexus go-live, AQs will be either be updated monthly following the submission and acceptance of meter reads for Product 1, 2 and 3, or on an ad-hoc basis following the acceptance of a periodic read where the meter point is in Product 4, following an AQ correction request or at change of supply. Cyclic reads, transfer reads including SARS, check reads, must reads and meter removal readings will all be used to revise the AQ. For an AQ to be calculated meter readings used in the calculation process must be 9 months apart.

An AQ correction process will be implemented from 1st October 2015 and shippers should use this when reads are submitted that fail tolerances but are legitimate. It is anticipated that this process will be used following theft of gas, new sites, and meter exchanges.

Winter consumption profiles will still be required to calculated the correct winter annual ratio (WAR) band for sites with a consumption of >293,000 kWh. These ratios determine a meter point's sensitivity to weather changes during the winter months. A start read is required between 1st November and 31st December and an end read is needed between 1st March and 31st April. Winter consumption profiles ensure that a bespoke profile applies for sites during winter. As more of these sites are allocated to product 3, the requirement for a winter consumption profile will reduce, as they will be allocated gas based on actual daily reads. In 2013, a maximum of 8% of eligible sites had a calculated WAR band, suggesting that current profiling contains inaccuracy due to shippers not gaining the required reads.

6.2.1 Risk

26. Following meter read acceptance a revised AQ will be calculated. These AQs may not be reflective of true consumption. Additionally, incorrect AQs could be migrated from the current UK Link system. AQs that do not reflect accurate consumption will cause an incorrect amount of initial energy to be allocated to the shipper. The difference between initial allocation and actual consumption will be allocated to the unidentified gas reconciliation adjustment.

    Inaccurate AQs create a shipper performance based risk. AQ values can be updated using the AQ correction process. To avoid a shipper gaining an unfair advantage a consistent approach to AQ corrections should be implemented. Performance targets could be used to manage this risk.

27. AQ vary in accuracy dependent on recalculation frequency and product selection. The AQ of meter points in product 1, 2 and 3 that are calculated monthly are likely to closely reflect actual consumption. Shippers with meter points allocated to product 1-3 will be allocated initial energy consumption that is closer to actual consumption. Shippers with a higher percentage of meter points in product 4 are likely to be allocation initial consumption which will be less accurate. All shippers will pick up the cost of inaccuracies in product 4 through the unidentified gas reconciliation adjustment. This creates a timing risk that falls within the Nexus settlement rules.

28. AQs remain uncalculated for one of the following reasons;

    - The meter point is registered as dead/extinct;
    - The meter point is unregistered;
    - AQs are equal to 1 and remain uncalculated, as the readings fail validation;
    - There are insufficient meter reads or meter reads do not adhere to the time constraints;
    - The supply point is live for less than 9 months;
    - Supply point history not continuous over relevant period which creates a consumption gap or there is an overlap of non-consumption;
    - Legitimate meter reads are rejected and no consumption is calculated; and
    - Sub and prime meters do not have reads for all sites within 5 days of each other.

A shipper who has meter points with AQs which are uncalculated is likely to be allocated energy which doesn't reflect consumption. Any difference in allocation and consumption is allocated to the unidentified gas reconciliation adjustment. This is a rules based risk. Performance targets can only manage the associated risk of not obtaining sufficient meter readings.

29. WAR bands are used to determine the winter profile of a site with an AQ > 273,000kWh. If the shipper does not get meter readings for Nov/Dec and Mar/Apr, a WAR band is not calculated. Any I&C meter point with a qualifying AQ will not have a bespoke profile. This will result in shippers' daily profile of energy being incorrect. Settlement incorporates any differences into the unidentified gas reconciliation adjustment and allocates it to all shippers in accordance to their market share. This causes a shipper profiling performance risk and a performance assurance metric could manage this risk.

30. The implementation of UNC Modification 432 introduces a discrete AQ recalculation process with updated AQs becoming live for allocation purposes on first day of every month. This will create a step change in aggregate AQs on the first day of every month. This will create a step change in initial allocation amongst shippers every month. This will mean there are some allocation inaccuracies; however they will be resolved following individual meter point reconciliation.

6.2.2 Control

A check read obligation will be imposed on shippers so they will be required to ensure that a read is obtained at least every 24 months dependent on product type. This should minimise the number of aged AQs; however, there typically remains a population of sites that remain unread for an extended period. Only reads that pass tolerance checks will be used within the AQ calculation, estimates will be not be used.

Where a shipper identifies an AQ is incorrect, the AQ corrections process is in place to allow shippers to update AQs. Xoserve will validate the AQ correction request ensuring that the correction is required and a pair of meter readings are provided that adhere to the AQ calculation timescales.

Xoserve currently oversee the AQ review process. They identify groups of sites which will not have a revised AQ and report back to the industry between January and March yearly, through the AQ forum. The AQ review forum provides a mechanism for shippers and Xoserve to raise concerns and agree approaches to uncalculated AQs. Additionally, Xoserve sense check the proposed AQs to ensure that significantly high AQs are not activated in September. It is our understanding that this level of control will not be applied to the monthly AQ revision process following Nexus go-live.

6.3 Profiling

Settlement uses daily consumption profiles to allocate energy between days. Daily consumption profiles are unique to each end user category (EUC) and LDZ. These profiles take into account consumption thresholds, annual load profiles, and weather sensitivity. A sample of NDM supply points is used to construct each profile, which can be revised through the UNC Demand Estimation Sub-Committee. Following Nexus go-live the profile of meter points in Product 1-3 will be less important as reconciliation will be completed in accordance to daily reads. Meter points in product 4 will continue to be reliant on an accurate profile.

6.3.1 Risk

31. For meter points in product 4 where a shippers portfolio does not mirror the consumption profile of the population sampled the shippers allocation will not reflect the true consumption of its customers. Any daily misallocation will be allocated to the unidentified gas reconciliation adjustment. This is a risk to settlement data input.

6.3.2 Control

With the mandated rollout of AMR and smart metering, more data will be available and the allocation algorithm and profiling can be refined through the UNC Demand Estimation Sub-Committee. As more AMR and smart meters are installed, sites will migrate to product 3 and whilst there may be inaccuracies in initial allocation, this should be reconciled in the following month.

7 Reconciliation Process

7.1 Overview

Following the implementation of Project Nexus, all meter points will be reconciled individually when Shippers submit valid meter reads. This will help to ensure that settlement allocates energy to the right sector. The new process will allow re-reconciliation where shippers replace readings to update the reconciliation. Each individual reconciliation or re-reconciliation volume will be calculated using CV values by LDZ. The following reads will be used to reconcile energy; customer reads, meter reader reads, must reads, transfer reads, check reads, re-syncs and meter removal reads. Reconciliation will not use estimated readings, except for change of supply processes. In each case for all reconciliations a reconciliation factor will be calculated as follows;

Reconciliation Factor = Actual Volume / Allocated Volume

Reconciliation Energy = Reconciliation Factor x allocated energy = Actual Energy

The role of the AUGE, who currently re-assess the fair allocation of energy and reapportion it to the correct market segments, will change. The Project Nexus business requirements documents currently allocate all unallocated energy evenly among supply points by the unallocated gas-scaling factor. There is currently no requirement for an independent expert to assess this allocation on an annual basis.

7.2 Individual Meter Point Reconciliation

Individual meter point reconciliation for daily-metered sites in product 1 and 2 will occur when a shipper submits an actual read following an estimated read. For sites in product 3, individual reconciliation will occur for each gas day up to and including the date of the last reading. Where reads are missing within the reconciliation period of between 36-48 months, an estimate will be inserted and cannot be replaced. For meter points in product 4, reconciliation will be processed for sites following an accepted read.

When all the monthly reconciliation volume has been derived the unidentified gas reconciliation adjustment can be calculated. The unidentified gas reconciliations are shared out across the preceding 12 month shares of latest consumption.

7.2.1 Risk

32. Some meter points will be partly reconciled and others will not be reconciled at all. Where there are gaps in consumption history, meter points will not be fully reconciled. Where Xoserve does not accept meter readings, reconciliation will not be processed. When the reconciliation window of 36-48 months elapses, the initial allocation will become firm. This will mean that any energy incorrectly allocated to the shipper will be crystallised. Any error in consumption between the AQ and actual usage will be permanently absorbed by the unidentified gas reconciliation adjustment. Fully unreconciled MPRNs create a settlement performance based risk.

    Meter points with historical consumption periods that are partly reconciled create a rules based risk. To correct partly reconciled periods, shippers should process consumption adjustments. This rules based risk could be minimised by monitoring and incentivising shipper performance when completing consumption adjustments.

33. If erroneous reads or estimated reads are used to reconcile meter points, the final energy allocation will not reflect true consumption. Estimated reads will be used for reconciliation purposes when a change of supply has occurred and no actual transfer

read has been loaded. Any misallocation will be incorporated into the unidentified gas reconciliation adjustment. This creates a shipper driven performance risk.

7.2.2 Control

Xoserve will review reconciliation values to identify if corrective action is required. Xoserve may suppress some values and trigger a re-reconciliation where required.

UNC Modification 429 provides the opportunity to correct historical and erroneous reconciliation.

7.3 Ad-hoc Reconciliation/ Consumption Adjustments

Consumption adjustments will need to be processed where a daily meter read error has occurred, where a meter has been fitted with a by-pass, and where a faulty asset has been determined.

It is not clear how this consumption adjustments will be completed and whether this will be a manual process.

7.3.1 Risk

34. Where an estimate of the energy used by a meter point is determined following an extra ordinary event, shippers should process a consumption adjustment. There is a risk that this will not be instigated when it should be. Shippers will have different processes to address manual consumption adjustments. There creates a risk that the energy is not allocated correctly to the period when the energy was incurred. If the process is manual, accurate settlement will be reliant on shipper activity and will create a shipper performance based risk.

7.3.2 Control

The consumption adjustment must pass logic checks and validation for the adjustment to be permitted.

7.4 Unidentified Gas Reconciliation Adjustment

Following Nexus go-live, the settlement rules will allocate the unidentified gas reconciliation adjustment to all sites in accordance to their average market share over the last 12 months. The unidentified gas will be calculated as;

(Actual LDZ Offtake- Total LDZ site level consumption)/Total LDZ site level consumption

This new process moves the risks from SSP shippers through the current RbD allocation process to the whole of the market. As the unidentified gas reconciliation adjustment does not mirror the reconciliation window, there is inherent error in the allocation of unidentified gas.

7.4.1 Risk

35. Currently the AUGE process is in place to provide an estimate of the amount of unallocated gas that should be allocated to different sizes of consumer. The Nexus approach allocates all unidentified gas to shippers based on market share. There is a risk that fair allocation between end user categories is not achieved without an AUGE as consumers with different usage profiles, types of meter and types of connection should be allocated a different proportion of unidentified gas. For example, meter accuracy is different for larger consumers and the propensity for theft would differ from domestic meter points. This creates a rules based risk that the settlement volume allocated to each EUC does not reflect reality.

36. The unidentified scaling adjustment is allocated to shippers dependent on the last 12 months of consumption, which doesn't match the reconciliation window. There is a risk that if the shipper grows its market share they will be under allocated a proportion of unidentified gas, however if a shipper shrinks its customer base it will be over allocated a proportion of unidentified gas. This creates a settlement rules based risk to shipper allocation.

7.4.2 Control

No identified control.

7.5 Retrospective Updates

Currently UK Link system constraints limit retrospective updates. Following the implementation of Project Nexus, settlement will process financial adjustments following an asset update for the current shipper. Where a financial adjustment affects the previous shipper these will be processed at the request of that shipper. Following retrospective updates the unallocated gas reconciliation adjustment will be updated.

7.5.1 Risk

37. Retrospective updates involves complex processes with significant numbers of touch points where errors can be incorporated. There is a risk that retrospective updates create incomplete reconciliation periods or impact the AQ calculation. Errors arising from retrospective updates could impact the accuracy of reconciliation and the initial allocation. The incorrect use of the retrospective updates process creates a performance risk. Settlements performance could be optimised by monitoring the correct use of the retrospective updates process, by measuring the number of filed update requests.

7.5.2 Control

For a retrospective update to be processed shippers must validate the data submitted. The gas transporter will then also complete further validation and any recalculated consumption must be subjected to market breaker validation.

8 Conclusion

8.1 Summary of Risks

The report has identified 37 specific risks to gas throughput or fair allocation of gas between shippers.

A complete list of the risks is appended to this report and they have been categorised as;

- Risk to settlement data input, which will affect the total allocation accuracy to shippers in a perfect settlements scenario;
- Risk to accurate allocation which have been created by extension of the current settlement rules or implementation of new rules. These risks identified are where rules limit accurate allocation between shippers; and
- Risk to accurate allocation caused by shipper or transporter performance.

The dynamic model will simulate market conditions following Nexus go-live and will include settlement data input inaccuracies within the input values. The dynamic model will illustrate a gas market using the proposed settlement rules. Rules based risks to settlement allocation will not be evaluated within the model.

The settlement data input risks to be reflected in the model are as follows:

- Systemic risk to total LDZ measurement inaccuracy as a result of;
  - Offtake meter errors;
  - Offtake meter accuracy; and
  - LDZ shrinkage calculation
- Risk to accuracy of meters at individual customers meter points which is not identified;
- Accuracy of meter measurements as a result of metering drift;
- Accuracy of the volume correction factor; and
- Inaccuracy of the number of meter points held on the supply point register from;
  - New supply point registrations; and
  - Shipperless and unregistered sites.

The following performance based settlement risks will be quantified using the dynamic model and are summarised as follows;

a. The risk of offtake measurement errors being identified and impacting the accuracy of shipper energy allocation which is classified as a transporter performance risk;

b. The risk of inaccurate meter reading being accepted by Xoserve and subsequently used in the settlement allocation process or inaccurate reads being rejected, which have been identified as a shipper performance risks;

c. Overuse of the market breaker flag, compromising accurate settlement which has been identified as a shipper performance risk;

d. The use of estimated reads on daily read sites which compromises accurate settlement and subsequent use of consumption adjustment has been identified as a shipper performance risk;

e. Over use of read replacement and re-reconciliation is a shipper based performance risks shippers should ensure reads are correct first time;

f. The risk of infrequent meter reading submission creates a shipper performance risk;

g. Lack of maintenance of the supply point register creates a shipper and transporter performance risk as both parties are responsible for ensuring information is correct;

h. Overuse of estimated reads at change of supply creates a shipper performance risk to accurate allocation;

i. Failure to completed check reads in accordance with the Nexus rules creates a shipper based performance risk;

j. Shipperless and unregistered sites create an energy misallocation which is partly systemic of the rules but is also partly a shipper performance risk;

k. Lack of identification and accurate recording of theft of gas creates a shipper performance risk to accurate allocation;

l. Inaccurate maintenance of faulty meters creates a shipper based performance risk;

m. Lack of maintenance of AQs through the AQ correction process and risk of uncalculated AQs causes a shipper based performance risk;

n. The lack of maintenance of winter annualised ratios is a shipper performance risks that causes misallocation between meter points; and

o. Shipper errors created using the retrospective updates process is a shipper based performance risk that may result in the supply point register being incorrect.

The PAW and Ofgem will be able to use the model to determine the most appropriate level of performance targets to provide an acceptable level of performance risk.

9 Appendix

9.1 Matrix of all Risks

Risk No.	Risk Description	Type of Risk
1.	Offtake measurement error Risk that offtake meters develop an error, which causes the reading to be inaccurate.	Data input risk/ Transporter performance risk
2.	Offtake meter accuracy The systemic accuracy error that offtake meters under or over record volume throughput.	Data input risk
3.	LDZ Shrinkage calculation error Inaccuracy in the final shrinkage calculation using the methodology set out following the National Leakage Testing Programme.	Data input risk
4.	Inaccurate meter reads accepted by Xoserve Read are not correct that pass validation tolerances and are subsequently used in settlement.	Shipper performance risk
5.	Accurate meter reads are not accepted by Xoserve Accurate reads fail validation tolerances and are not used in settlement processes.	Settlement rules risk/ Shipper performance risk
6.	Over use of market breaker flag Shippers may not complete two levels of validation and submit all reads with a market breaker flag increasing the likelihood of risk 4 occurring.	Shipper performance risk
7.	Estimated reads used for daily metered sites Where estimated are initially used the profile and allocation will be inaccurate.	Shipper performance risk
8.	Meter read submission frequency Determines the how accurately AQs reflect consumption. Timing differences will create a risk of misallocation among shippers.	Settlement rules risk/ Shipper performance risk
9.	Impact of minimum submission frequency on settlement accuracy Where a shipper fails to provide an acceptable read for sites which are hard to access, there is a risk of unread sites creates incomplete reconciliation.	Shipper performance risk
10.	Maintenance of supply point register The supply point register must contain accurate information, where there are inaccuracies there is a risk settlement processes will not be continuous.	Shipper performance risk/ Transporter performance risk
11.	Complex metering consumption There is a risk that allocation to complex sites is unknown.	Settlement rules based risk
12.	Sub and prime Meters	Settlement rules based risk

	Subs and primes create a risk that AQ and reconciliation is aged.	
13.	Use of estimated change of supply reads Estimated readings will create incorrect periods of reconciliation.	Settlement rules based risk / Shipper performance risk
14.	New meter points Create a risk that the supply point register may be inaccurate.	Data input risk
15.	Changes to supply point statuses Create a risk that the supply point register may be inaccurate.	Shipper performance risk
16.	Meter exchanges Create a risk that the supply point register may be inaccurate.	Shipper performance risk
17	Meter point drift Causes a risk that reconciliation will not be allocated to the correct gas flow day.	Data input risk
18.	Completion of check reads Where check reads are not completed there is a risk that meters are under or over reading for an extended period of time which will impact allocation accuracy.	Shipper performance risk
19	Product 1 & 2 consumption adjustment This is a manual process which must be completed to ensure correct allocation.	Shipper performance risk
20.	Product 3 missing meter reads Creates a risk of misallocation between gas flow days.	Settlement rules based risk
21.	Shipperless and Unregistered sites Risk that all energy consumed by these sites will be incorporated into the unidentified gas reconciliation adjustment.	Data input risk/ Shipper performance risk
22.	Systemic meter error There is a risk that measured consumption at individual meter points carries a systemic inaccuracy.	Data input risk
23.	Theft of gas Risk that the majority of energy consumed by these sites will be incorporated into the unidentified gas reconciliation adjustment.	Shipper performance risk
24.	Maintenance of faulty meters Where meters are faulty there is a risk to correct reconciliation of energy and maintenance of the supply point register,	Shipper performance risk
25.	Accuracy of volume correction factor There is a systemic under billing of customers with a consumption of <732,000kWh AQ which affects the total allocation to each EUC.	Data input risk

26	Inaccurately calculated AQs Inaccurately calculated AQs will cause a misallocation of energy. Use of AQ correction process To reduce the impact of incorrectly calculated AQs shippers must used the AQ correction process.	Settlement rules based risk Shipper performance risk
27.	Frequency of AQ recalculation This causes a risk that the AQs will be calculated at different times and some will be more reflective of consumption than others.	Settlement rules based risk
28.	Uncalculated AQs Uncalculated AQs cause an initial allocation risk.	Settlement rules based risk/ Shipper performance risk
29.	Lack of WAR calculation This causes a profiling risk which affects the accuracy of daily gas allocation for sites with an AQ >293,000kWh and are in product 4.	Shipper performance risk
30.	Step change in AQs on 1st day of the month This causes a monthly risk to correct initial allocation.	Settlement rules based risk
31.	Energy allocation profiles do not reflect actual consumption This creates a risk that profile inaccuracies affect accurate daily allocation between shippers.	Settlement rules based risk
32.	Unreconciled/partly reconciled meter points Create a risk that there are periods of unreconciled energy that will never be correct.	Settlement rules based risk
33.	Reconciliation is completed using erroneous reads This risk should be minimised by the appropriate use of the read replacement and reconciliation processes	Shipper performance risk
34.	Consumption adjustments Must be manually completed to ensure allocation is correct. There is a risk that shippers are not incentivised to complete this correct allocation.	Shipper performance risk
35.	Unidentified gas reconciliation adjustment Creates a risk that unidentified gas will not be allocated to the correct market segment.	Settlement rules based risk
36.	Unidentified gas reconciliation adjustment profile Creates a risk that it is not allocated to the correct shipper the adjustment does not match the reconciliation window.	Settlement rules based risk
37.	Retrospective updates processed used appropriately Correct retrospective updates minimise the risk of inaccurate reconciliation periods.	Shipper performance risk

9.2 Glossary

Term	Definition
LMN	Logical Meter Number
NTS	National Transmission System
DNO	Distribution Network Operator
GT	Gas Transporter
MPRN	Meter Point Reference Number
SSP	Small Supply Point
LSP	Large Supply Point
NDM	Non-Daily Metered
DM	Daily Metered
C&D Store	Connections and Disconnections database held by Xoserve.
UK Link	Is the global term for a suite of systems including the supply point register run and maintained by Xoserve.
Sub & Primes	A group of meter assets downstream of a primary emergency control valve.
D+5	Five days after the end of the gas flow day
AUGE	Allocation of unidentified gas expert
Supply point business day	Business day in England and Wales
SAR	Shipper Agreed Read
Outgoing shipper	Shipper who no longer ships gas to a meter point following a change of supply activity
Incoming shipper	Shipper who has recently taken on responsibility of shipping gas for a meter point
AQ	Annual Quantity
SOQ	Supply Offtake Quantity