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# Network Output Measures Health & Risk Reporting Methodology

**IMPLEMENTATION PLAN PART 2**

**NORTHERN GAS NETWORKS' DATA GATHERING AND INITIATIVE PLAN**

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Version <1.0>  
<30/09/2015>

## VERSION HISTORY

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# 1 Part 2 – Network Deliverables

## 1.1 Overview

The NOMs Methodology, requires each individual GDN to provide input values that are reflective of their failure rates, asset deterioration (where failure data can demonstrate significant variance), and maintenance and intervention costs. This will ensure that the Monetised Risk value is reflective of the network assets and current maintenance regimes of each individual GDN. The GDN specific values will be defined within the Global Values table and each of the Data Reference Libraries applicable to individual Event Tree risk maps.

Each GDN will be responsible for the capture and alignment of available data from their core systems to the format of the base data tables required to run the risk model.

## 1.2 Performance Monitoring – All GDNs

The performance of implementing the risk models will be completed against the specific asset data reference libraries produced during the development of the individual risk models. GDNs will chart their data gaps and quality issues against each nodal value that is specific to the individual GDNs i.e. Probability of Failure (PoF), Probability of Consequence (PoC), internal financial costs.

The future data improvements or data gathering initiatives outlined within this document will be updated and communicated to Ofgem through an Annual Report. This will include updates covering:

- The current status of asset data applicable to the derivation of Monetised Risk
- The forecasted timescales for the completion of the Implementation Plan

The review process will take into account those factors where it is appropriate to make them consistent across all GDNs and additionally, GDN specific factors to be employed within the methodology (e.g. deterioration factors, Information Gathering Plans).

This review process will ensure that:

- Monetised Risk and the associated nodal value drivers are monitored and reviewed on a regular basis to verify that assumptions about the derived Monetised Risk remain valid
- Assumptions on which the risk assessment is based, including the external and internal context, remain valid
- Event Tree Analysis techniques are being properly applied through a consistent application of the processes outlined within the “Network Output Measures Health & Risk Reporting Methodology & Framework” document
- Validation of results on Asset Health, Criticality and Monetised Risk outputs against expected values, and
- Innovation interventions are being correctly modelled

### **1.3 Gap Analysis (Distribution Mains) – Northern Gas Networks**

As per the NOMs Methodology Data Assessment section (4.2), the Mains Risk Map is accompanied with details of global values applied (see section 3.6.2 of NOMs Methodology) and a Data Reference Library (see section A2.5 of NOMs Methodology). The Data Reference Library details the inputs required. Gap analysis of NGN's data quality levels against these data reference libraries will ensure that NGN work towards having the required asset, fault and financial data structure to enable consistent annual reporting of asset risk, health and criticality.

The risk map for Distribution Mains has been finalised and the specific data requirements are documented within the Mains Data Reference Library. In order to understand NGN's current asset data position, a gap analysis has been completed to ensure that NGN are able to meet the NOMs reporting requirements. This analysis is split into 2 main areas:

- Core Asset Data
- Top 6 Risk Drivers

#### **1.3.1 Distribution Mains – Core Asset Data**

Gap analysis has been undertaken for asset data that will be used in the determination of PoF values along with financial data for each anticipated asset cohort. These include:

- Location
- Diameter
- Length
- Material
- Failures

There are four key data categories that will impact the development and implementation of the risk model and these are (see Appendix A for description):

1. Asset Functional location data
2. Asset Health data
3. Failure data
4. Financial data

The tables on the following pages provides details on our current data gaps against these data areas that will be utilised for the production and future modification of the Event Tree Risk Maps developed under the NOMs methodology and states a timeframe for completion of data capture.

Where the Data Assessment Levels are Green, data is of sufficient quantity/quality to enable the consistent application of the methodology for RRP 2016.

An Amber Data Assessment Level indicates there are gaps or quality issues, but assumptions can be applied to enable application of the methodology for RRP 2016. Where a Green delivery status is indicated, further data improvements can be applied to reduce or remove

gaps/assumptions or improve the quality of data by July 2016 (Amber/Red by RIIO mid-point and end respectively).

Red indicates a significant gap which would prevent the application of the methodology for RRP 2016, in which case data improvements (to either an Amber or Green level) must be undertaken to enable application of the methodology for RRP 2016.

	<b>Key:</b> <b>Red: Significant Gap</b> <b>Amber: Data Gap - Assumptions Applied</b> <b>Green: Complete /Consistent</b>	<b>Key:</b> <b>Red – End of GD1</b> <b>Amber – Mid-Point GD1</b> <b>Green – July 2016</b>	
<b>Data Type</b>	<b>Data Assessment Level</b>	<b>Indicative Delivery</b>	<b>Comment</b>
Asset Functional location data	Green	Green	No data issues - Good data available for application of methodology.
Asset health data	N/A	N/A	Asset Health inferred via failure data.
Failure data	Green	Green	No data issues - Good data available for application of methodology.
Financial data	Amber	Green	Good data available for application of methodology – further analysis required to apportion costs across assets within model (for July 2016)  Future improvement on granularity - i.e. TMA_Orders & Complaints data. (not subject to indicative delivery timescales)

**Table 1. Distribution Mains Core Asset Data**

### 1.3.2 Distribution Mains - Top 6 Risk Drivers

The current model was developed utilising Northern Gas Networks data, although a refresh and validation of this data is required for reporting in 2016, it is expected that there is unlikely to be a significant deviation to the main cost drivers identified.

The approach is to look at the main 6 cost drivers, defined below, and provide a status for current data quality for each nodal value along each of the 6 branches on the risk map.

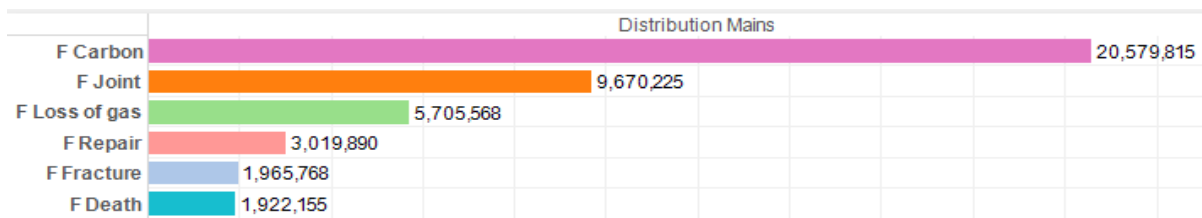


Fig 1. Top 6 Monetised Risk Drivers – Distribution Mains

Associated nodes for Mains	
<b>F Carbon – Driver 1</b>	<b>F Repair – Driver 4</b>
General Emissions	Corrosion Failure
Joint Failure	Interference Failure
Interference Failure	<b>F Fracture – Driver 5</b>
Corrosion Failure	Fracture Failure
Fracture Failure	<b>F Death – Driver 6</b>
<b>F Joint – Driver 2</b>	Corrosion Failure
Joint Failure	Death Major
<b>F Loss of gas – Driver 3</b>	Explosion
Corrosion Failure	Fracture Failure
Fracture Failure	Gas Escape
Gas Escape	Gas Ingress
General Emissions	Interference Failure
Interference Failure	Joint Failure
Joint Failure	
Loss of gas	

Table 2. Associated Nodes – Distribution Mains

Following the data gap analysis of the Distribution Mains risk models, table 3 has been populated detailing NGN's current asset data position for each of the nodal values that form part of the calculation of the top 6 Monetised Risk drivers:

Nodal for top 6 risk drivers	Key:		Comment
	Data Assessment Level	Indicative Delivery	
Corrosion Failure	Green	Green	No data issues - Good data available for application of methodology.
Fracture Failure	Green	Green	No data issues - Good data available for application of methodology.

	<b>Key:</b> <b>Red: Significant Gap</b> <b>Amber: Data Gap - Assumptions Applied</b> <b>Green: Complete /Consistent</b>	<b>Key:</b> <b>Red – End of GD1</b> <b>Amber – Mid-Point GD1</b> <b>Green – July 2016</b>	
<b>Nodal for top 6 risk drivers</b>	<b>Data Assessment Level</b>	<b>Indicative Delivery</b>	<b>Comment</b>
General Emissions	Green	Green	No data issues - Industry standard leakage model utilised
Interference Failure	Green	Green	No data issues - Good data available for application of methodology.
F Joint Failure (£)	Amber	Green	Good data available for application of methodology - further data verification & analysis required to allocate costs across assets within model, a degree of assumption may be applicable (for July 2016)
Joint Failure	Green	Green	No data issues - Good data available for application of methodology.
F Repair (£)	Amber	Green	Good data available for application of methodology - further data verification & analysis required to allocate costs across assets within model, a degree of assumption may be applicable (for July 2016)
F Fracture (£)	Amber	Green	
F Loss of Gas (£)	Green	Green	No data issues - Common value used (All GDNs), subject to governance process
Loss of gas	Amber	Green	Industry standard leakage model utilised. Further analysis required to determine GDN-specific and cohort level figures if possible.
Capacity	Amber	Amber	Detail not at level of granularity required (i.e. capacity issues as a result of poor pressure and associated redundancies), further improvement required.
Supply Interruptions	Green	Green	Good data available for application of methodology (at population level)  Future analysis required to improve level of granularity (not subject to indicative delivery timescales)



	Key: Red: Significant Gap Amber: Data Gap - Assumptions Applied Green: Complete /Consistent	Key: Red – End of GD1 Amber – Mid-Point GD1 Green – July 2016	
Nodal for top 6 risk drivers	Data Assessment Level	Indicative Delivery	Comment
GIB_Joint			Good data available for application of methodology (at population level)  Future analysis required to improve granularity of data and improvement required to align MRPS and SAP (not subject to indicative delivery timescales)
GIB_Interference			
GIB_Corrosion			
GIB_Fracture			

Table 3 – Mains and Services Nodal Value Data Quality Position

#### 1.4 Data Improvement Initiative (Mains)

NGN's core Distribution Mains asset data, both within SAP and GIS, is robust and of good quality, with well-established processes as part of the ongoing REPEX programme. Further improvements have been progressed, such as the use of Measurement Technicians to ensure data accuracy and the move to enable the capture of field data electronically.

NGN have integrated the use of Business Intelligence (BI) which is a set of techniques and tools that enable the transformation of raw data (including asset and financial data) into meaningful and useful information for business analysis purposes. The outputs from BI and GIS, and the processes around them, will be further reviewed and refined to ensure they can be easily incorporated into the data structure for Event Tree analysis.

NGN are currently undertaking predictive analytics studies to support the proactive replacement of mains before they fail. The outputs from this may enable data improvements in the PoF and deterioration calculations within the risk model.

Going forward, there are other areas of analysis for consideration, with the potential for improving the accuracy and detail of risk reporting. For example, the analysis of property density and criticality (type) to provide a more granular and detailed consequence outcome.

## 1.5 Implementation of Reporting (Mains)

Following the completion of the gap analysis, further processes are being developed to ensure Distribution Mains RRP is completed for July 2016. All of the model's data variables and parameters required have been mapped against data sources. Where a full dry-run of the model isn't possible in the timeframe, a high-level validation exercise will be undertaken to ensure the RRP process (data collection) can commence soon after 15/16 year-end. *Please note: Data collection and analysis is dependent on data capture post-March 2016 and completion of other RRP tables.*

The following tasks will be completed (timescales are indicative):

### **Data Process & Collection – Oct 2015 to May 2016**

Finalisation of Mains and Services Excel Risk Model

Training of appropriate personnel

Data collection from defined sources & validation

### **Data Analysis – Mar to Jul 2016**

Perform data calculations

Population of risk model base data table

Population of intervention plans

Run Mains Risk Model

Model validation incl. comparison of scenarios to business plan

Populate 2015/16 RRP

Re-state 2013, 2017 and 2021 with-without intervention

### **Review – Aug to Sep 2016**

Review population process and capture lessons learnt.

Review and update Implementation Plan.

## 1.6 Gap Analysis (Services) – Northern Gas Networks

As per the NOMs Methodology Data Assessment section (4.2), the Service Risk Map is accompanied with details of global values applied (see section 3.6.2 of NOMs Methodology) and a Data Reference Library (see section B2.5 of NOMs Methodology). The Data Reference Library details the inputs required. Gap analysis of NGN's data quality levels against these data reference libraries will ensure that NGN work towards having the required asset, fault and financial data structure to enable consistent annual reporting of asset risk, health and criticality.

The risk map for Services has been finalised and the specific data requirements are documented within the Services Data Reference Library. In order to understand NGN's current asset data position, a gap analysis has been completed to ensure that NGN are able to meet the NOMs reporting requirements. This analysis is split into 2 main areas:

- Core Asset Data
- Top 6 Risk Drivers

### **1.6.1 Services - Core Asset Data**

Gap analysis has been undertaken for asset data that will be used in the determination of PoF values along with financial data for each anticipated asset cohort. These include:

- Location
- Diameter
- Material
- Failures
- Criticality/Customer

There are four key data categories that will impact the development and implementation of the risk model and these are (see Appendix A for description):

- Asset Functional location data
- Asset Health data
- Failure data
- Financial data

The tables on the following pages provides details on our current data gaps against these data areas that will be utilised for the production and future modification of the Event Tree Risk Maps developed under the NOMs methodology and states a timeframe for completion of data capture.

Where the Data Assessment Levels are Green, data is of sufficient quantity/quality to enable the consistent application of the methodology for RRP 2016.

An Amber Data Assessment Level indicates there are gaps or quality issues, but assumptions can be applied to enable application of the methodology for RRP 2016. Where a Green delivery status is indicated, further data improvements can be applied to reduce or remove gaps/assumptions or improve the quality of data by July 2016 (Amber/Red by RIIO mid-point and end respectively).

Red indicates a significant gap which would prevent the application of the methodology for RRP 2016, in which case data improvements (to either an Amber or Green level) must be undertaken to enable application of the methodology for RRP 2016.

	<b>Key:</b> <b>Red: Significant Gap</b> <b>Amber: Data Gap - Assumptions Applied</b> <b>Green: Complete /Consistent</b>	<b>Key:</b> <b>Red – End of RIIO-GD1</b> <b>Amber – Mid-Point</b> <b>Green – July 2016</b>	
<b>Data Type</b>	<b>Data Assessment Level</b>	<b>Indicative Delivery</b>	<b>Comment</b>
Asset Functional location data			<p>Data available for application of methodology - assumptions applied (i.e. population material split)</p> <p>Improvement - Application of the previously accepted service asset data analysis within the national leakage model (for July 2016).</p> <p>Business As Usual - Service records incomplete in both GIS and SAP, continuous improvement driven via REPEX programme (not subject to indicative delivery timescales)</p>
Asset health data	N/A	N/A	Asset Health inferred via failure data.
Failure data			No data issues - Good data available for application of methodology.
Financial data			<p>Good data available for application of methodology – further analysis required to apportion costs across assets within model, a degree of assumption may be applicable (for July 2016)</p> <p>Future improvement on granularity - i.e. cost data at a cohort/asset level. (not subject to indicative delivery timescales)</p>

**Table 4 – Service Core Asset Data**

### 1.6.2 Services - Top 6 Risk Drivers

The current model was developed utilising Northern Gas Networks data, although a refresh and validation of this data is required for reporting in 2016, it is expected that there is unlikely to be a significant deviation to the mains cost drivers identified.

The approach is to look at the main 6 cost drivers, defined below, and provide a risk status for current data quality for each nodal value along each of the 6 branches on the risk map.

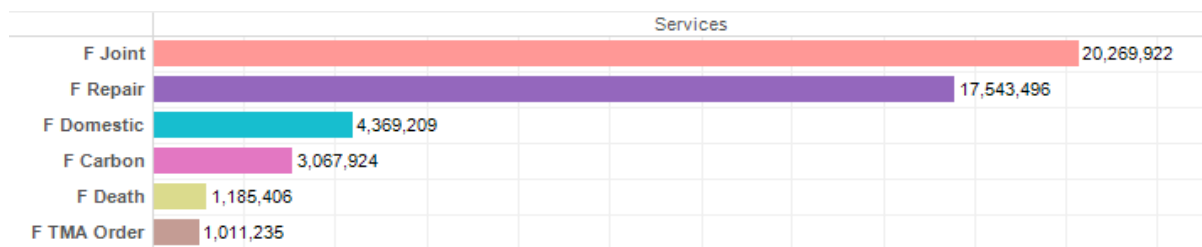


Fig 2. Top 6 Monetised Risk Drivers – Services

Associated nodes for Services	
<b>F Joint – Driver 1</b>	<b>F Carbon – Driver 4</b>
Joint Failure	General Emissions
<b>F Repair – Driver 2</b>	Joint Failure
Corrosion Failure	Interference Failure
Interference Failure	Corrosion Failure
<b>F Domestic – Driver 3</b>	Fracture Failure
Joint Failure	<b>F Death – Driver 5</b>
Interference Failure	Joint Failure
Corrosion Failure	Interference Failure
Fracture Failure	Corrosion Failure
Capacity	Fracture Failure
Gas Escape	GIB_Joint
Supply interruptions	GIB_Interference
Props Domestic	GIB_Corrosion
	GIB_Fracture

Table 5. Associated Nodes – Services

Following the data gap analysis of the Services risk models, table 6 has been populated detailing NGN’s current asset data position for each of the nodal values that form part of the calculation of the top 6 Monetised Risk drivers:

Nodal for top 6 risk drivers	Data Assessment Level	Indicative Delivery	Comment
Corrosion Failure			No data issues - Good data available for application of methodology.  Please note: Risk output subject to data improvements driven via REPEX programme and leakage model analysis (See Asset Functional Location data in table 4)

	Key: Red: Significant Gap Amber: Data Gap - Assumptions Applied Green: Complete /Consistent	Key: Red – End of GD1 Amber – Mid-Point GD1 Green – July 2016	
Nodal for top 6 risk drivers	Data Assessment Level	Indicative Delivery	Comment
Fracture Failure			No data issues - Good data available for application of methodology.  Please note: Risk output subject to data improvements driven via REPEX programme and leakage model analysis (See Asset Functional Location data in table 4)
General Emissions			No data issues - Industry standard leakage model utilised  Please note: Risk output subject to data improvements driven via REPEX programme and leakage model analysis (See Asset Functional Location data in table 4)
Interference Failure			No data issues - Good data available for application of methodology.  Please note: Risk output subject to data improvements driven via REPEX programme and leakage model analysis (See Asset Functional Location data in table 4)
F Joint Failure (£)			Basic data available for application of methodology - further data verification & analysis required to allocate costs across assets within model, a degree of assumption may be applicable (for July 2016)
Joint Failure			No data issues - Good data available for application of methodology.  Please note: Risk output subject to data improvements driven via REPEX programme and leakage model analysis (See Asset Functional Location data in table 4)
F Repair (£)			Basic data available for application of methodology - further data verification & analysis required to allocate costs across assets within model, a degree of assumption may be applicable (for July 2016)
F Fracture (£)			Basic data available for application of methodology - further data verification & analysis required to allocate costs across assets within model, a degree of assumption may be applicable (for July 2016)
F Loss of Gas (£)			No data issues - Common value used (All GDNs), subject to governance process

		Key: Red: Significant Gap Amber: Data Gap - Assumptions Applied Green: Complete /Consistent	Key: Red – End of GD1 Amber – Mid-Point GD1 Green – July 2016
Nodal for top 6 risk drivers	Data Assessment Level	Indicative Delivery	Comment
Loss of gas			Industry standard leakage model utilised. Further analysis required to determine GDN-specific and cohort level figures if possible.
Capacity			Detail not at level of granularity required (i.e. capacity issues as a result of poor pressure and associated redundancies), further improvement required.
Supply Interruptions			Good data available for application of methodology (at population level)  Future analysis required to improve level of granularity (not subject to indicative delivery timescales)
GIB_Joint			Good data available for application of methodology (at population level)  Future analysis required to improve granularity of data and improvement required to align MRPS and SAP (not subject to indicative delivery timescales)
GIB_Interference			
GIB_Corrosion			
GIB_Fracture			

Table 6 –Services Nodal Value Data Quality Position (including GDN-Specific Global Values)

### 1.7 Data Improvement Initiative (Services)

NGN's core Services asset data is improving as part of the ongoing REPEX programme. As services are replaced or transferred, new asset data is being captured within core systems. Further improvements have been progressed, such as the use of Measurement Technicians to ensure data accuracy and the move to enable the capture of field data electronically. Additionally NGN are looking to progress the digitisation of domestic services (<63mm) and capture MPRN data.

NGN have integrated the use of Business Intelligence (BI) which is a set of techniques and tools that enable the transformation of raw data (including asset and financial data) into meaningful and useful information for business analysis purposes. The outputs from BI and GIS, and the processes around them, will be further reviewed and refined to ensure they can be easily incorporated into the data structure for Event Tree analysis.

NGN are currently undertaking predictive analytics studies to support the proactive replacement of services before they fail (hotspot analysis). The outputs from this may enable data improvements in the PoF and deterioration calculations within the risk model.

Going forward, there are other areas of analysis for consideration, with the potential for improving the accuracy and detail of risk reporting. For example, the mapping and consolidation of GIS, Xoserve and DDS data to accurately determine the service criticality (property type, cellars etc) providing a more detailed consequence outcome and risk distribution.

## **1.8 Implementation of Reporting (Services)**

Following the completion of the gas analysis, further processes are being developed to ensure Services RRP is completed for July 2016. All of the model's data variables and parameters required have been mapped against data sources. Where a full dry-run of the model isn't possible in the timeframe, a high-level validation exercise will be undertaken to ensure the RRP process (data collection) can commence soon after 15/16 year-end. *Please note: Data collection and analysis is dependent on data capture post-March 2016 and completion of other RRP tables.*

The following tasks will be completed (timescales are indicative):

### **Data Process & Collection – Oct 2015 to May 2016**

- Finalisation of Mains and Services Excel Risk Model
- Training of appropriate personnel
- Data collection from defined sources & validation

### **Data Analysis – Mar to Jul 2016**

- Perform data calculations
- Population of risk model base data table
- Population of intervention plans
- Run Services Risk Model
- Model validation incl. comparison of scenarios to business plan
- Populate 2015/16 RRP
- Re-state 2013 and 2021 with-without intervention

### **Review – Aug to Nov 2016**

- Review population process and capture lessons learnt.
- Review and update Implementation Plan.

## **1.9 Other Asset Groups**

Gap analysis will be undertaken as and when Event Trees are developed, in line with the primary assets identified within Table 1 of the Implementation Plan Part 1.

When initial Event Trees are drafted, an interim analysis is undertaken to ensure that the Event Tree is fit for purpose and that current and future data requirements can be, or will be, met.



When Event Trees are finalised and approved, a full analysis is undertaken to identify data sources, data gaps, processes and the data improvements required to enable the use of this methodology for Regulatory Reporting in 2016 and beyond.

The completed Gap Analysis for each Asset Group will be published and updated within the body of this document (Implementation Plan – Part 2).

## APPENDIX A: KEY TERMS

The following table provides definitions and explanations for terms and acronyms relevant to the content presented within this document.

Term	Definition
Asset Functional location data	<p>This is the asset base data of individual asset records from the core SAP system (or similar, including MRPS) and may include the following attributes:</p> <ul style="list-style-type: none"> <li>• Asset classifications</li> <li>• Asset ID's</li> <li>• Asset Location</li> <li>• Asset operational status</li> <li>• Asset Configuration</li> </ul>
Asset Health data	<p>This includes all asset health related data such as, but not limited to:</p> <ul style="list-style-type: none"> <li>• Asset design specification</li> <li>• Asset Age</li> <li>• Observed Condition</li> <li>• Duty</li> <li>• Capacity</li> <li>• Location &amp; Environmental health factors</li> </ul>
Failure data	<p>This includes all functional failure data collected through the core system and the PSSR fault recording process</p>
Financial data	<p>This includes all financial data held in the core systems that will be utilised within the risk models</p>