An Coimisiún um Rialáil Fóntais
Commission for Regulation of Utilities

Gas Safety Regulatory Framework for Ireland

Gas Safety Case Guidelines for Natural Gas & LPG Licensed Undertakings

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4.0	Decision Document	CRU/18/253	Loretta Joyce	Revised version following consultation CRU/18/217 to incorporate introduction of RNG
5.0	Decision Document	CRU19155	Loretta Joyce	Revised version following consultation CRU/19099 to amend shipper and supplier requirements

Overview

These Safety Case Guidelines ("the Guidelines") have been prepared to assist gas undertakings in the development of their respective safety cases or material changes for submission to the Commission for Regulation of Utilities (CRU).

These Guidelines were initially published in 2007 in respect of natural gas undertakings, in 2013 in respect of LPG (Liquefied Petroleum Gas) undertakings and in 2017 in respect of the introduction of CNG (Compressed Natural Gas) facilities and supply. The Guidelines were updated in 2018 to incorporate the introduction of Renewable Natural Gas (RNG) into the distribution and transmission network in Ireland and to update the document to CRU format. The Guidelines are constantly kept under review by the CRU and updated regularly in consultation with industry and the public.

In line with CRU's Strategic Priority to ensure compliance and accountability through best regulatory practice, the CRU has conducted a review of current regulatory arrangements with respect to supply and shipper undertakings. The CRU has now drafted updated Guidelines version 5.0 to propose more specific and transparent guidance to suppliers and shippers in the preparation of their safety cases. The CRU will keep these Guidelines under review as the gas market develops in Ireland and may further amend these Guidelines as appropriate.

The Guidelines have been divided into the following sections:

Part A General Requirements for Gas Undertakings' Safety Cases
Part B LNG Undertakings.
Part C Storage Undertakings.
Part D Transmission Undertakings.
Part E Distribution Undertakings.
Part F Supply Undertakings,
Part G Shipper Undertakings,
Part H Liquefied Petroleum Gas Undertakings
Part I CNG Supplier Undertakings

All undertakings, excluding supply and shipper undertakings with the exception of CNG supplier undertakings, should have regard to Part A.

All undertakings should have regard to the part which relates to that undertaking's specific activity.

Table of Contents

List of Key Defined Terms

Abbreviation or Term	Definition or Meaning
ALARP Guidance	CER document ALARP Guidance (Ref: CER/16/106). The document describes processes that must be used to determine whether a risk is ALARP. The ALARP Guidance document, and any subsequent amendments, form part of the Gas Safety Regulatory Framework
Connected Systems Operator	Any person(s) who enters into a Connected System Agreement or any agreement of a similar nature with a Transmission and/or Distribution System Operator for the purposes of providing natural gas to a natural gas transmission and/or distribution system.
Gas Undertakings	Refers to Natural Gas undertakings and LPG undertakings, as defined in the Electricity Regulation Act 1999(as amended)
Good Practice	The recognised risk management practices and measures that are used by competent organisations to manage well-understood hazards arising from their activities.
Infrastructure	Any Natural Gas infrastructure and piped LPG distribution networks, as defined in the Energy (Miscellaneous Provisions) Act 2012
LPG Undertaking	Means any person who imports LPG or purchases LPG directly from a refinery

	within the State and makes LPG available to individual domestic or commercial final customers by way of LPG cylinder, bulk tank or via a piped LPG distribution network;
Major Accident	An event, such as a major emission, fire, explosion, impact or structural failure resulting from uncontrolled developments that could lead to a serious danger to human health whether immediate or delayed. Serious danger implies events which could impact multiple persons, including members of the public and/or workforce
Natural Gas	*" "natural gas" means any gas derived from natural strata (whether or not it has been subjected to liquification or any other process or treatment) and in this Act, a reference to natural gas may also be construed as including, where the Commission considers it appropriate and where, in the opinion of the Commission, such gas may be technically and safely injected into, and transported through, the natural gas system, biogas, gas from biomass and other types of gas;"* as defined by the Gas Act 1976 as amended by section 4 of S.I. no 452 of 2004.
Natural Gas Undertaking	A person engaged in the transmission, distribution, supply or storage of natural gas including any holder of a licence or a consent or under the Electricity Regulation Act 1999(as amended) or any person who has been granted a licence or given a consent under the Gas Acts, 1976 to 2021

[1] Section 2(1) Electricity Regulation Act 1999, inserted by Section 22(a)(ii) of the Gas(Interim)(Regulation) Act 2002

RNG Delivery Facility	The plant and equipment constructed and/or installed immediately upstream of the transmission and/or distribution system where quality parameters are measured and controlled and from which Renewable Natural Gas which meets the Gas Quality Specification may be delivered to the transmission and/or distribution system.
RNG Supply Facility	Any facility which provides biogas or RNG to the connected system operator and may include anaerobic digestion equipment and/or an RNG delivery facility, pressure reduction and injection technology.
Safety Policy	A document or series of documents that set out management objectives with regard to the safety management of the business
Shipper	Any person(s) who engages in the activity of "shipping" as defined in the Gas (Interim) (Regulation) Act 2002, as amended.
Shipping	"Shipping" in relation to natural gas, means the introduction into, the conveyance by means of, or take off from the natural gas system of natural gas by persons other than the operator of the relevant pipeline or facility being used for the purpose of introducing, conveying or taking off the natural gas as defined in the Gas (Interim) Regulation Act 2002, as amended.
Supplier	Any person(s) who engages in the activity of "supply" as defined in the Gas (Interim) (Regulation) Act 2002, as amended.

Supply	"Supply" in relation to natural gas, means the delivery or sale of natural gas, including liquefied natural gas, to customers and includes shipping as defined in the Gas (Interim) Regulation Act 2002, as amended.
Transporter	Any person(s) who engages in the activity of a "transmission system operator" and/or "distribution system operator" as defined in the Electricity Regulation Act 1999 as amended, "transmission system operator" means the holder of a licence under section 14(1)(e) of the Act, "distribution system operator" means the holder of a licence under section 14(1)(g) of the Act.
Renewable Natural Gas (RNG)	Sustainably produced or purified Renewable Natural Gas (RNG) includes gas types such as; Biomethane, Synthetic Methane, Methanised Hydrogen, Natural Gas blended Hydrogen, eGas/P2G, "Green Gas", etc.
5 Year Review	A full audit including an assessment report of an undertaking's safety case, carried out by an independent external body. The report generated from this assessment shall be submitted to the Commission and the undertaking at the same time.

List of Abbreviations

Abbreviation	Definition or Meaning
ALARP	As Low as Reasonably Practicable
CCPC	Competition and Consumer Protection Commission
CNG	Compressed Natural Gas
DM	Daily Metered
EPA	Environmental Protection Agency
GTSC	Gas Technical Standards Committee
HSA	Health and Safety Authority
LDM	Large Daily Metered
LPG	Liquified Petroleum Gas
NDM	Non Daily Metered
NGEM	National Gas Emergency Manager
NGEP	National Gas Emergency Plan
NSAI	National Standards Authority of Ireland
PAPA	Promotion and Public Awareness Group

PART A: GENERAL REQUIREMENTS FOR GAS UNDERTAKING'S SAFETY CASE

A.1 Introduction

The CRU is responsible for the safety regulation of natural gas and Liquefied Petroleum Gas (LPG) undertakings[2]. In order to carry out this regulation, the CRU established a Gas Safety Regulatory Framework (the Framework) in 2007. In 2012 the CRU was enabled[3] to license specified LPG undertakings and increased its enforcement powers in respect of both Natural Gas and LPG undertakings. Since the establishment of the Framework in 2007 (and following its expansion to include elements of the LPG industry and additional enforcement powers), a number of consultations have been carried out on the key Framework documents including Safety Case Guidelines ("the Guidelines") for both Natural Gas undertakings and licensed LPG undertakings.

The Gas Safety Framework is a dynamic and evolving framework which reflects the current gas market, legal and regulatory requirements. The strategy of the Framework is twofold; firstly to make sure that all industry safety requirements are fulfilled competently and secondly, to promote and develop public awareness with respect to gas safety. The Framework was last reviewed and updated in 2014, 'Gas Safety Regulatory Framework for Ireland – High Level Approach Version 2.0' (Ref: CER/14/296)

The key change to the Guidelines is more specific and detailed requirements for supplier and shipper safety cases. This will provide greater transparency and clarity to suppliers and shippers in providing safety cases to the CRU for acceptance while ensuring that they manage safety risks to a level which is As Low as Reasonably Practicable (ALARP).

Requirements for suppliers and shippers are set out in Parts F and Part G respectively. Requirements for suppliers (with the exception of Compressed Natural Gas suppliers) and shippers previously set out in Part A have been removed and included in Part F or Part G for simplicity.

[2] Under the Electricity Regulation Act 1999 as amended

[3] The Energy (Miscellaneous Provisions) Act 2012 (the 2012 Act) amended the Electricity Regulation Act 1999

A.2 Safety Case Contents

LNG, storage, transmission, distribution, LPG and CNG supplier undertakings should have regard to Part A.

The high-level structure of a safety case is generic in nature for all undertakings captured under the gas safety regulatory framework.

The safety case should contain the following sections:

1. Facility Description
2. Formal Safety Risk Assessment
3. Safety Management System
4. Emergency Procedures

Further details of the requirements for the safety case as they apply to individual undertakings are outlined in Section B to I of this document. A brief summary of each section of the safety case is described in Sections A.2.1 to A.2.4 below.

A.2.1 Facility Description

The '**Facility Description**' describes the nature, activities, location, organisation structure, safety related responsibilities and gas infrastructure assets (where applicable) employed in carrying out the day-to-day business of the gas undertaking. The Facility Description must provide sufficient information to enable the extent and scope of the assets and operations of the gas undertaking in relation to the facility, and the risks associated with those assets and operations, to be assessed.

A.2.2 Formal Safety Risk Assessment

The '**Formal Safety Risk Assessment**' should be consistent with the activities described in the Facility Description. It should be based on a detailed and systematic assessment of risks, including the likelihood and consequence of a gas safety-related incident occurring and a description of the mitigation measures adopted to ensure that identified risks are maintained at a level that is as low as reasonably practicable (ALARP). The risk assessment process should take into account the safety risks inherent at each stage of the undertakings' gas infrastructure asset lifecycle, namely:

- design,
- construction,
- operation,
- maintenance, and
- modification and decommissioning.

The Formal Safety Risk Assessment for a facility should provide:

- a description of the methodology used and investigations undertaken for the Formal Safety Risk Assessment;
- an identification of all hazards and initiating events having the potential to cause a gas incident;
- a detailed and systematic assessment of risk, including the likelihood and consequence of a gas incident;
- a description of technical and other measures undertaken, or to be taken, to reduce that risk to a level that is ALARP; and
- copies of any reports arising from the studies and investigations undertaken for the purposes of the Formal Safety Risk Assessment.

An important requirement of the Formal Safety Risk Assessment is that identified safety risks are mitigated to ALARP. The CRU has published an ALARP Guidance Document (Ref: CER/16/106) which provides detailed guidance on the CRU requirements for an assessment to demonstrate that safety risk is as low as is reasonably practicable (ALARP). This assessment is termed an ALARP assessment.

Under the GSF, the responsibility to carry out and document an ALARP assessment lies with each undertaking. It is a requirement of the CRU that the ALARP assessment process set-out in the ALARP Guidance, or a process that achieves the same objectives, is followed.

Additional information is provided below which describes how the ALARP assessment must be documented in a gas safety case. However, in general a level of professional judgment is required when applying the requirements of the ALARP guidance document to the gas safety cases described in these safety case guidelines.

- If GSF undertakings cannot fully comply with their own codes and industry standards for any reason, then an explanation should be provided as to why compliance is not possible to achieve, and a full justification of the method to be used, and how this demonstrates a similar level of safety.
- Where improvements in good practice arise from changes to standards etc, the undertaking should fully assess the implications of changes, and incorporate them where practicable.
- Where risk assessment methodologies rely on input data, it is important that the reality of the condition of any operating asset is taken into account. The use of generic data in these circumstances is unlikely to give a true representation or measure of the risk and either asset specific information should be used, or the uncertainty recognised.
- Whilst it is recognised that direct historical data may not be available, the undertaking should ensure that systems and processes are in place to collect this data moving forward.
- Compliance with certain risk based industry codes and standards will generally satisfy the requirements of ALARP demonstration, however where good practices exist over and above the requirements of the codes, an ALARP demonstration must describe those measures that have not been implemented and a justification for this.
- As an activity progresses there is no guarantee that the risks will remain ALARP. It is recognised that it takes time to implement good practice as it evolves, however robust monitoring / continual improvement processes must be in place, and steps made toward good and best practices as they are identified and documented. This should include re-evaluation of the risk assessment and risk reduction measures.
- The potential for a number of different scenarios to arise from the same hazard should be considered. In this case a number of scenarios must be assessed in order to identify the highest risk without dilution of the overall risk.

A.2.3 Safety Management System

The '**Safety Management System**' is the system that the gas undertaking employs to effectively manage the safety risks as identified in the Formal Safety Risk Assessment. It includes, but is not limited to activities and documents such as:

- the safety policy;
- organisation;
- planning;
- implementing;
- audit and performance monitoring; and
  reviewing systems used by the gas undertaking to manage their business-specific safety risks, to an acceptable level and ensure that there is a process for continual improvement in place.

The Safety Management System should also address the human factors (competencies and capabilities) of staff and contractors that are important in managing and controlling the safety hazards and risks that are identified in the Formal Safety Risk Assessment. The Safety Management System should address the safety risks identified in the Formal Safety Risk Assessment in a manner that reduces all identified risks to a level that is ALARP.

The Safety Management System should contain a list of all relevant Irish, European and International codes, standards, recommendations and specifications that are used by the undertaking for the design, construction and operation, modification and maintenance of infrastructure assets. It is important that the undertaking has a system for assuring itself that the technical standards and specifications currently being used are the latest version. As such, the Safety Management System should describe the process for ensuring that all amendments and new editions are recorded and an up to date list of standards is maintained and included in, or referenced, by the safety case. A list of Irish publications for the gas industry, as recommended by the Gas Technical Standards Committee (the 'GTSC') of the National Standards Authority of Ireland (the 'NSAI') is included at Appendix 1 for reference.

In its decision paper "A Natural Gas Safety Regulatory Framework for Ireland" (ref: CER/07/172) and subsequently in the updated version of this paper (ref: CER/14/296) the CRU stated that:

*"The emphasis of the Safety Case regime is on '**demonstration**' by the gas undertaking that acceptable safety arrangements for the management of gas-safety related risks are in place and working effectively on a day-to-day basis. In this context, demonstration involves a higher standard than simply describing the way measures work or are expected to work. There is a requirement on the undertaking to provide evidence that the*

measures described in the safety case work in practice and are monitored to ensure that this actually happens".

The safety case contents describe the safety management systems that the undertaking has put in place to ensure that gas safety risks arising from the activities of the undertaking are controlled to a level that is considered by the undertaking to be as low as reasonably practicable. The safety management systems consist of various policies, procedures, processes, codes, recommendations, technical standards and specifications that are used by the undertaking to manage and control gas safety risks and these will be referenced in the safety case. However, it will not be acceptable to merely quote such documents within the safety case as evidence that safety management systems are based on robust management arrangements. There will be a requirement to provide evidence of:

- How the safety-related policies and procedures are effectively implemented within the undertaking and who has responsibility for implementation;
- What monitoring and control measures are in place to ensure that the safety-related policies and procedures are implemented effectively;
- How often policies and procedures are reviewed;
- How safety-related data is collected and stored – what systems, databases are used; and
- Who reviews safety-related data, how often and how does this inform decision-making as to what actions are required.

The CRU will seek evidence that the undertaking has made a robust 'case' that the necessary safety measures are in place and that senior management has the ability to support and maintain the arrangements on an ongoing basis. The CRU recognises that there is a practical limit to the amount of information that can be logically presented in a safety case document. However, the safety case should be suitably cross-referenced (and hyper-linked where practical) to supporting internal company documents that collectively constitute the safety management system. There should also be references to the company IT systems and databases that are used for storing and analysing safety-related data.

A.2.4 Emergency Procedures

The '**Emergency Procedures'** should provide details of the emergency response arrangements that undertakings have in place in order to provide an effective and coordinated response to day-to-day emergency call-out situations as well as larger scale network gas related incidents and emergencies.

The emergency procedures should detail how the undertaking responds to individual incidents and emergencies at a local level. It should outline what processes and procedures are in place for responding to incidents that are reported to it, and how these are implemented.

These arrangements should include a description of:

- roles and responsibilities of the various Emergency Management team members;
- arrangements for providing a 24-hour response capability;
- contact details for staff on an emergency rota;
- details of the incident room arrangements including telephone and fax numbers and e-mail addresses; and
- arrangements for undertaking in-house testing of emergency arrangements and emergency exercises.

A critically important aspect of all natural gas safety case emergency procedures is the Natural Gas Emergency Plan (NGEP). The emergency procedures must describe in detail how resources and staff with the necessary skills and competencies are arranged to provide a coordinated response to the requests and instructions of the National Gas Emergency Manager (NGEM) during the various stages of gas supply emergencies

For major accident hazard facilities, the emergency procedures should also provide details of the on-site major accident plans that are in place. The operators of major accident hazard facilities will be responsible for managing the response to on-site emergencies, the role of the NGEM in these circumstances will be to manage the response to the downstream impacts of such emergency events within the transmission and distribution networks.

LPG undertakings are not subject to the requirements of the Natural Gas Emergency Plan, and the directions of the NGEM (as they are not Natural Gas undertakings), however they

should have adequate emergency response arrangements in place within the organisation to respond to emergencies across their geographically dispersed network assets.

For LPG undertakings, the emergency procedures should clearly describe the actions an LPG undertaking will take at each step of an LPG emergency situation. This should include details of how and by whom these actions will be carried out.

A.3 Safety Case Reporting Framework

The safety case regime includes a Safety Reporting Framework that will be used to assess the overall effectiveness and performance of the natural gas safety regulatory framework. Where relevant, undertakings will be required to report on the following basis:

(i) Immediate incident reporting by gas undertakings to the CRU when a gas incident or emergency has occurred and the CRU will be required to undertake an investigation and make a report to the Minister;

(ii) Quarterly safety reporting by gas undertakings to the CRU based on a suite of key safety performance indicators that are specific to the operational activities of the undertaking. Only annual rather than quarterly safety reports are required from CNG supply undertakings, as per Part I 4.9. These safety performance indicators are listed in Appendix 2 of this document; and

(iii) An annual safety report to the CRU which should provide a detailed description of the overall safety performance of the undertaking during the year and the actions that the undertaking proposes to perform to improve gas safety. This information will feed into the CRU annual report, which is published and provided to the Minister, on the gas safety outcomes for the industry and the performance of the gas safety regulatory framework.

Undertakings will need to develop their 'business-specific' safety key performance indicators (KPIs) and liaise with the CRU on the appropriateness of those KPIs for assessing the safety performance of the undertaking. A suggested suite of safety KPIs for gas undertakings is included in Appendix 2 of this document. This list may not be exhaustive and some of items may not be relevant to all undertakings.

A.4 Safety Case Submission Process

The safety case submission and assessment process comprises three main stages:

1. Pre-Submission and Development Safety Case Process
2. Submission Safety Case Assessment Process; and
3. Acceptance of Safety Case and Licence Approval.

At a high level the Pre-Submission Safety Case Development Process stage involves:

- Kick Off Meeting between CRU and undertaking;
- Registration of Licence Application by undertaking; and
- Pre-submission meetings.

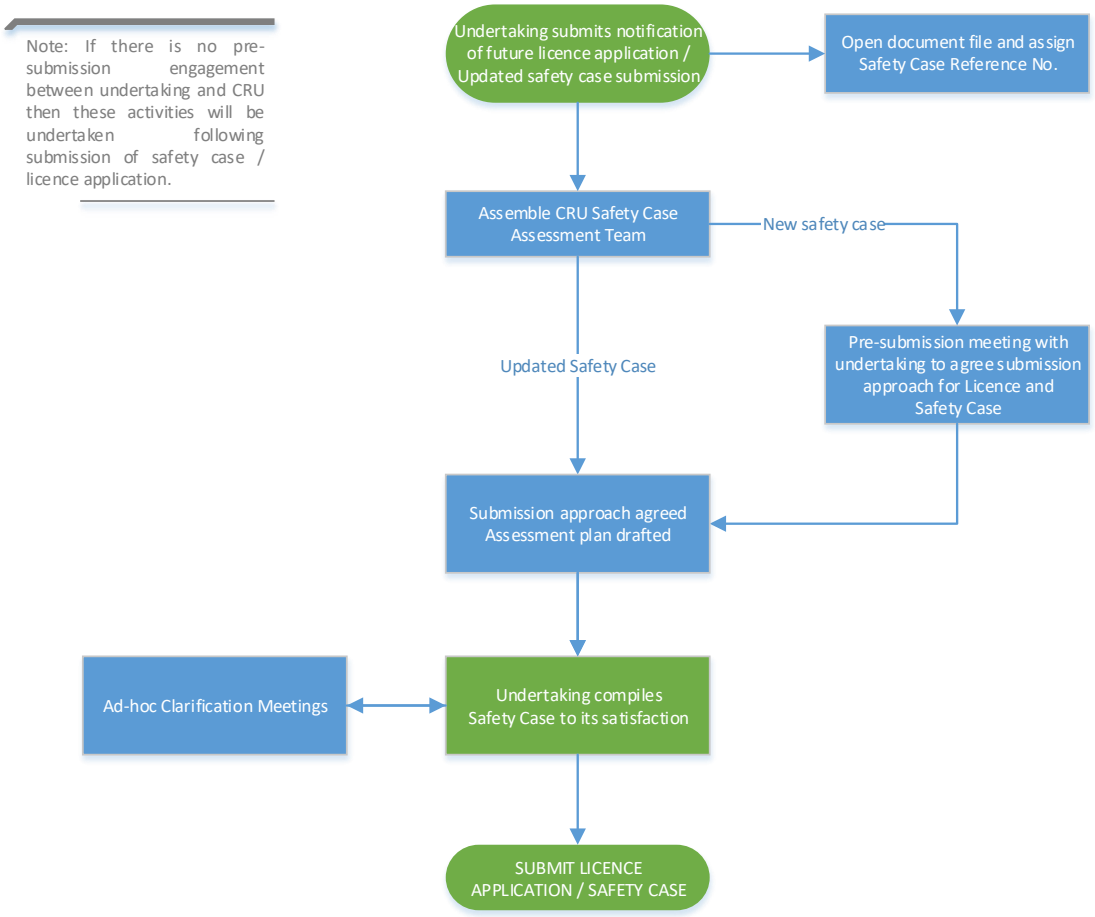
The purpose of this stage of the process is to encourage as much information as possible to be gathered as early as possible thereby enabling the detailed assessment to be completed within an acceptable period of time.

The Submission Safety Case Assessment Process stage involves:

- Submission of the safety case;
- Formulation of an assessment plan by CRU;
- Undertake formal assessment by CRU;
- Production of a safety case assessment report with an accompanying recommendation for acceptance or rejection of the safety case; and
- The acceptance or rejection of the submitted safety case by the Commission.

Stage 1 – Safety Case Registration Process

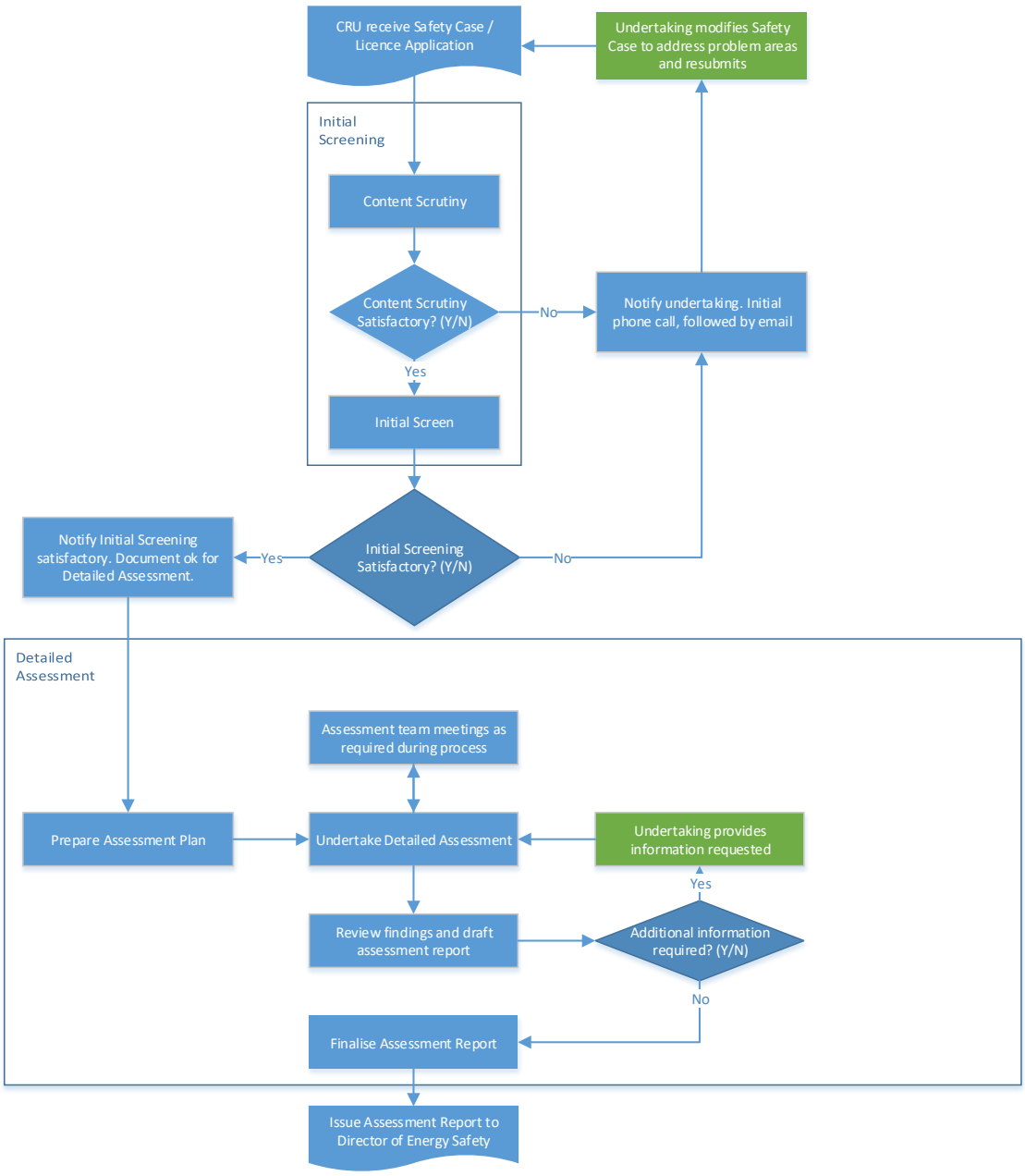
The ‘pre-submission safety case development process map’ below outlines the steps to submission.



When the undertaking has compiled the safety case to its satisfaction an electronic copy of the safety case should be submitted to the CRU. The CRU may also request hard copies of the safety case.

Stage 2 – Safety Case Assessment Process

Upon receipt of the submitted safety case, the safety case file will be updated accordingly and this will constitute day 'D'. The 'post-submission safety case assessment process map' below outlines the steps in the assessment process.



An initial '**Content Scrutiny**' is carried out to ensure that the safety case document is complete compared against the requirements of these safety case guidelines.

Subsequently, an '**Initial Screen'** of the document is undertaken to enable:

- a decision to be made on whether the document is of sufficient standard to proceed to full detailed assessment;
- the development of an assessment plan, outlining team members, responsibilities and areas for detailed examination.

The '**Detailed Assessment'** of the submitted Safety Case will be undertaken upon successful completion of the initial screen activities outlined above.

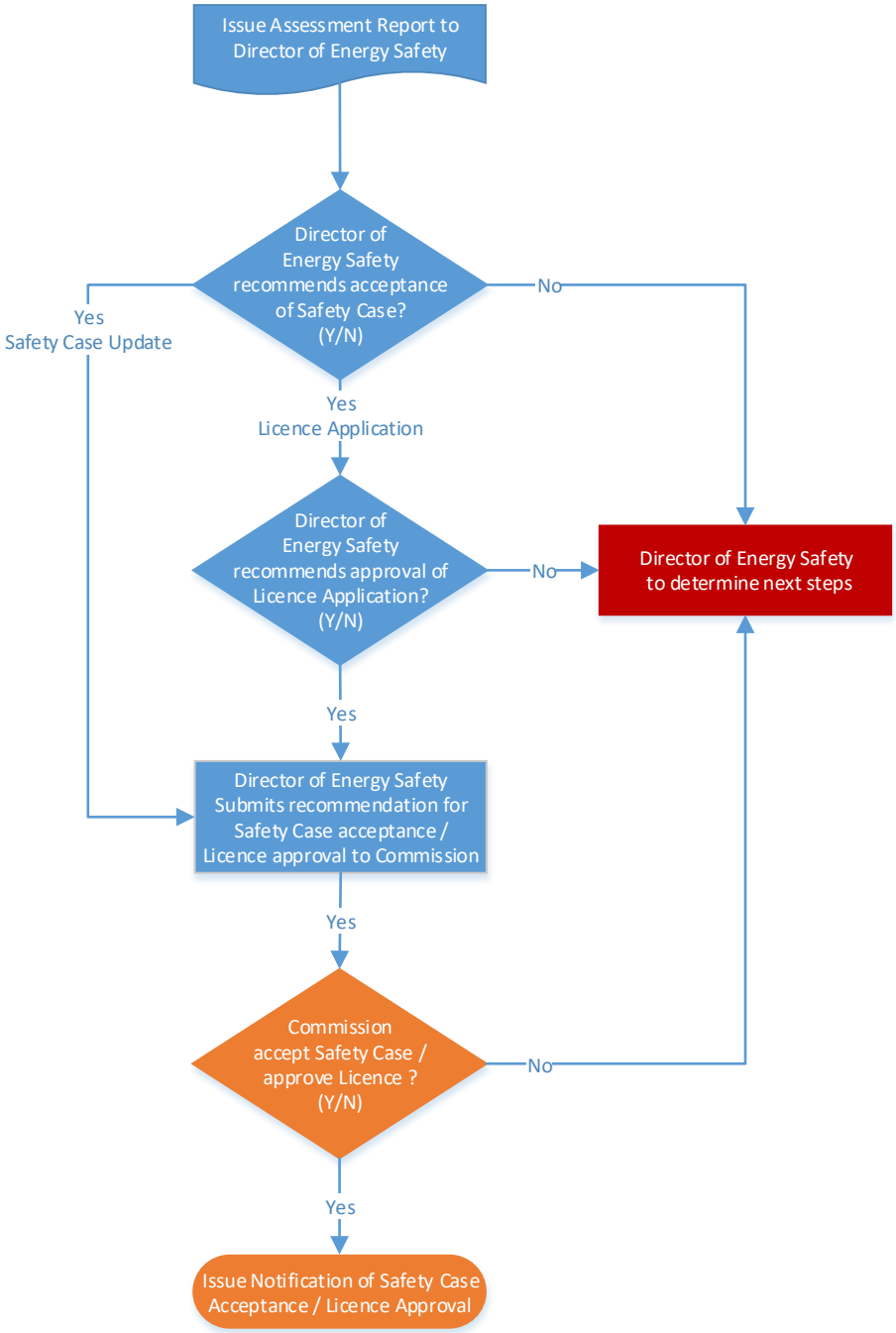
The major objectives are as follows: -

- determine the areas of the submission that are satisfactorily covered and can be accepted;
- identify areas where further information or clarification is required to enable suitability or otherwise to be determined;
- agree areas where improvement is required;
- compile a report to recommend acceptance or rejection of the safety case;
- to identify and examine the areas of highest perceived risk within the submission; and
- identify topics for post acceptance inspections, these may include areas of strength or weakness encountered during the assessment process.

It is expected that detailed assessment period will be particularly intensive for both the undertaking and the CRU assessment team. The appropriate resources within the undertaking should be made available to the assessment team throughout the detailed assessment period to deal with requests/issues and problems.

Stage 3 – Acceptance of Safety Case and Licence Approval

The 'Safety Case Acceptance / Licence Approval Process map' below outlines the steps in the acceptance / approval process.



Upon the final decision by the Commission, the undertaking will be formally notified of the decision in writing. All decisions of the Commission are final.

In the event that the decision is a rejection of the safety case, the undertaking will have the option to re-commence the process with a suitably modified safety case.

A.5 Safety Case Assessment

The CRU's aim in carrying out assessments of submitted safety cases is to satisfy itself that the gas undertakings have made appropriate and sufficient arrangements to ensure that the gas safety risks that arise from the undertakings business activities are reduced and controlled to a level that is ALARP. The assessment of the undertaking's safety case will include a detailed review of both the safety case contents and the undertakings safety management systems as referenced in the safety case. Safety cases will be assessed by the CRU in order to verify that:

- a sufficiently detailed description of the undertakings organisational arrangements, key safety responsibilities, operational characteristics and the nature and extent of the infrastructure assets are provided such that an assessment of the gas related safety risks can be made;

- a detailed and systematic assessment of gas related safety risks has been undertaken that is based on the range of activities described in the Facility Description and that the risks are managed to a level that is ALARP (please refer to the ALARP Guidance Document (Ref: CER/16/106);

- the undertakings safety management systems are adequate to control the gas safety risks that arise from the operations of the gas undertaking and are identified in the Formal Safety Risk Assessment; and

- in the event that a gas emergency situation or a major accident arises, the undertaking's emergency procedures and arrangements are adequate to provide a coordinated and effective emergency response and restoration of supply.

The purpose of the assessment is to examine the evidence as presented in the safety case. It is the responsibility of the undertaking to demonstrate that suitable safety arrangements are in place and that gas safety risks are being managed and controlled to level which is ALARP.

The emphasis of the safety case regime is on '**demonstration**' by the gas undertaking that acceptable safety arrangements for the management of gas-safety related risks are in place and working effectively. In this context, demonstration involves a higher standard than simply describing the way measures work or are expected to work. There will be a requirement on the undertaking to provide evidence that the measures described in the safety case are implemented in practice and are monitored to ensure that this actually happens.

The CRU's role with respect to the safety case will be to:

- develop and update these Safety Case Guidelines and all relevant Framework documents to provide the safety information and demonstration requirements for undertakings;
- review and assess submitted safety cases according to CRU assessment criteria for acceptance of the safety case;
- monitor and audit the activities of undertakings to check for compliance with their safety cases through a programme of audits and inspections; and

Generally, the CRU works to finalise safety case assessments within 6 months of receipt of a complete and comprehensive submission. However, timeframes may be longer if the initial information submitted is incomplete. The safety case assessment is not a 'one-off' activity and each undertaking's safety case will be subject to ongoing audit and inspections by the CRU to verify that the arrangements in the safety case are actually operating in practice.

A.6 Safety Case Modifications

A.6.1 Material Change

An undertaking's safety case is regarded by the CRU as a 'living document' and should be maintained as up to date in order to reflect what the CRU may regard as material changes.

Illustrative examples of what the CRU may consider to be material changes include:

- Changes in ownership and/or operating responsibility;
- Changes in management structure and key safety responsibilities, particularly with respect to the safety case duty holder;
- Significant changes to the capacity, configuration and/or operation of the undertaking's gas infrastructure assets;
- Significant changes in risk levels that are identified via the ongoing assessment of safety risks;
- Outsourcing of key safety-related functions; or
- Changes to major emergency plans and/or the Natural Gas Emergency Plan.

However, it is the responsibility of the undertaking to make its own assessment on the materiality of changes and to advise the CRU accordingly

The above list is not intended to be exhaustive but to provide an indication of changes that would, in the opinion of the CRU, be of sufficient materiality to warrant a modification to the undertaking's safety case. Undertakings should recognise that the cumulative effect of a series of relatively minor, non-material changes may well result in the need for a safety case modification. As such, all changes in the undertaking's operating practices should be considered in the context of the potential impact on the safety case, which has been accepted by the CRU. Generally, safety case material change assessments are completed within 2-4 months. However, timeframes may be longer if the initial information submitted is incomplete. The CRU is willing to engage with undertakings regarding any uncertainty that might arise around material change.

A.6.2 Safety Case Modifications Process

A.6.2.1 Material Changes

Where proposed changes in a safety case result in a material change the CRU requires the safety case to be submitted to the CRU for review. In such instances the undertaking shall:

- inform the CRU of the proposed change and provide:
    - the details of the proposed change; and
    - the reasons for the change
- undertake a safety risk impact assessment of the proposed change and submit the results of the safety risk impact assessment to the CRU for review;
- modify and update the safety case;
- provide the CRU with an updated version of the modified safety case for acceptance/approval;
- upon acceptance from the CRU, implement the change within the agreed timescale.

A.6.2.2 Non-Material Changes

For changes that are considered by the undertaking to be relatively minor or non-material, the undertaking shall:

- undertake a safety risk impact assessment of the proposed change;
- where the level of safety risk resulting from the proposed change remains the same or is lowered, the undertaking shall update its safety case to reflect the change and make a record of the change and the associated risk assessment. There will be no requirement to notify the CRU in this circumstance; and

- where the safety risk impact assessment shows that the proposed change increases the level of safety risk, the undertaking shall notify the CRU. The CRU will then liaise with the undertaking in order to determine if the proposed change can be implemented whilst maintaining the safety risk at an acceptable level. Alternatively, the CRU may view the proposed change as material and the undertaking will follow the process described above for material changes.

If a number of relatively minor changes are made over a short period of time, which are established to be non-material, the CRU may agree to accept a single safety case submission, rather than a series of individual submissions. Undertakings should discuss this with the CRU prior to these changes being made.

A.6.3 Recording Changes and Modifications

Changes in safety arrangements and modifications to safety cases should be safety assessed prior to implementation. Such risk assessments and changes should be recorded by updating all relevant documentation, whether held centrally or circulated amongst staff and operatives. This provides an audit trail of changes. In this way, there is 'demonstration' that the safety case is maintained as a 'living document' within the undertaking and is evidence that the undertaking is operating in compliance with their safety case.

Audits or inspections carried out by the CRU shall be carried out against the current accepted version of the safety case. However, undertakings should ensure, prior to audit or inspection, that the CRU has the latest updated version of their safety case. Suitable document control should be applied to all safety cases.

The following parts of these Guidelines contain specific minimum information requirements for each category of gas undertaking, as follows:

Part B LNG Undertakings,

Part C Storage Undertakings,

Part D Transmission Undertakings,

Part E Distribution Undertakings,

Part F Supply & Shipper Undertakings,

Part G Shipper-only undertakings,

Part H Liquefied Petroleum Gas Undertakings,

Part I CNG Supplier Undertakings.

PART B: SPECIFIC REQUIREMENTS FOR LNG UNDERTAKINGS

At the time of publishing there are currently no LNG undertakings on-shore within Ireland, under the CRU's regulatory jurisdiction. As a result, the CRU will not publish requirements for LNG undertakings as part of the Safety Case Guidelines main document at this time.

It is recognised that some natural gas operations, such as LNG undertakings, fall under the safety requirements of the Seveso III Directive and S.I 209 of 2015. As a result, there is significant overlap between the requirements for the LNG Safety Cases as required by the CRU as safety regulator under the *Electricity Regulation Act 1999 (as amended)* and the Pre-Operating Safety Report required by the Health and Safety Authority (HSA) as the Central Competent Authority under the Seveso III Directive and S.I 209 of 2015.

With this in mind, the CRU will review the requirements with the HSA at such a time as the need arises, with the objective of agreeing an approach to the safety regulation of natural gas Seveso sites that minimises the level of duplication of safety reporting by undertakings, whilst respecting the legislative responsibilities of both the CRU and the HSA.

PART C: SPECIFIC REQUIREMENTS FOR GAS STORAGE UNDERTAKINGS

At the time of publishing there are currently no gas storage undertakings on-shore within Ireland, under the CRU's regulatory jurisdiction. To date the CRU has issued one natural gas storage licence for a storage facility at Kinsale, Co. Cork. However, as this facility is off-shore it falls outside the scope of these Safety Case Guidelines as safety cases for offshore storage must be accepted under the Petroleum Safety Framework Safety4. As a result of there being no on-shore storage facilities, the CRU will not publish requirements for gas storage undertakings as part of the Safety Case Guidelines document at this time.

It is recognised that some natural gas operations, such as gas storage undertakings, fall under the safety requirements of the Seveso III Directive and S.I 209 of 2015. As a result, there is significant overlap between the requirements for the Gas Storage Safety Cases as required by the CRU as safety regulator under the *Energy (Miscellaneous Provisions) Act 2006* and the Pre-Operating Safety Report required by the Health and Safety Authority (HSA) as the Central Competent Authority under the Seveso III Directive and S.I 209 of 2015.

With this in mind, the CRU will review the requirements with the HSA at such a time as the need arises, with the objective of agreeing an approach to the safety regulation of natural gas Seveso sites that minimises the level of duplication of safety reporting by undertakings, whilst respecting the legislative responsibilities of both the CRU and the HSA.

[4] For further information see CER/15/016

PART D: SPECIFIC REQUIREMENTS FOR GAS TRANSMISSION UNDERTAKINGS

This section of the guidelines contains the specific minimum information requirements for the development of the safety case for **gas transmission undertakings**. These are minimum information requirements and it is the responsibility of the relevant undertaking to provide sufficient information in order to allow the CRU to make an assessment of the adequacy of the safety case. A balance will need to be struck between the material to be included in the safety case and supporting information, which can be cross-referenced and provided on request. As a guiding principle, safety cases should be presented as self-contained documents which:

- present the main safety arguments clearly and succinctly so that the core principles can be readily understood; and
- include sufficient detail to establishing a convincing case for the safety arrangements.

The safety case contents should include the following sections.

D.0 Executive Summary

An Executive Summary, which clearly sets out the following:

- the transmission undertaking's approach to risk management;
- the generic gas safety risks that arise from the gas transmission operations; and,
- a description of the structure of the safety case to demonstrate that there are comprehensive safety management systems in place to identify, assess, manage and control the risks associated with the safe management of the flow and quality of gas and the response to emergencies.

D.1. Introduction

The safety case should commence with an Introduction that provides information on:

1.1 Scope and objectives of the safety case;
1.2 References to license conditions;
1.3 Identification of those person(s) responsible for the preparation and maintenance of the safety case;
1.4 The contact details of the person with whom the CRU will liaise on matters regarding the safety case; and
1.5 A description of the formal change control procedure(s) that will be applied to the safety case.

The document revision should be clearly displayed on the document. All material changes shall be sent to the CRU in a timely manner.

D.2 Facility Description

The Facility Description should provide information on the following aspects of the undertaking's operation:

2.1. the name of the person and position who has overall managerial responsibility for the gas transmission business;

2.2. the name of the duty holder with respect to the safety case;

2.3. the name of the person responsible for the preparation and submission of the safety case;

2.4. The geographic area covered by the transmission business and the downstream assets supplied;

2.5. the location of the undertaking's headquarters or main office, the location of subsidiary offices and a description of the activities undertaken at each location;

2.6. a management organisation structure for the gas transmission business that describes how the management of gas safety is undertaken, who has responsibilities for gas safety, the numbers of personnel employed in each department/function and the key safety interfaces with operational staff;

2.7. a description of the activities undertaken with the gas transmission business, how these are organized and the resources employed to manage the operations of the business; and

2.8. a description of how gas is transported throughout the transmission network including details of:

- gas entry points to the transmission network from gas suppliers, including inputs from other networks, subsea pipelines, gas terminals, LNG terminals, gas storage installations and RNG supply facilities;
- the various pressure tiers that are used to transmit gas throughout the geographic area;

- a description of the network assets that includes:

    - the length, diameter, pipe specification & operating pressures of the transmission pipe system;
    - the number and type of above-ground installations and compressor stations in the transmission network;
    - the various categories and numbers of meters installed for custody transfer.

- Suitable maps, drawings, tables, charts and diagrams should be used to convey information wherever appropriate.
- a description of how gas flows and pressures in the transmission network are controlled and, where relevant, how gas blending is used to maintain gas quality within safe limits;
- gas exit points to distribution networks or industrial consumers with direct connections to the transmission system;
- Details of any connected distribution systems and industrial installations with direct connections to the transmission system, and the identity of their owners and operators; and

2.9. Gas exit points from transmission assets to CNG filling stations:

- Location.
- Capacity.
- Demarcation of responsibilities for Transmission and CNG assets, including diagram.
- Gas exit point from transmission asset.
- Gas exit point from CNG undertaking asset (if CNG asset owner is same operator as upstream transmission assets).
- Supply pressure.
- Any site / location specific safety risks.
- Any other relevant site / location specific safety information.

D.3 Formal Safety Risk Assessment

The safety case should provide detailed information on the processes adopted to systematically identify and assess all reasonably foreseeable hazards for gas incidents in order to determine the likelihood and consequence of the actual risks that they present to persons and property at each stage of the asset lifecycle – i.e. design, construction, operation, maintenance, modification/refurbishment and de-commissioning.

The descriptions should include the methods of any analyses made and details of any assumptions on asset and human performance and reliability. Risks should be controlled to a level that is as low as reasonably practicable (ALARP); the risk assessment is required to demonstrate this. The CRU has published a paper providing guidance on its expectations regarding the demonstration of *ALARP (ALARP Guidance – Part of the Petroleum Safety Framework and the Gas Safety Regulatory Framework" Ref: CER/16/106).* Undertakings should refer to both this Safety Case Guidelines document and the ALARP Guidance document in preparing their risk assessments and safety cases.

D.3.1 Hazard and Risk Identification and Assessment

With respect to hazard identification, the transmission undertaking should identify all significant network hazards that arise from the operation of the whole transmission network, together with the initiating events that could lead to these hazards. The assessment must cover all assets, plant and equipment that could cause or contribute to a gas incident, for example buried pipelines, above-ground installations and pipelines, compressor stations and subsea pipelines where present. The assessment may be carried out using qualitative and/or quantitative techniques as considered appropriate. In carrying out a risk assessment, the undertaking must identify whether there is a risk of Major Accident Hazards surrounding the installation, and carry out a risk assessment that is appropriate to the level of risk.

Compliance with certain risk based industry codes and standards will generally satisfy the requirements of ALARP demonstration, however:

- where undertakings cannot fully comply with their own codes and industry standards for any reason, then an explanation should be provided as to why compliance is not possible to achieve, and a full justification of the method to be used, and how this demonstrates a similar level of safety; and
- where good practices exist over and above the requirements of the codes an ALARP demonstration must describe those measures that have not been implemented and a justification for this.

- where hazards are not well defined or understood by an undertaking, additional measures should be considered to support the overall ALARP demonstration.

Reference should be made to ALARP Guidance document and section A2.2 of these Safety Case Guidelines for further information.

D.3.2 Recording of Risks

The results of the hazard and risk identification and assessment process should be recorded in a suitably formatted 'risk register'. Risk assessments should be carried out according to guidance and requirements set out in the ALARP Guidance Document, and should include, at a minimum, information such as:

- identified hazards and their causes (initiating events);
- existing safety controls that are used to manage the risk;
- an assessment of the risk based on the likelihood and consequence of the risk occurring and tolerability of the risk;
- a description of any additional control measures that are required to reduce the risk;
- a revised assessment of risk based on the implementation of the additional control measures; and
- the name of the person who is responsible for the day-to-day management of the risk(s).

D.3.3 Monitoring and Review of Hazards and Risks

There should be a description of the processes used to ensure that identified risks are regularly reviewed to ensure that they are still valid, have not altered in terms of likelihood and/or consequence and are not outdated or redundant as a result of changes in organisational or operational circumstances, or changes in external risk profile by external developments.

D.4 Safety Management System

The Safety Management System should describe how the Operator of the gas transmission undertaking provides for the safe and reliable flow of gas within the transmission network for the duration of the lifecycle of these assets. The essential elements of the Safety Management System are outlined below.

D.4.1 Safety Management Policy

The Safety Management System should reference the specific Safety Policy documents published by the transmission undertaking that set out the safety management objectives with regard to the safe management of the gas transmission network. This section should describe the approach and methodology used to ensure that the gas transmission system is designed, constructed and operated and maintained in a safe manner and how this will be achieved.

There should be a clear statement of the undertaking's intention to implement the Safety Policy regarding the prevention of risk and the protection from hazards to all persons who may be affected by its activities and how the undertaking proposes to meet its safety objectives. The policy documents must be endorsed by a member of senior management with sufficient authority to ensure that all safety-related commitments within these documents are met.

D.4.2 Technical Standards

The Safety Management System should contain a list of all relevant Irish, European and other International codes, standards and recommendations that are used by the transmission undertaking for the design, construction and operation, modification and maintenance of the transmission system. These should include a list of:

- updated current technical standards;
- legacy or historical technical standards used for the design and construction of existing assets; and,
- any internal standards used by the undertaking.

It is important that the transmission undertaking has a system for assuring itself that the technical standards and specifications currently being used are the latest version. The

Safety Management System should describe the process for ensuring that all amendments and new editions are recorded An up to date list of standards should be maintained and included, or referenced, in the Safety Case.

D.4.3 Asset Lifecycle Safety

The Safety Management System should contain sufficient information to demonstrate the management of safety during the lifecycle of its assets. Information should be provided on the following areas:

4.3.1 Design

The Safety Management System should describe in detail the design principles applied to ensure that all identified hazards and risks are eliminated or reduced to a level as low as reasonably practicable during the life cycle of the network assets. The design requirements should include the physical assets. Any associated monitoring and control systems for the network, and any associated standards. It should, at a minimum, cover the following:

4.3.1.1 Design Inputs

Key inputs to the design process should include:

- a list of identified design hazards and risks;
- a statement of the transmission network design policy;
- a description of the system design parameters for all network assets – e.g. pipelines, services, above-ground installations, compressor stations, CNG assets and RNG assets; and
- identification of the various codes, standards and recommendations adopted.

4.3.1.2 Design Process Controls

Controls over the design process should include a description of:

- the policies and procedures used for network design;
- the risk mitigating measures adopted;
- the systems and tools used for network design and modelling, including safety studies such as Hazard and Operability (HAZOP) studies, and studies to establish performance standards for safety related equipment; and
- the design validation and approval process.

4.3.1.3 *Design Outputs*

The outputs from the design should include:

- construction plans and specifications;
- performance standards, both in terms of risks and operational performance; and
- specific operational procedures required for safe operation.

4.3.2 Construction, Testing & Commissioning and Work Recording

The Safety Management System should describe in detail how the Operator manages the processes of any construction carried out on the network, testing and commissioning in accordance with adopted codes, standards and specifications. The Operator should provide demonstration of the processes for:

- ensuring that construction activities are undertaken by staff and/or contractors who possess the requisite qualifications, training, skills & experience and competencies to undertake the work in a safe manner;

- assessing and verifying that the construction work undertaken complies with the specifications;

- ensuring that post-construction and pre-commissioning testing is undertaken in a safe and competent manner and is sufficient to prove that the installed asset is suitable for its intended use;

- ensuring that assets are commissioned as per an agreed procedure; and

- as-laid records are submitted, checked for accuracy and completeness and approved prior to being recorded on the company's asset database.

4.3.3 Operation and Maintenance

The Safety Management System should describe in detail how the Operator undertakes the operation and maintenance of the network assets. It should take into account the particular risks posed by the asset under consideration. This should also extend to any associated systems that are in place to support the operation and maintenance of the assets. The Operator should provide demonstration of the arrangements in place and processes for undertaking the activities listed below, by asset group – e.g. pipelines, AGI's, compressors, CNG assets and RNG assets - wherever possible:

4.3.3.1 *Preventative Maintenance* - which includes such activities as:

- third party damage prevention;
- leakage survey – vehicle and foot patrol surveys;
- pressure monitoring;
- gas quality monitoring (e.g. CV, Wobbe number, water/hydrocarbon dewpoint, oxygen, sulphur compounds and other relevant compounds as necessary);
- ground movement surveys;
- cathodic protection monitoring;
- maintenance of safety instrumented systems and other safety related protective or control systems;
- non-routine operations procedures;
- permit-to-work systems; and;
- RNG feedstock verification and compliance assurance as it relates to GNI effectively managing its responsibility with respect to gas quality under the Gas Safety Framework i.e. to independently monitor and measure gas quality parameters and subsequently either accept gas into the transmission and/or distribution system, or, reject gas delivered for entry by shutting out and isolating the non-compliant source as specified in the Code of Operations (Part G Technical)

4.3.3.2 *Corrective Maintenance* - which includes such activities as:

- attending 'local' incidents involving the transmission system, including reports of potential damage or pipeline contact, and adjacent incidents where pipeline safety may be an issue;
- responding to gas system operating pressure related incidents – i.e. low pressure or high pressure in the network; and
- other asset-related emergency maintenance that may be required to be undertaken as identified in the Formal Safety Risk Assessment.

4.3.3.3 *Supporting Systems Maintenance* - which includes such activities as:

- storing and updating asset records – i.e. drawings, plans, databases etc; and
- maintenance of DCS or SCADA systems.

4.3.4 Modification, Replacement and Reinforcement

The Safety Management System should describe in detail the processes that the Operator uses for undertaking network modifications, replacements and reinforcements including the processes for:

- identifying the need for modification, replacement or reinforcement;
- developing, designing and selecting the chosen approach to modification, replacement or reinforcement;
- approving the selected design; and
- updating asset records.

4.3.5 De-Commissioning and Abandonment

The Safety Management System should describe in detail the processes that the Operator uses for de-commissioning and abandoning transmission assets including:

- identifying the need for de-commissioning and abandonment of an asset;
- assessing the impact of the decision to de-commission and abandon an asset; and
- recording of de-commissioned and abandoned assets on the company's asset database.

D.4.4 New Connections

The Safety Management System should provide a description of the processes in place for ensuring that new connections to the transmission system are installed in accordance with relevant Irish and International Standards before natural gas is supplied to them.

D.4.5 Connected Systems

The Safety Management System should provide a description of the control processes for the connection of third party systems or connections to the Operator's network. This should include a description of the processes for:

- assessing and approving third party designs;
- ensuring that all construction, testing and commissioning is undertaken in accordance with the design specifications;
- managing the interface (pressures, flows and gas quality) between the connected system and the Operators network; and
- managing emergencies on connected systems where emergency response arrangements have been agreed between the relevant System Operators or Asset Owners and
- Any agreements regarding the demarcation of responsibilities between the relevant System Operators and Asset Owners.

D.4.6 Procurement

The Safety Management System should provide a description of the controls which will be applied to ensure that contractual arrangements entered into with third parties give appropriate assurance of safety. In particular, to ensure that no person is exposed to unacceptable risk from the actions and services or from the equipment and products

provided to the transmission undertaking by external providers. The controls should include processes for:

- undertaking pre-contract checks on competency of personnel and conformity of products and equipment with relevant standards and specifications;
- assessing the overall safety management systems of the provider; and
- arrangements for monitoring of compliance with agreed safety standards.

D.4.7 Human Factors

The Safety Management System should describe how the transmission undertaking addresses the human factors that are important to the management of the safe flow of gas and managing the response to gas emergency incidents. This should include detail regarding the management of any third parties such as contractors and consultants, who may be involved in carrying out any work on the network. In particular, the Safety Management System should include processes for:

- identifying safety critical roles, responsibilities and tasks at all levels in the organisation, including management, operational staff and contractors;
- identifying the role specific competencies and capabilities that are required to ensure the safe management of the flow of gas and the response to emergencies;
- selecting & recruiting, training, assessing and re-assessing staff and contractors;
- demonstrating that there is adequate availability of competent personnel (including contractors) for the safe management of the flow of gas and the response to emergencies;
- demonstrating that adequate supervision of personnel in safety critical roles is provided, and that a satisfactory team-working culture is maintained;
- demonstrating that procedures associated with operations are developed to take into account human factors, are maintained as current and are used in practice; and

- demonstrating that control room and human-machine interface (HMI) design are satisfactory, and that staff fatigue issues have been addressed especially where shift working is involved.

D.4.8 Consultation, Communication and Cooperation

The Safety Management System should describe the systems in place for involving staff, either directly or through their representatives, in the development and implementation of the Safety Management System, and for consulting with staff and their representatives generally on issues relating to safety.

A description of the processes for the communication of safety information both internally and externally to the organisation and cooperation with external bodies with respect to gas safety should be provided. This should include a description of the processes for the communication of safety information:

- upwards and downwards within the undertaking;
- to and from other gas market participants;
- to and from other utilities, local authorities, construction industry and other third parties with respect to the protection of plant;
- to and from the CRU;
- to and from end-use customers and the general public; and
- to and from the entity with responsibility for a CNG dispenser.
- to and from operators of RNG supply facilities (‘connected system operators’) that are connected to the natural gas transmission system.

The Safety Management System should also describe the cooperative arrangements that exist between the undertaking and other external bodies that have interests in gas safety issues. For example these external bodies include:

- Health and Safety Authority;
- Emergency services;
- Government departments and other public and institutional bodies.
- gas consumer representative bodies;
- installation contractors;
- National Standards Authority for Ireland; and
- architects, building design consultants and developers;
- Environmental Protection Agency

D.4.9 Documentation, Data and Records Management

The Safety Management System should describe the documentation, data and records management systems that relate to asset and operational safety performance, including:

- the type and extent of asset and operational data to be collected;
- the mechanisms that are used to collect, analyse, interpret and record the data;
- how asset and operational documentation and data is made available to those authorized persons requiring access to the data;
- how changes to documentation, data and records are communicated to the relevant staff; and
- how obsolete documents, data and information are removed from points of issue and use.

The Safety Management System should also describe the IT systems, databases and any other means of recording asset and operational safety performance data and how the data is protected, updated, retrieved, 'backed-up' and archived.

D.4.10 Change Management

The Safety Management System should describe the systems and procedures implemented to ensure that the risks arising from changes to the transmission undertaking are assessed and properly controlled both during the change process and after its completion. Examples of such changes include, but are not limited to:

- 'significant' changes to the configuration of the network or the way in which the network is supplied with gas;
- major organisational changes that impact key safety related roles and responsibilities;
- changes to operating policies and procedures; and
- outsourcing of key activities.

The Safety Management System should also contain procedures for analysing proposed changes through the Formal Safety Risk Assessment process. Where a change is deemed

by the undertaking to be ‘material’, the CRU should be notified in accordance with the guidance on ‘Safety Case Modifications’ as explained in Section A of these Guidelines.

D.4.11 Accident and Incident Investigation

The Safety Management System should provide evidence of appropriate arrangements for investigating gas safety related accidents and incidents, which should show that sufficient competency will be applied to ascertain not only the immediate cause(s) but also the ‘root cause’ of such accidents and incidents. The arrangements for carrying out accident and incident investigation should also describe how recommendations to prevent recurrence are made and how follow-up actions are managed.

D.4.12 Gas Safety Promotion and Public Awareness

The Safety Management System should provide a description of how the transmission undertaking promotes gas safety to raise public awareness of the potential dangers of gas. This will include for example:

- advertising the national gas emergency number;
- advising on the actions to be taken in the event of a suspected gas escape;
- implementing ‘dial-before-you-dig’ schemes and protecting underground gas plant from the activities of third parties;
- Liaisons with landowners and local authorities and;
- Where CNG assets are supplied and/or operated by the transmission undertaking:
    - establish and maintain systems for communicating information to consumers regarding the safety of CNG filling, for example, in the form of signage; and
    - provide published material with information and adequate warnings about the potentially hazardous properties of CNG,

D.4.13 Safety Reporting

The Safety Management System should provide details of the safety reporting framework that the transmission undertaking uses to demonstrate that gas safety is being managed effectively, that safety trends are analysed and progress towards safety performance objectives and targets are being achieved. The safety reporting framework should provide details of:

- the reporting regime for gas emergency incidents, a definition of the various categories of incident that may arise and the process and person interfaces involved in incident reporting and subsequent investigation;

- the structure and contents of the quarterly safety reports that the gas undertaking will be required to submit to the CRU. This should include a description and explanation of the safety key performance indicators (KPIs) that are used in measuring gas safety performance; and

- the structure and content of the annual safety report that the undertaking will be required to submit to the CRU. This should include a detailed description of the overall safety performance of the transmission undertaking during the year and the actions that the undertaking proposes to take to improve gas safety.

D.4.14 Audit and Inspection

Under the Gas Safety Regulatory Framework, the CRU considers that there are three forms of audit and inspection involving the safety case and any associated safety activities. These are:

- Internal safety audit and inspections, as carried out by the undertaking;
- External safety audit and inspections, carried out by the CRU; and,

- The 5 year review[5], which is a detailed independent external review of an undertakings' safety case, carried out by an independent external body on a 5 year basis. The report from this review is submitted to the CRU.

For the purposes of the Safety Case, the "Audit and Inspection" section of the Safety Management System should describe the undertakings' arrangements for internal safety audit and inspections as a continuing management and monitoring tool, and the resources which will be applied to these activities. The audit and inspections regime should be based on the assessment of risk as it applies to the asset or activity under consideration. There should be a description of the approach to undertaking audit and inspection:

- the timing of routine audits and inspections
- the structure of audits and inspections; and
- persons undertaking audits and inspections.

There should be a description of how the results of audits and inspections are fed back into the performance monitoring and review process.

D.4.15 Performance Monitoring and Review

The Safety Management System should describe how the transmission undertaking reviews and assesses the safety performance of its assets and operations and should include the following:

- the approach to setting safety performance objectives and targets and the details of the intended frequency of monitoring progress towards the targets and who will be directly involved in reviewing the results;

[5] As of the 1st January 2016 undertakings will now be required to undertake a five yearly review. This change is to align the GSF with the PSF.

- the methodology used to process data in order to monitor trends and progress towards safety performance objectives and targets and identification of the resources used to undertake such data processing and analysis;

- the process for determining whether the safety performance objectives and targets have been achieved and how the extent of any safety performance 'gaps' are assessed; and

- the process for making recommendations on the corrective actions to be taken, approving the proposed corrective actions and monitoring outcomes for the results of corrective actions.

D.4.16 Continual Improvement

The Safety Management System should provide a description of the procedures for the regular and ongoing re-evaluation of the Safety Management System and the initiation of any necessary improvements. The inputs to this process should include the outcomes of the actions taken under the following:

4.11 – Accident and Incident Investigation;
4.12 – Gas Safety Promotion and Public Awareness;
4.13 – Safety Reporting;
4.14 – Audit and Inspection; and
4.15 – Performance Monitoring and Review.

D.5 Emergency Procedures

The Emergency Procedures section should describe in detail how the Operator of the gas transmission undertaking will fulfil its duties and obligations as required by the National Gas Emergency Manager. Potential triggers for gas emergencies are set out in the CER's *National Gas Supply Emergency Plan (Ref: CER/14/784)* and the *Natural Gas Emergency Plan* (NGEP), as prepared by Gas Networks Ireland. However it should be noted that an emergency may arise due to a situation outside the "triggers" described in these documents; the undertaking's emergency procedures should take account of this.

The actions required of the transmission undertaking are currently described in the Natural Gas Emergency Plan. The emergency procedures should describe clearly the specific actions that the Operator of the transmission undertaking will perform at each step of the gas emergency situation and how, and by whom, these actions will be carried out. The various steps in the gas emergency process are as shown below:

Step 1: Potential Emergency
Step 2: Declaration and Load Shedding
Step 3: Allocation of Gas and Isolation
Step 4: Restoration

The Emergency Procedures should also identify:

- the structure of the emergency management team that will coordinate the overall response to the gas emergency incident, and the means of communication employed between the various participants during an emergency;
- details on how the emergency management team is established;
- the individual persons that will undertake the emergency management roles required of a gas transmission undertaking;
- the contact details of the personnel on the emergency standby rota;
- detail of the training that is given to ensure that these roles can be fulfilled safely and competently;

- the resources (personnel and facilities) that will be employed in providing an effective emergency response; and

- the frequency of testing of the emergency response capability that the undertaking carries out in order to assure itself that an effective emergency response can be provided both during and out of normal working hours.

- The emergency procedures should also describe how the Operator establishes and maintains procedures to minimise risk in the event that the composition of the gas received and distributed by the network is outside the specified safe limits. The Operator should establish a control system to ensure that gas of inappropriate quality is not received from natural gas shippers.

A local site specific Emergency Plan should be developed for each site location into which all parties who are involved in the CNG activity should input. This structure of this document should follow that of the HSA Emergency Response Plans for Petrol Stations, available here.[6]

[6]http://www.hsa.ie/eng/Your_Industry/Petrol_Stations/Emergency_Response_for_Petrol_Stations.pdf

PART E: SPECIFIC REQUIREMENTS FOR GAS DISTRIBUTION UNDERTAKINGS

This section of the Guidelines contains the specific minimum information requirements for the development of the safety case for **gas distribution undertakings**. These are minimum information requirements and it is the responsibility of the relevant undertaking to provide sufficient information in order to allow the CRU make an assessment of the adequacy of the safety case. A balance will need to be struck between the material to be included in the safety case and supporting information, which can be cross-referenced and provided on request. As a guiding principle, safety cases should be presented as self-contained documents which:

- present the main safety arguments clearly and succinctly so that the core principles can be readily understood; and

- include sufficient detail to establishing a convincing case for the safety arrangements.

The safety case contents should include the following sections.

E.0 Executive Summary

An Executive Summary, which explains the distribution undertaking's approach to risk management, describes the generic gas safety risks that arise from the gas distribution operations and a description of the structure of the safety case to demonstrate that there are comprehensive safety management systems in place to identify, assess, manage and control the risks associated with the safe management of the flow of gas and the response to emergencies.

E.1. Introduction

The safety case should commence with an Introduction that provides information on:

1.1 scope and objectives of the safety case;

1.2 references to license conditions;

1.3 identification of those person(s) responsible for the preparation and maintenance of the safety case;

1.4 the contact details of the person with whom the CRU will liaise on matters regarding the safety case; and

1.5 a description of the formal change control procedure(s) that will be applied to the safety case.

The document revision should be clearly displayed at the beginning of the document. All material changes shall be sent to the CRU in a timely manner.

E.2 Facility Description

The Facility Description should provide information on the following aspects of the undertaking's operation:

2.1. the name of the person and position who has overall managerial responsibility for the gas distribution business;

2.2. the name of the duty holder with respect to the safety case

2.3. the name of the person who is responsible for the preparation and submission of the safety case

2.4. the geographic area covered by the distribution business and the numbers and categories of customers supplied;

2.5. the location of the undertaking's headquarters or main office, the location of subsidiary offices and a description of the activities undertaken at each location;

2.6. a management organisation structure for the gas distribution business that describes how the management of gas safety is undertaken, who has responsibilities for gas safety, the numbers of personnel employed in each department/function and the key safety interfaces with operational staff;

2.7. a description of the activities undertaken with the gas distribution business, how these are organized and the resources employed to manage the operations of the business; and

2.8. a description of how gas is transported throughout the distribution network including details of:

- gas entry points to the distribution network from the higher pressure transmission system and from gas suppliers, including inputs from other networks, gas terminals, LNG terminals, gas storage installations and RNG supply facilities;

- the various pressure tiers that are used to distribute gas throughout the geographic area;
- a description of the network assets that includes:

    - the length, diameter, pipe materials & operating pressures of the distribution pipe system;
    - the number and type of pressure reducing installations in the distribution network; and
    - the various categories and high level numbers of meters installed;
    - suitable maps, drawings, tables, charts and diagrams should be used to convey information wherever appropriate.

- a description of how gas flows and pressures in the distribution network are controlled

2.9. Gas exit points from distribution assets to CNG filling stations:

- Location
- Capacity
- Demarcation of responsibility for Distribution and CNG assets, including diagram
    - Gas exit point from distribution asset
    - Gas exit point from CNG undertaking asset (if CNG asset owner is same operator as upstream distribution assets)
- Supply pressure
- Any site / location specific safety risks
- Any other relevant site / location specific safety information

E.3 Formal Safety Risk Assessment

The safety case should provide detailed information on the processes adopted to systematically identify and assess all reasonably foreseeable hazards for gas incidents in order to determine the likelihood and consequence of the actual risks that they present to persons and property at each stage of the asset lifecycle – i.e. design, construction, operation & maintenance, modification/refurbishment and de-commissioning.

The descriptions should include the methods of any analyses made and details of any assumptions on asset and human performance and reliability. Risks should be controlled to a level that is ALARP the risk assessment is required to demonstrate this. The CRU has published a paper providing guidance on its expectations regarding the demonstration of ALARP *(ALARP Guidance Document Ref: CER/16/106*). Undertakings should refer to both this *Safety Case Guidelines* document and the *ALARP Guidance* document in preparing their risk assessments and safety cases.

E.3.1 Hazard and Risk Identification and Assessment

With respect to hazard identification, the distribution undertaking should identify all significant network hazards that arise from the operation of the distribution network. An assessment should made of all the identified hazards in order to determine the likelihood and consequences of the risks that may arise. The assessment may be carried out using qualitative and/or quantitative techniques as considered appropriate by the distribution undertaking. The assessment may be carried out using qualitative and/or quantitative techniques as considered appropriate. In carrying out a risk assessment, the undertaking must identify whether there is a risk of Major Accident Hazards surrounding the installation, and carry out a risk assessment that is appropriate to the level of risk.

Compliance with relevant industry codes and standards will generally satisfy the requirements of ALARP demonstration, however:

- where undertakings cannot fully comply with their own codes and industry standards for any reason, then an explanation should be provided as to why compliance is not possible to achieve, and a full justification of the method to be used, and how this demonstrates a similar level of safety; and

- where good practices exist over and above the requirements of the codes an ALARP demonstration must describe those measures that have not been implemented and a justification for this.
- Where hazards are not well defined or understood by an undertaking, additional measures should be considered to support the overall ALARP demonstration

Reference should be made to *ALARP Guidance document* and *section A2.2 of these Safety Case Guidelines* for further information.

E.3.2 Recording of Risks

The results of the hazard and risk identification and assessment process should be recorded in a suitably formatted 'risk register'. Risk assessments should be carried out according to guidance and requirements set out in the *ALARP Guidance Document*, and should include, at a minimum, information such as:

- identified hazards and initiating events and their causes;
- existing safety controls that are used to manage the risk;
- an assessment of the risk based on the likelihood and consequence of the risk occurring and tolerability of the risk;
- a description of any additional control measures that are required to reduce the risk;
- a revised assessment of risk based on the implementation of the additional control measures; and
- the name of the person who is responsible for the day-to-day management of the risk(s).

E.3.3 Monitoring and Review of Hazards and Risks

There should be a description of the processes used to ensure that any new risks are identified and that existing risks are regularly reviewed to ensure that they are still valid, have not altered in terms of likelihood and/or consequence and are not outdated or redundant as a result of changes in organisational or operational circumstances, or changes in external risk profile by external developments.

E.4 Safety Management System

The Safety Management System should describe, at a minimum, how the Operator of the gas distribution undertaking provides for the safe and reliable flow of gas within the distribution network for the duration of the lifecycle of these assets. The essential elements of the Safety Management System are outlined below.

E.4.1 Safety Management Policy

The Safety Management System should reference the specific Safety Policy documents that set out the safety management objectives with regard to the *safe management of the gas distribution network.* This should describe the approach and methodology used to ensure that the gas distribution system is designed, constructed and operated and maintained in a safe manner and how this will be achieved.

There should be a clear statement of the undertakings' intention to implement the Safety Policy regarding the prevention of risk and the protection from hazards to all persons who may be affected by its' activities and how the undertaking proposes to meet its safety objectives. The policy documents must be endorsed by a member of senior management with sufficient authority to ensure that all safety-related commitments within these documents are met.

E.4.2 Technical Standards

The Safety Management System should contain a list of all relevant Irish, European and other international codes, standards and recommendations that are used by the distribution undertaking for the design, construction, operation and maintenance, modification and decommissioning of the distribution system. These should include:

- a list of updated current technical standards;
- legacy or historical technical standards used for the design and construction of existing assets; and,
- any internal standards used.

It is important that the distribution undertaking has a system for assuring itself that the technical standards and specifications that are currently being used are the latest version.

The Safety Management System should describe the process for ensuring that all amendments and new editions are recorded. An up to date list of standards should be maintained and circulated to the CRU and other relevant bodies.

E.4.3 Asset Lifecycle Safety

The Safety Management System should contain sufficient information to demonstrate the management of safety during the lifecycle of its assets. Information should be provided on the following areas:

4.3.1 Design

The Safety Management System should describe in detail the design principles applied to ensure that all identified hazards and risks are eliminated or reduced to a level as low as reasonably practicable during the life cycle of the network assets. The design requirements should include the physical assets. Any associated monitoring and control systems for the network, and any associated standards. It should, at a minimum, cover the following:

4.3.1.1 *Design Inputs*

Key inputs to the design process should include:

- a list of identified design hazards and risks;
- a statement of the distribution network design policy;
- a description of the system design parameters for all network assets – e.g. mains, services, pressure-reducing installations, meters, CNG assets and RNG assets; and
- identification of the various codes, standards and recommendations adopted.

4.3.1.2 *Design Process Controls*

Controls over the design process should include a description of:

- the policies and procedures used for network design;
- the risk mitigating measures adopted;
- the systems and tools used for network design and modelling; and

- the design validation and approval process.

4.3.1.3 *Design Outputs*

The outputs from the design should include:

- construction plans and specifications;
- performance standards, both in terms of risks and operational performance; and
- specific operational procedures required for safe operation.

4.3.2 Construction, Testing & Commissioning and Work Recording

The Safety Management System should describe in detail how the Operator manages the processes of any construction carried out on the network, including testing and commissioning in accordance with the adopted codes, standards and specifications. The Operator should provide demonstration of the processes for:

- ensuring that construction activities are undertaken by staff and/or contractors who possess the requisite qualifications, training, skills & experience and competencies to undertake the work in a safe manner;

- assessing and verifying that the construction work undertaken complies with the specifications;

- ensuring that post-construction and pre-commissioning testing is undertaken in a safe and competent manner and is sufficient to prove that the installed asset is suitable for its intended use;

- ensuring that assets are commissioned as per an agreed procedure; and

- as-laid records are submitted, checked for accuracy and completeness and approved prior to being recorded on the company's asset database.

4.3.3 Operation and Maintenance

The Safety Management System should describe in detail how the Operator undertakes the operation and maintenance of the network assets. It should take into account the particular risks posed by the asset under consideration. This should also extend to any associated systems that are in place to support the operation and maintenance of the assets –The Operator should provide demonstration of the arrangements in place and processes for undertaking the activities listed below *by asset group* – i.e. mains, services, Pressure Regulating Stations (PRS)/District Regulating installations (DRI meters, CNG assets and RNG assets - wherever possible:

4.3.4 Preventative Maintenance

…which includes such activities as:

- third party damage prevention;
- leakage survey – vehicle and foot patrol surveys;
- pressure monitoring;
- gas quality monitoring (CV and odorant);
- ground movement surveys;
- cathodic protection monitoring;
- DRI maintenance – pneumatic and E&I control system maintenance;
- I&C meter maintenance (including customers' downstream equipment);
- non-routine operations procedures;
- permit-to-work systems; and;
- RNG feedstock verification and compliance assurance as it relates to GNI effectively managing its responsibility with respect to gas quality under the Gas Safety Framework i.e. to independently monitor and measure gas quality parameters and subsequently either accept gas into the transmission and/or distribution system, or, reject gas delivered for entry by shutting out and isolating the non-compliant source as specified in the Code of Operations (Part G Technical).

4.3.5 Corrective Maintenance

…which includes such activities as:

- attending public reported escapes (PREs) both inside and outside the property, including 3rd party damages, reports of ‘no gas’, fires, explosions and CO incidents etc;
- responding to gas system operating pressure related incidents – i.e. low pressure or high pressure in the network; and
- other asset-related emergency maintenance that may be required to be undertaken as identified in the Formal Safety Risk Assessment.

4.3.6 Supporting Systems Maintenance

which includes such activities as:

- storing and updating asset records – i.e. drawings, plans, databases etc; and
- maintenance of DCS or SCADA systems.

The Safety Management System should describe how the Operator undertakes both gas leakage and gas pressure management through the systematic monitoring of leakage trends and pressures within the network and the measures that are used to achieve: (i) an ongoing reduction in gas leakage from the network; and (ii) reliable security of gas supply.

4.3.7 Modification, Replacement and Reinforcement

The Safety Management System should describe in detail the processes that the Operator uses for undertaking network modifications, replacements and reinforcements including the processes for:

- identifying the need for modification, replacement or reinforcement;
- developing, designing and selecting the chosen approach to modification, replacement or reinforcement;
- approving the selected design; and
- updating asset records.

4.3.8 De-Commissioning and Abandonment

The Safety Management System should describe in detail the processes that the Operator uses for de-commissioning and abandoning distribution assets including:

- identifying the need for de-commissioning and abandonment of an asset;
- assessing the impact of the decision to de-commission and abandon an asset; and
- recording of de-commissioned and abandoned assets on the company's asset database.

E.4.4 New Connections and Re-connections

The Safety Management System should provide a description of the control processes in place for ensuring that customers downstream (of the meter) installations are installed in accordance with relevant Standards before natural gas is supplied, or re-supplied, to the premises.

E.4.5 Connected Systems

The Safety Management System should provide a description of the control processes for the connection of third party systems or connections to the Operators network. This should include a description of the processes for:

- assessing and approving third party designs;
- ensuring that all construction, testing and commissioning is undertaken in accordance with the design specifications;
- managing the interface (pressures and flows) between the connected system and the Operator's network; and
- managing emergencies on connected systems where emergency response arrangements have been agreed between the relevant System Operators or Asset Owners and
- Any agreements regarding the demarcation of responsibilities between the relevant System Operators or Asset Owners.

E.4.6 Procurement

The Safety Management System should provide a description of the controls which will be applied to ensure that contractual arrangements entered into with third parties give appropriate assurance of safety. In particular, to ensure that no person is exposed to unacceptable risk from the actions and services or from the equipment and products provided to the distribution undertaking by external providers. The controls should include processes for:

- undertaking pre-contract checks on competency of personnel and conformity of products and equipment with relevant standards and specifications;
- assessing the overall safety management systems of the provider; and
- arrangements for monitoring of compliance with agreed safety standards.

E.4.7 Human Factors

The Safety Management System should describe how the distribution undertaking addresses the human factors that are important to the management of the safe flow of gas and managing the response to gas emergency incidents. This should include detail regarding the management of any third parties, such as contractors and consultants who may be involved in carrying out any work on the network. In particular, the Safety Management System should include processes for:

- identifying safety critical roles, responsibilities and tasks at all levels in the organisation, including management, operational staff and contractors;

- identifying the role specific competencies and capabilities that are required to ensure the safe management of the flow of gas and the response to emergencies;

- selecting, recruiting, training, assessing and re-assessing staff and contractors;

- demonstrating that adequate supervision of personnel in safety critical roles is provided.

E.4.8 Consultation, Communication and Cooperation

The Safety Management System should describe the systems in place for involving staff, either directly or through their representatives, in the development and implementation of the Safety Management System, and for consulting with staff and their representatives generally on issues relating to safety.
A description of the processes for the communication of safety information both internally and externally to the organisation and cooperation with external bodies with respect to gas safety should be provided. This should include a description of the processes for the communication of safety information:

- upwards and downwards within the undertaking;
- to and from other gas market participants;
- to and from other utilities, local authorities, construction industry and other third parties with respect to the protection of plant;
- to and from the CRU
- to and from end-use customers and the general public; and
- to and from the entity with responsibility for a CNG dispenser.
- to and from operators of RNG supply facilities (‘connected system operators’) that are connected to the natural gas distribution system.

The Safety Management System should also describe the cooperative arrangements that exist between the undertaking and other external bodies that have interests in gas safety issues. For example these external bodies include:

- Health and Safety Authority;
- Emergency Services
- Government departments and other public and institutional bodies.
- gas consumer representative bodies

- installation contractors;
- National Standards Authority for Ireland; and
- architects, building design consultants and developers;
- Environmental Protection Agency

E.4.9 Documentation, Data and Records Management

The Safety Management System should describe the documentation, data and records management systems that relate to asset and operational safety performance, including:

- the type and extent of asset and operational data to be collected;
- the mechanisms that are used to collect, analyse, interpret and record the data;
- how asset and operational documentation and data is made available to those authorized persons requiring access to the data;
- how changes to documentation, data and records are communicated to the relevant staff; and
- how obsolete documents, data and information are removed from points of issue and use.

The Safety Management System should also describe the IT systems, databases and any other means of recording asset and operational safety performance data and how the data is protected, updated, retrieved, 'backed-up' and archived.

E.4.10 Change Management

The Safety Management System should describe the systems and procedures implemented to ensure that the risks arising from changes to the distribution undertaking are assessed and properly controlled both during the change process and after its completion. Examples of such changes include, but are not limited to:

- 'significant' changes to the configuration of the network or the way in which the network is supplied with gas;

- major organisational changes that impact key safety related roles and responsibilities;
- changes to operating policies and procedures; and
- outsourcing of key activities.

The Safety Management System should also contain procedures for analysing proposed changes through the Formal Safety Risk Assessment process. Where a change is deemed by the undertaking to be 'material', the CRU should be notified in accordance with the guidance on 'Safety Case Modifications' as explained in Section A of these Guidelines.

E.4.11 Accident and Incident Investigation

The Safety Management System should provide evidence of appropriate arrangements for investigating gas safety related accidents and incidents, which should show that sufficient skill will be applied to ascertain not only the immediate cause(s) but also the 'root cause' of such accidents and incidents. The arrangements for carrying out accident and incident investigation should also describe how recommendations to prevent recurrence are made and how follow-up actions are managed.

E.4.12 Gas Safety Promotion and Public Awareness

The Safety Management System should provide a description of how the distribution undertaking promotes gas safety to raise public awareness of the potential dangers of gas. This will include for example:

- advertising the national gas emergency number;
- advising on the actions to be taken in the event of a suspected gas escape;
- implementing 'dial-before-you-dig' schemes and protecting underground gas plant from the activities of third parties;
- information on specific targeted campaigns (for example, Carbon Monoxide, Meter Tampering, etc); and

- Where CNG assets are supplied and/or operated by the distribution undertaking:
    - establish and maintain systems for communicating information to consumers regarding the safety of CNG filling, for example, in the form of signage;
    - provide published material with information and adequate warnings about the potentially hazardous properties of CNG,

E.4.13 Safety Reporting

The Safety Management System should provide details of the safety reporting framework that the distribution undertaking uses to demonstrate that gas safety is being managed effectively, that safety trends are analysed and progress towards safety performance objectives and targets are being achieved. The safety reporting framework should provide details of:

- the reporting regime for gas emergency incidents, a definition of the various categories of incident that may arise and the process and person interfaces involved in incident reporting and subsequent investigation;

- the structure and contents of the quarterly safety reports that the gas undertaking will be required to submit to the CRU. This should include a description and explanation of the safety key performance indicators (KPIs) that are used in measuring gas safety performance; and

- the structure and content of the annual safety report that the gas undertaking will be required to submit to the CRU. This should include a detailed description of the overall safety performance of the distribution undertaking during the year and the actions that the undertaking proposes to take to improve gas safety.

E.4.14 Audit and Inspection

Under the Gas Safety Regulatory Framework, the CRU considers that there are three forms of audit and inspection involving the safety case and any associated activities. These are:

- Internal safety audit and inspections, as carried out by the undertaking;
- External safety audit and inspections, carried out by the CRU; and,
- The 5 year review, which is a detailed independent external audit of an undertakings' safety case, carried out by an independent external body on a 5 yearly basis. The report from this review is submitted to the CRU.

For the purposes of the Safety Case, the "Audit and Inspection" section of the Safety Management System should describe the undertakings' arrangements for internal safety audit and inspections as a continuing management and monitoring tool, and the resources which will be applied to these activities. The audit and inspections regime should be based on the assessment of risk as it applies to the asset or activity under consideration. There should be a description of the approach to undertaking audit and inspection:

- the timing of routine audits and inspections
- the structure of audits and inspections; and
- persons undertaking audits and inspections.

There should be a description of how the results of audits and inspections are fed back into the performance monitoring and review process.

E.4.15 Performance Monitoring and Review

The Safety Management System should describe how the distribution undertaking reviews and assesses the safety performance of its assets and operations and should include the following:

- the approach to setting safety performance objectives and targets and the details of the intended frequency of monitoring progress towards the targets and who will be directly involved in reviewing the results;

- the methodology used to process data in order to monitor trends and progress towards safety performance objectives and targets and identification of the resources used to undertake such data processing and analysis;

- the process for determining whether the safety performance objectives and targets have been achieved and how the extent of any safety performance 'gaps' are assessed; and

- the process for making recommendations on the corrective actions to be taken, approving the proposed corrective actions and monitoring outcomes for the results of corrective actions.

E.4.16 Continual Improvement

The Safety Management System should provide a description of the procedures for the regular and ongoing re-evaluation of the Safety Management System and the initiation of any necessary improvements. The inputs to this process should include the outcomes of the actions taken under the following:

4.11 – Accident and Incident Investigation;
4.12 – Gas Safety Promotion and Public Awareness;
4.13 – Gas Safety Reporting;
4.14 – Audit and Inspection; and
4.15 – Performance Monitoring and Review.

E.5 Emergency Procedures

The emergency procedures section should describe in detail how the Operator of the gas distribution undertaking will fulfil its duties and obligations as required by the National Gas Emergency Manager. Potential triggers for gas emergencies are set out in the CRU's National Gas Supply Emergency Plan (Ref: CER/14/784) and the Natural Gas Emergency Plan (NGEP), as prepared by Gas Networks Ireland. However it should be noted that an emergency may arise due to a situation outside the "triggers" described in these documents; the undertaking's emergency procedures should take account of this.

The actions required of the distribution undertaking are currently described in the Natural Gas Emergency Plan as issued by Gas Networks Ireland. The Emergency Procedures should describe clearly the specific actions that the Operator of the distribution undertaking will perform at each step of the gas emergency situation and how, and by whom, these actions will be carried out. The various steps in the gas emergency process are as shown below:

Step 1: Potential Emergency
Step 2: Declaration and Load Shedding
Step 3: Allocation of Gas and Isolation
Step 4: Restoration

The Emergency Procedures should also identify:

- the structure of the emergency management team that will coordinate the overall response to the gas emergency incident, and the means of communication employed between the various participants during an emergency;
- details on how the emergency management team is established;
- the individual persons that will undertake the emergency management roles required of a gas distribution undertaking;
- the contact details of the personnel on the emergency standby rota;

- detail of the training that is given to ensure that these roles can be fulfilled safely and competently;

- the resources (personnel and facilities) that will be employed in providing an effective emergency response; and

- the frequency of testing of the emergency response capability that the undertaking carries out in order to assure itself that an effective emergency response can be provided both during and out of normal working hours.

A local site specific Emergency Plan should be developed for each site location into which all parties who are involved in the CNG activity should input. This structure of this document should follow that of the HSA Emergency Response Plans for Petrol Stations, available here.[7]

The emergency procedures should also contain detail on how the distribution undertaking responds to individual incidents and emergencies at a local level. It should outline what processes and procedures are in place for responding to incidents that are reported to it, and how these are implemented.

The Emergency Procedures should also describe how the Operator establishes and maintains procedures to minimise risk in the event that the composition of the gas distributed through the network is outside the specified safe limits. The Operator should establish a control system to ensure that the gas is not supplied to unsuitable appliances and installations.

[7] http://www.hsa.ie/eng/Your_Industry/Petrol_Stations/Emergency_Response_for_Petrol_Stations.pdf

PART F: SPECIFIC REQUIREMENTS FOR GAS SUPPLY UNDERTAKINGS

Natural gas supply undertakings are required to comply with the following part “F” only. Requirements for Compressed Natural Gas (CNG) supply undertakings are set out in parts A and I of the Guidelines. ‘Supply’ in relation to natural gas, means the delivery or sale of natural gas, including liquefied natural gas, to customers and includes shipping as defined in the Gas (Interim) Regulation Act 2002, as amended.

The supply undertaking is required to address each of the points below using the table format provided. This table can be also found in Microsoft Word format at the following location for ease of completion; link

Section		Section Requirement	Supply Undertaking Response
F.1-Introduction	**1.1**	Provide a brief background on the gas supply business	
	1.2	Include a description of the gas supply undertaking's existing and proposed activities	
F.2-Facility Description	**2.1**	The name and contact details of the person and position who has overall managerial responsibility for the gas supply business	
	2.2	The name and contact details of the duty holder. The 'Duty Holder' will be a person who is a representative of undertaking i.e. the person who represents the 'controlling mind' with regard to the day-to-day operating decisions that are taken.	
	2.3	The name and contact details of the person responsible for the preparation, submission and ongoing maintenance of the safety case	
	2.4	The geographic area covered by the undertaking	
	2.5	Describe the categories and numbers of customers that it actively retails gas to – e.g. LDM, DM and NDM customer groups.	
	2.6	The location of the undertaking's headquarters or main office, the location of subsidiary offices and a description of the activities undertaken at each location	
F.3-Customer Gas Safety Awareness	**3**	**The gas supply undertaking must confirm that it will carry out each of the following in relation to gas safety awareness**	
	3.1	Establish and maintain systems for communicating information to consumers regarding the safety of gas installations and appliances	

	3.2	Provide published material to customers with information and adequate warnings about the potentially hazardous properties of gas, in particular the dangers of carbon monoxide, and the national emergency contact telephone number for reporting gas escapes.	
	3.3	If the appliance is assessed or determined to be defective or unsafe, consumers should be informed that they should report defective or unsafe gas appliances to the Competition and Consumer Protection Commission (CCPC), at productsafety@ccpc.ie including the make, model, manufacturer, when and where the product was purchased and include 'Unsafe Gas Appliance' in the email subject line. Consumers should also be informed to report the defective or unsafe gas appliance to the distributor/retailer they purchased the appliance from.	
	3.4	Inform consumers that the CCPC is one of the market surveillance authorities and the competent authority in Ireland for safety of domestic gas appliances (the Health and Safety Authority (HSA) has remit for non-domestic gas appliances). The following is further useful information from the CCPC for consumers: Product Safety Legislation requires distributors /retailers of gas appliances to comply with a number of obligations. The distributor must ensure that before making a gas appliance available on the market that: 1. The Appliance bears the CE Mark. 2. The Appliance is accompanied by the required documentation and instructions to allow the appliance to be installed, operated and maintained safely. 3. The Manufacturer has carried out their obligations with regard to ensuring the product complies with the essential	

		safety rules laid down in EU Legislation. If after receiving the complaint the distributor considers that the product presents a risk to the customer and/or does not comply with the safety rules, then they are required to: 1. Refrain from making the product available until it has been brought into conformity, that is to withdraw the product from their shelves. 2. In the case where the products present a risk, the distributor must inform the manufacturer and the Market Surveillance Authority and they should also recall the product from customers.	
	3.5	Inform customers that persons undertaking domestic gas works must be registered with the Registered Gas Installer (RGI) scheme and the customer should check on www.rgii.ie that a person is appropriately registered	
	3.6	Provide additional safety support measures to vulnerable customers	
	3.7	The gas supply undertaking should confirm that it will become a member and engage fully with the PAPA[8] (Promotion and Public Awareness) Group chaired by the CRU. Suppliers will be required to report on their promotion and public awareness activities through the PAPA group.	

[8] The Promotion and Public Awareness (PAPA) Group is chaired by the CRU, its main objective is to enhance knowledge and awareness of gas safety to help ensure life and property are protected from risks associated with gas use. The PAPA Group is composed of licensed natural gas transmission and distribution system operators, LPG undertakings and suppliers, alongside other stakeholders such as the Registered Gas Installer (RGI) Scheme.

F. 4-Gas Emergencies	**4.1**	As required under Section 16(13)(j) of the Gas (Interim)(Regulation) Act 2002, the gas supply undertaking should confirm that procedures are put in place to ensure that final customers are informed of any interruption or possible interruption to the supply of natural gas to those customers as a consequence of the implementation of the Natural Gas Emergency Plan or a direction of the National Gas Emergency Manager	
F. 5 Risks	**5.1**	The gas supply undertaking should confirm it will assess on a regular basis if its risks are still addressed or whether further steps/management of risks are needed	
F.6 Notification	**6.1**	The gas supply undertaking should declare to the CRU if it is no longer operating within one month of ceasing operation	

PART G: SPECIFIC REQUIREMENTS FOR GAS SHIPPER UNDERTAKINGS

Shipper undertakings are required to comply with the following part “G” only. Shipping’ in relation to natural gas, means the introduction into, the conveyance by means of, or take off from the natural gas system of natural gas by persons other than the operator of the relevant pipeline or facility being used for the purpose of introducing, conveying or taking off the natural gas as defined in the Gas (Interim) Regulation Act 2002, as amended.

For example, shippers are active at an Interconnection (IP) entry or exit point, contract for capacity with the Transporter and make entry or exit nominations.

The shipper undertaking is required to address each of the points below using the table format provided. This table can be also found in Microsoft Word format at the following location for ease of completion; link

Section		Section Requirement	Shipper Undertaking Response
G.1-Introduction	**1.1**	Provide a brief background on the gas shipping business	
	1.2	Include a description of the gas shipper undertaking's existing and proposed activities	
G.2-Facility Description	**2.1**	The name and contact details of the person and position who has overall managerial responsibility for the gas shipper business	
	2.2	The name and contact details of the duty holder. The 'Duty Holder' will be a person who is a representative of undertaking i.e. the person who represents the 'controlling mind' with regard to the day-to-day operating decisions that are taken.	
	2.3	The name and contact details of the person responsible for the preparation, submission and ongoing maintenance of the safety case	
	2.4	The geographic area covered by the undertaking	
	2.5	The location of the undertaking's headquarters or main office, the location of subsidiary offices and a description of the activities undertaken at each location	
G. 3-Gas Quality and Quantity	**3.1**	Part G (Technical) of the Code of Operations sets out the requirements re gas quality and quantity and obligations on the shipper undertaking. The undertaking should confirm that it will sign up to the Code of Operations and will comply with the Code	
G. 4-Gas Emergencies	**4.1**	Part H Section 1 of the Code of Operations sets out the requirements on shippers re: gas emergencies/exceptional events. The gas shipper should confirm that it will sign up to the Code of Operations and will comply with the Code. The gas shipper should confirm that it will respond to the instructions of the	

		National Gas Emergency Manager, notably with respect to customer load shedding. Where, pursuant to an Emergency, the Transporter instructs a shipper to give any notification or communication to a supplier, the gas shipper should confirm that it will do so.	
G. 5 Risks	**5.1**	The gas shipper undertaking should confirm that following any Code Modification, it will assess if its risks are still addressed by the Code of Operations, or whether further steps/management of risks are needed	
G. 6 Notification	**6.1**	The gas shipper undertaking should declare to the CRU if it is no longer operating within one month of ceasing operation	

PART H: SPECIFIC REQUIREMENTS FOR LIQUEFIED PETROLEUM GAS UNDERTAKINGS

This section of the Guidelines contains the specific minimum information requirements for the development of the safety case for **LPG undertakings operating piped LPG distribution system(s),** as defined in Section 1.1. These are minimum information requirements and it is the responsibility of the relevant undertaking to provide sufficient information in order to allow the CRU to make an assessment of the adequacy of the safety case. A balance will need to be struck between the material to be included in the safety case and supporting information, which can be cross-referenced and provided on request. As a guiding principle, safety cases should be presented as self-contained documents which:

- present the main safety arguments clearly and succinctly so that the core principles can be readily understood; and
- include sufficient detail to establishing a convincing case for the safety arrangements.

This Safety Case contents should include the following sections:

H.0 Executive Summary

An Executive Summary should be included at the beginning of the document. It should explain the LPG undertaking's approach to risk management, describes the generic LPG safety risks that arise from the LPG distribution operations and provides a brief description of the structure of the safety case. The aim is to demonstrate that there are comprehensive safety management systems in place to identify, assess, manage and control the risks associated with the safe management of the supply of LPG and the response to emergencies.

H.1 Introduction

The safety case should commence with an Introduction that provides information on:

1.6 scope and objectives of the safety case;

1.7 references to licence conditions;

1.8 identification of those person(s) responsible for the preparation and maintenance of the safety case;

1.9 the contact details of the person with whom the CRU will liaise on matters regarding the safety case; and

1.10 a description of the formal change control procedure(s) that will be applied to the safety case.

The document revision should be clearly displayed at the beginning of the document. All material changes shall be sent to the CRU in a timely manner.

H.2 Facility Description

The Facility Description should provide information on the following aspects of the undertaking's operation:

2.1. The name of the person and position who has overall managerial responsibility for the part of the business that manages piped LPG distribution networks;

2.2. the name of the 'Duty Holder' with respect to the safety case, and their position within the organisation. The 'Duty Holder' will be a person who is a representative of the operation of the undertaking's facility – i.e. the person who represents the 'controlling mind' with regard to the day-to-day operating decisions that are taken;

2.3. the name of the person who is responsible for the preparation and submission of the safety case;

2.4. details of personnel with key LPG operational responsibilities and a description of how LPG technical safety competencies are resourced;

2.5. the geographic areas covered by the company and the numbers of domestic customers supplied by piped LPG distribution networks;

2.6. The location of the undertaking's headquarters or main office, the location of subsidiary offices and a description of the activities (relevant to piped LPG distribution systems) undertaken at each location;

2.7. a management organisation structure for the part of the business that deals with LPG piped distribution networks, that describes how the management of LPG safety is undertaken, who has responsibilities for LPG safety, the numbers of personnel employed in each department/function and the key safety interfaces with operational staff;

2.8. a description of the activities relevant to piped LPG distribution systems undertaken within the LPG business, how these are organized and the resources employed to manage the operations of the distribution networks side of the business; and

2.9. a description of the different methods of LPG distribution to individual final customers including:

- a description of the network assets that includes:
  - commonly used length, diameter, pipe materials, meters and operating pressures of the distribution pipe systems;

- suitable maps, drawings, tables, charts and diagrams should be used to convey information wherever appropriate.

The Facility Description must provide sufficient information to enable the extent and scope of the assets and operations of the LPG undertaking in relation to the facility and the associated risks to be assessed

H.3 Formal Safety Risk Assessment

The safety case should provide detailed information on the processes adopted to systematically identify and assess all reasonably foreseeable hazards for LPG incidents on piped distribution networks, in order to determine the likelihood and consequence of the actual risks that they present to persons and property at each stage of the asset lifecycle – i.e. design, construction, operation & maintenance, modification/refurbishment and de-commissioning.

The descriptions should include the methods of any analyses made and details of any assumptions made regarding asset and human performance and reliability. Risks should be controlled to a level that is as low as reasonably practicable (ALARP); the risk assessment is required to demonstrate this. The CRU has published a paper providing guidance on its expectations regarding the demonstration of ALARP *(ALARP Guidance Document Ref CER/16/106)* Undertakings should refer to both this Safety Case Guidelines document and the ALARP Guidance document in preparing their risk assessments and safety cases.

H.3.1 Hazard and Risk Identification and Assessment

With respect to hazard identification, the LPG undertaking should identify all significant hazards that arise from the operation of distribution networks. An assessment should be made of all the identified hazards in order to determine the likelihood and consequences of the risks that may arise. The assessment may be carried out using qualitative and/or quantitative techniques as considered appropriate by the distribution undertaking. The assessment may be carried out using qualitative and/or quantitative techniques as considered appropriate. In carrying out a risk assessment, the undertaking must identify whether there is a risk of Major Accident Hazards surrounding the installation, and carry out a risk assessment that is appropriate to the level of risk.

Compliance with relevant industry codes and standards will generally satisfy the requirements of ALARP demonstration, however:

- where undertakings cannot fully comply with their own codes and industry standards for any reason, then an explanation should be

provided as to why compliance is not possible to achieve, and a full justification of the method to be used, and how this demonstrates a similar level of safety; and

- where good practices exist over and above the requirements of the codes an ALARP demonstration must describe those measures that have not been implemented and a justification for this.

Reference should be made to *ALARP Guidance document* and *section A2.2 of these Safety Case Guidelines* for further information.

H.3.2 Recording of Risks

The results of the hazard and risk identification and assessment process should be recorded in a suitably formatted 'risk register'. Risk assessments should be carried out according to guidance and requirements set out in the *ALARP Guidance Document*, and should include at a minimum, information such as:

- identified hazards and initiating events and their causes;
- existing safety controls that are used to manage the risk;
- an assessment of the risk based on the likelihood and consequence of the risk occurring and tolerability of the risk;
- a description of any additional control measures that are required to reduce the risk;
- a revised assessment of risk based on the implementation of the additional control measures; and
- the name of the person who is responsible for the day-to-day management of the risk(s).

H.3.3 Monitoring and Review of Hazards and Risks

There should be a description of the processes used to ensure that any new risks are identified and that existing risks are regularly reviewed to ensure that they are still valid,

have not altered in terms of likelihood and/or consequence and are not outdated or redundant as a result of changes in organisational or operational circumstances.

H.4 Safety Management System

The Safety Management System should describe, at a minimum, how the LPG undertaking provides for the safe and reliable flow of LPG within a piped distribution network for the duration of the lifecycle of these assets. The essential elements of the Safety Management System are outlined in the following sections.

H.4.1 Safety Management Policy

The Safety Management System should make reference to the specific Safety Policy documents that set out the safety management objectives with regard to the safe management of LPG distribution networks. This should describe the approach and methodology used to ensure that the LPG distribution systems are designed, constructed and operated and maintained in a safe manner, and how this will be achieved.

There should be a clear statement of the undertaking's intention to implement its Safety Policy regarding the prevention of risk and the protection from hazards to all persons who may be affected by its activities and how the undertaking proposes to meet its safety objectives. The policy documents must be endorsed by a member of senior management with sufficient authority to ensure that all safety-related commitments within these documents are met.

H.4.2 Technical Standards

The Safety Management System should contain a list of all relevant Irish, European and other International codes, standards and recommendations that are used by the LPG undertaking for the design, construction, operation and maintenance, modification and decommissioning of a piped LPG distribution system. These should include:

- a list of updated current technical standards;
- legacy or historical technical standards used for the design and construction of existing assets; and,
- any internal standards used

It is important that the LPG undertaking has a system for assuring itself that the technical standards and specifications that are currently being used are the latest version. The Safety Management System should describe the process for ensuring that all amendments and new editions are recorded. An up to date list of standards should be maintained and circulated to the CRU and other relevant bodies.

H.4.3 Asset Lifecycle Safety

The Safety Management System should contain sufficient information to demonstrate the management of safety during the lifecycle of its assets. Information should be provided on the following areas:

4.3.1 Design

The Safety Management System should describe in detail the design principles applied to ensure that all identified hazards and risks are eliminated or reduced to a level as low as reasonably practicable during the life cycle of the network assets. The design requirements should include both the physical assets and the associated monitoring systems for networks. It should, at a minimum, cover the following:

4.3.1.1 Design Inputs

Key inputs to the design process should include:

- a list of identified design hazards and risks;
- a statement of the piped LPG distribution system design policy;
- a description of the system design parameters for all network assets – e.g. mains, services, equipment and fittings, and meters; and
- identification of the various codes, standards and recommendations adopted.

4.3.1.2 Design Process Controls

Controls over the design process should include a description of:

- the policies and procedures used for piped LPG distribution system design;
- the risk mitigating measures adopted;
- the systems and tools used for design and modelling; and

- the design validation and approval process.

4.3.1.3 Design Outputs

The outputs from the design should include:

- construction plans and specifications;
- performance standards, both in terms of risks and operational performance; and
- specific operational procedures required for safe operation.

4.3.2 Construction, Testing & Commissioning and Work Recording

The Safety Management System should describe in detail how the Operator manages the processes of installation or any other construction carried out on the network, including testing and commissioning in accordance with the adopted codes, standards and specifications. The Operator should provide demonstration of the processes for:

- ensuring that construction activities are undertaken by staff and/or contractors who possess the requisite qualifications, training, skills & experience and competencies to undertake the work in a safe manner;
- assessing and verifying that the construction work undertaken complies with the specifications;
- ensuring that post-construction and pre-commissioning testing is undertaken in a safe and competent manner and is sufficient to prove that the installed asset is suitable for its intended use;
- ensuring that assets are commissioned as per an agreed procedure; and
- recording the as-laid locations of piped LPG distribution networks.

4.3.3 Operation and Maintenance

The Safety Management System should describe in detail how the operation and maintenance of network assets. It should take into account the particular risks posed by the asset under consideration. This should also extend to any associated systems that are in place to support the operation and maintenance of the assets. The Operator should provide demonstration of the arrangements in place and the processes for undertaking the activities listed below:

4.3.3.1 Preventative Maintenance

…which includes such activities as:

- third party damage prevention;
- prevention of ground movement, e.g. subsidence;
- meter maintenance, including customer's downstream equipment; and
- permit-to-work systems.

4.3.3.2 Corrective Maintenance

….which includes such activities as:

- attending public reported escapes (PREs) both inside and outside the property, including 3rd party damage, reports of 'no gas', fires, explosions, CO incidents etc;
- other asset-related emergency maintenance that may be required to be undertaken as identified in the Formal Safety Risk Assessment.

4.3.3.3 Supporting Systems Maintenance,

…which includes such activities as:

storing and updating asset records – i.e., drawings, plans, databases, etc. The Safety Management System should describe how installations are installed in accordance with the relevant Irish Standards before LPG is supplied or re-supplied to the premises.

4.3.4 Modification, Replacement and Reinforcement

The Safety Management System should describe in detail the processes that the Operator uses for undertaking network modifications, replacements and reinforcements including the processes for:

- identifying the need for modification, replacement or reinforcement;
- developing, designing and selecting the chosen approach to modification, replacement or reinforcement;
- approving the selected design; and
- updating asset records.

4.3.5 De-Commissioning and Abandonment

The Safety Management System should describe in detail the processes that the Operator uses for de-commissioning and abandoning distribution assets including:

- identifying the need for de-commissioning and abandonment of an asset;
- assessing the impact of the decision to de-commission and abandon an asset; and
- recording of de-commissioned and abandoned assets on the company's asset database

Abandonment procedures are only of concern for partial abandonment of piped distribution systems, where there is a need to ensure that redundant supplies are appropriately isolated from live networks.

H.4.4 New Connections and Re-connections

The Safety Management System should provide a description of the control processes in place for ensuring that customers installations (downstream of the meter) are installed in accordance with relevant Standards before LPG is supplied, or re-supplied, to the premises.

H.4.5 Procurement

The Safety Management System should provide a description of the controls which will be applied to ensure that contractual arrangements entered into with third parties give appropriate assurance of safety. In particular, they should ensure that no person is exposed to unacceptable risk from the actions and services or from the equipment and products provided to the LPG Undertaking by external providers. The controls should include processes for:

- undertaking pre-contract checks on competency of personnel and conformity of products and equipment with relevant standards and specifications;
- assessing the overall safety management systems of the provider; and
- arrangements for monitoring of compliance with agreed safety standards.

It must also be ensured that appropriate contractual arrangements are in place for outsourced safety-critical expertise.

H.4.6 Human Factors

The Safety Management System should describe how the LPG Undertaking addresses the human factors that are important to the management of the safe flow of LPG in piped distribution systems and managing the response to LPG emergency incidents. This should include detail regarding the management of any third parties, such as contractors and consultants who may be involved in carrying out any works on the network. In particular, the Safety Management System should include processes for:

- identifying safety critical roles, responsibilities and tasks at all levels in the organisation, including management, operational staff and contractors;
- identifying the role specific competencies and capabilities that are required to ensure the safe management of the flow of LPG and the response to emergencies;
- selecting, recruiting, training, assessing and re-assessing staff and contractors;

- demonstrating that there is adequate availability of competent personnel (including contractors) for the safe management of the flow of gas and the response to emergencies; and

- demonstrating that adequate supervision of personnel in safety critical roles is provided

H.4.7 Consultation, Communication and Cooperation

The Safety Management System should describe the systems in place for involving staff, either directly or through their representatives, in the development and implementation of the Safety Management System, and for consulting with staff and their representatives generally on issues relating to safety.

A description of the processes for the communication of safety information both internally and externally to the organisation and cooperation with external bodies with respect to LPG safety should be provided. This should include a description of the processes for the communication of safety information:

- upwards and downwards within the undertaking;
- to and from other market participants;
- to and from other utilities, local authorities, construction industry and other third parties with respect to the protection of plant;
- to and from the CRU; and
- to and from end-use customers and the general public.

The Safety Management System should also describe any cooperative arrangements that exist between the undertaking and other external bodies that have interests in gas safety issues. For example these external bodies include:

- Health and Safety Authority;
- Emergency Services;
- Government departments and other public and institutional bodies.

- gas consumer representative bodies;
- installation contractors;
- National Standards Authority for Ireland; and,
- architects, building design consultants and developers;

H.4.8 Documentation, Data and Records Management

The Safety Management System should describe the documentation, data and records management systems that relate to asset and operational safety performance, including:

- the type and extent of asset and operational data to be collected;
- the mechanisms that are used to collect, analyse, interpret and record the data;
- how asset and operational documentation and data is made available to those authorized persons requiring access to the data;
- how changes to documentation, data and records are communicated to the relevant staff; and
- how obsolete documents, data and information are removed from points of issue and use.

The Safety Management System should also describe the IT systems, databases and any other means of recording asset and operational safety performance data and how the data is protected, updated, retrieved, 'backed-up' and archived.

H.4.9 Change Management

The Safety Management System should describe the systems and procedures implemented to ensure that the risks arising from changes to the undertaking are assessed and properly controlled both during the change process and after its completion. Examples of such changes include but are not limited to:

- major organisational changes that impact key safety related roles and responsibilities;
- changes to operating policies and procedures that may affect piped distribution activities; and
- outsourcing of key activities.

The Safety Management System should also contain procedures for analysing proposed changes through the Formal Safety Risk Assessment process. Where a change is deemed by the undertaking to be 'material', the CRU should be notified in accordance with the guidance on 'Safety Case Modifications' as explained in Section 2.3.2 of these Guidelines.

H.4.10 Accident and Incident Investigation

The Safety Management System should provide evidence of appropriate arrangements for investigating LPG safety-related accidents and incidents. It should show that sufficient skill will be applied to ascertain not only the immediate cause(s) but also the 'root cause' of such accidents and incidents. The arrangements for carrying out accident and incident investigation should also describe how recommendations to prevent recurrence are made and how follow-up actions are managed.

H.4.11 LPG Safety Promotion and Public Awareness

The Safety Management System should provide a description of how the LPG Undertaking promotes LPG safety to raise public awareness of the potential dangers of LPG. This will include for example:

- advertising the undertaking's national LPG emergency number;
- advising on the actions to be taken in the event of a suspected LPG escape;
- Information on targeted campaigns;
- protecting underground LPG assets or services from the activities of third parties; and
- issuing advice on safe working in the vicinity of underground LPG equipment.

H.4.12 Safety Reporting

The Safety Management System should provide details of the safety reporting framework that the distribution undertaking uses to demonstrate that LPG safety is being managed effectively, that safety trends are analysed and progress towards safety performance objectives and targets are being achieved. The safety reporting framework should provide details of:

- the reporting regime for LPG emergency incidents, a definition of the various categories of incident that may arise and the process and person interfaces involved in incident reporting and subsequent investigation;

- the structure and contents of the quarterly safety reports that the LPG undertaking will be required to submit to the CRU. This should include a description and explanation of the safety key performance indicators (KPIs) that are used in measuring LPG safety performance. Suggested KPIs are included in Appendix 3 of this paper; and

- the structure and content of the annual safety report that the LPG undertaking will be required to submit to the CRU. This should include a detailed description of the overall safety performance of the LPG Undertaking during the year and the actions that the undertaking proposes to take to improve LPG safety on distribution networks. Annual safety reports must be submitted to the CRU before 31st March each year.

H.4.13 Audit and Inspection

Under the Gas Safety Regulatory Framework, the CRU considers that there are three forms of audit and inspection involving the safety case and any associated activities. These are:

- internal safety audit and inspections, as carried out by the undertaking;
- external safety audit and inspections, carried out by the CRU; and,
- the 5 yearly review, which is a detailed independent external review of an undertakings' safety case, carried out by an independent external body on a five yearly basis. The report from this review is submitted to the CRU.

For the purposes of the Safety Case, the "Audit and Inspection" section of the Safety Management System should describe the arrangements for safety audit and inspections as a continuing management and monitoring tool and the resources which will be applied to it. The audit and inspections regime should be based on the assessment of risk as it applies to the asset or activity under consideration. There should be a description of the approach to undertaking audit and inspection, which should include:

- the timing of routine audits and inspections – daily, weekly, monthly, quarterly, annually;
- the structure of audits and inspections – activity v. process; and
- persons undertaking audits and inspections.

There should be a description of how the results of audits and inspections are fed back into the performance monitoring and review process.

H.4.14 Performance Monitoring and Review

The Safety Management System should describe how the LPG undertaking reviews and assesses the safety performance of its assets and operations and should include the following:

- the approach to setting safety performance objectives and targets and the details of the intended frequency of monitoring progress towards the targets and who will be directly involved in reviewing the results;

- the methodology used to process data in order to monitor trends and progress towards safety performance objectives and targets and

identification of the resources used to undertake such data processing and analysis;

- the process for determining whether the safety performance objectives and targets have been achieved and how the extent of any safety performance 'gaps' are assessed; and

- the process for making recommendations on the corrective actions to be taken, approving the proposed corrective actions and monitoring outcomes for the results of corrective actions.

H.4.15 Continual Improvement

The Safety Management System should provide a description of the procedures for the regular and ongoing re-evaluation of the Safety Management System and the initiation of any necessary improvements. The inputs to this process should include the outcomes of the actions taken under the following:

4.11 – Accident and Incident Investigation;
4.12 – Gas Safety Promotion and Public Awareness;
4.13 - Safety Reporting;
4.14 – Audit and Inspection; and
4.15 – Performance Monitoring and Review.

H.5 Emergency Procedures

The emergency procedures section should describe in detail how the LPG undertaking will fulfil its duties and obligations in an emergency situation on a piped distribution network.

The emergency procedures should describe clearly the actions that the undertaking will undertake at each step of a LPG emergency situation and how, and by whom, these actions will be carried out.

The emergency procedures should also identify:

- the structure of the emergency management team that will coordinate the response to the LPG emergency incident;
- the individual persons that will undertake any emergency management roles required;
- the contact details of the personnel on the emergency standby rota;
- the training that is given to ensure that these roles can be fulfilled safely and competently;
- the resources (personnel and facilities) that will be employed in providing an effective emergency response; and
- the frequency of testing of the emergency response capability that the undertaking carries out in order to assure itself that an effective emergency response can be provided both during and out of normal working hours.

Due to the nature of LPG emergencies, significant interaction with emergency services is to be expected. Along with detailing the LPG undertaking's emergency arrangements, the Safety Case should describe any arrangements that are in place with third party emergency services such as Fire Services, Gardaí, etc. to manage LPG incidents.

PART I SPECIFIC REQUIREMENTS FOR CNG SUPPLIER UNDERTAKING

“CER’s Decision Paper Compressed Natural Gas (CNG) for Vehicular Transport: Licensing Arrangements” (Ref. CER/16/154) committed to developing Safety Case Guidelines for CNG suppliers for vehicular transport.

These safety case guidelines apply to undertakings who procure natural gas for the supply of CNG for vehicular transport. CNG suppliers for vehicular transport should adequately describe the ownership of their assets and interaction with upstream CNG asset owners, as it applies to their activities for the purpose of the development of their safety case.

It is the responsibility of the relevant undertaking to provide sufficient information in order to allow the CRU to make an assessment of the adequacy of the safety case. A balance will need to be struck between the material to be included in the safety case and supporting information, which can be cross-referenced and provided on request. As a guiding principle, safety cases should be presented as self-contained documents which:

- present the main safety arguments clearly and succinctly so that the core principles can be readily understood; and

include sufficient detail to demonstrate all risks created are managed to ALARP in accordance with CER ALARP Guidance Document (ref. CER/16/106)

The safety case contents should inclue the following sections.

Undertakings should note that not all sections may be relevant to all undertakings. These guidelines should be read in the context of the assets owned and operated and the activities carried out by that undertaking and the associated risks. These risks should be demonstrated to ALARP within the safety case. Where an undertaking is of the view that a section does not apply to them, this should be set out clearly and the justification for this view provided within the safety case.

Undertakings should also be aware of the “CER Decision Paper - Compressed Natural Gas (CNG) for Vehicular Transport: Licensing Arrangements” (Ref. CER/16/154) and where applying for derogations from the Supply Licence should ensure that these derogations are adequately reflected within their safety case, as they relate to the safety case.

I.0 Executive Summary

An Executive Summary, which explains the CNG supply undertaking's approach to risk management, describes the generic gas safety risks that arise from the CNG supply activities and a description of the structure of the safety case to demonstrate that there are comprehensive safety management systems in place to identify, assess, manage and control the risks associated with the safe management of the supply of CNG on filling station forecourts and the response to emergencies.

I.1 Introduction

The safety case should commence with an Introduction that provides information on:

1.1 scope and objectives of the safety case;

1.2 references to licence conditions and any derogations applied for during the Licence application;

1.3 identification of those person(s) responsible for the preparation and maintenance of the safety case;

1.4 the contact details of the person with whom the CRU will liaise on matters regarding the safety case; and

1.5 a description of the formal change control procedure(s) that will be applied to the safety case.

The document revision should be clearly displayed on the document.

I.2 Facility Description

The Facility Description should provide information on the following aspects of the undertaking's operation:

2.1. the name of the person and position who has overall managerial responsibility for the CNG supply business;

2.2. the name of the Duty Holder with respect to the safety case;

2.3. the name of the person responsible for the preparation and submission of the safety case;

2.4. the geographic area covered by the CNG supply business, including an Appendix with a list of all CNG stations as it relates to the undertaking's supply activities, to include as relevant:

- Location
- Capacity
- Description of the parties involved along with the demarcation of responsibilities for CNG assets, including diagram
    - Gas entry point to undertaking asset
    - Gas exit point from undertaking asset

The key priority for the CRU is to ensure that, regardless of the number and/or scope of the undertakings involved, each CNG supply operation is managed to a level that is ALARP. The CNG Supplier should ensure;

- that all risks associated with the CNG activity have been managed to a level that is ALARP.
- that all of the risks associated with their activity are adequately demonstrated to be ALARP in their safety case.
- that it has adequately demonstrated that any risks managed jointly with another undertaking are adequately demonstrated to be ALARP (e.g. via contractual arrangements) within their safety case

- Undertakings should clearly demonstrate where the demarcation of responsibility for each party occurs.

The CNG Supplier should confirm in their safety case that any other party involved in the CNG activity has a safety case submitted for acceptance/accepted by the CRU to cover the risks associated with that CNG activity.

This will enable the CRU to confirm that all risks associated with the entire CNG activity are covered and the party with responsibility can be identified.

- Supply Pressure Tier (Transmission / Distribution)
- Any site / location specific risks
- Any other relevant site / location specific information

2.5. The location of the undertaking's headquarters or main office, the location of subsidiary offices and a description of the activities undertaken at each location pertaining to the supply of CNG;

2.6. A management organisation structure for the CNG supply business that describes how the management of gas and CNG safety is undertaken, who has responsibilities for gas safety, the numbers of personnel employed in each department/function and the key safety interfaces with operational staff[9]; and

2.7. A description of the activities undertaken within the CNG supply business, how these are organised and the resources employed to manage the operations of the business. Examples of such activities include:

[9] Undertakings should submit an organogram outlining the key personnel roles and responsibilities for gas safety.

A: Procuring Gas

- procuring supplies of gas to meet the required gas quality specifications; and
- procuring sufficient quantity of gas to meet the undertaking's aggregate customer demand.

B: Supplying CNG

- Demand profiling, determination of target forecourts
- developing and maintaining IT systems to enable collection of payments and the provision of customer support services;
- providing CNG safety advice to end-use customers, i.e. how to fill safely;
- provide a CNG public safety awareness programme;
- maintaining a customer contact centre or bureau;
- providing CNG safety training and advice to forecourt personnel.

C: Emergency Response

- Establish site CNG Emergency procedures, to include:
  - Site Emergency Actions / Plans
  - Emergency shutdown and restart procedures
  - Emergency training for site personnel

- Arrangements in place with upstream Gas Transmission/Distribution and/or CNG asset owner with regard to emergency response actions
- NGEM interaction emergency requirements (as required)

D: NGEM Interface

- responding to directions from the National Gas Emergency Manager during gas supply emergency incidents.

I.3 Formal Safety Risk Assessment

The Formal Safety Risk Assessment should provide information on the processes adopted to systematically identify and assess all reasonably foreseeable hazards in order to determine the likelihood and consequence of the actual risks that they present to persons and property as a result of the CNG supply activities described in the Facility Description.

The descriptions should include the methods of any analyses made and details of any assumptions on asset and human performance and reliability.

The level of detail required (including with respect to the sophistication of the risk assessment) should be proportionate to the nature and complexity of the operations of the CNG supply undertaking and hence to the risks should be controlled to a level that is as low as reasonably practicable (ALARP); the risk assessment is required to demonstrate this.

The CRU has published a paper providing guidance on its expectations regarding the demonstration of ALARP *(ALARP Guidance Document Ref: CER/16/106*). The process of risk identification, evaluation and mitigation should be applied to the activities that are undertaken by CNG Supplier undertakings, notably the activities that have the potential to impact on gas safety – e.g. the procurement and retailing of CNG to the general public, forecourt emergency response activities and the response of the CNG Supplier to the instructions of the Network Emergency Manager during crisis events.

As per the CER ALARP Guidance Document (Ref. *CER/16/106)*, codes and standards form the basis of good practice, however good practice requires more than just compliance with codes and standards for hazards which are not well defined and understood by an undertaking.

Depending on the complexity of the risk and the extent of assets owned by the undertaking, an appropriate level of risk assessment methodology should be applied to demonstrate ALARP.

The undertaking must identify the risks related to the assets they are operating, and provide a proportional ALARP demonstration.

I.3.1 Hazard and Risk Identification and Assessment

With respect to hazard identification, the CNG supplier undertaking should identify all significant gas safety hazards that arise from the operation of the undertaking. The assessment may be carried out using qualitative and/or quantitative techniques as considered appropriate.
The results of the hazard and risk assessments should be used to identify and rank major risk contributors. Risk management strategies should include prevention, protection and mitigation activities and risk reduction strategies should be established for all significant risks.

The hazard and risk assessment should demonstrate that all risks are ALARP. It is expected that the ALARP demonstration contains, but is not limited to, the following:

- A demonstration of Compliance with current codes and standards
- Asset type reliability data
- Maintenance plans
- Assessment of the risks created by using appropriate risk assessment methods; as related to the scope and complexity of assets employed

Within the Hazard and Risk identification exercise, consideration should be given to the following:

- Change in external risk profile by external developments / review of risk assessment frequently
- The undertakings' performance in relation to key safety related KPIs / SLAs, such as:
    - Emergency response
    - Maintenance
- Security arrangements

I.3.2 Recording of Risks

The results of the hazard and risk identification and assessment process should be recorded in a suitably formatted 'risk register' that record details of:

- identified hazards and their causes;
- existing safety controls that are used to manage the risk;
- an assessment of the risk based on the likelihood and consequence of the risk occurring and acceptability of the risk;
- a description of any additional control measures that are required;
- a revised assessment of risk based on the implementation of the additional control measures and its' acceptability; and
- the name of the person who is responsible for the day-to-day management of the risk(s).

I.3.3 Monitoring and Review of Hazards and Risks

There should be a description of the processes used to ensure that identified risks are regularly reviewed to ensure that they are still valid, have not altered in terms of likelihood and/or consequence and are not outdated or redundant as a result of changes in organisational or operational circumstances, or changes in external risk profile by external developments.

I.4 Safety Management System

The Safety Management System should provide information on the following aspects of the undertaking's operation:

I.4.1 Safety Management Policy

The Safety Management System should reference the specific Safety Policy documents that set out the safety management objectives with regard to the safe management of the supply of CNG to end use customers.

There should be a clear statement of the undertakings' intention to implement the Safety Policy regarding the prevention of risk and the protection from hazards to all persons who may be affected by its activities and how the undertaking proposes to meet its safety objectives.

I.4.2 Technical Standards

The Safety Management System should contain a list of all relevant Irish, European and other international codes, standards, recommendations and undertaking's own internal standards that are used by the undertaking for the supply of CNG to end customers. It is important that the CNG supplier undertaking has a system for assuring itself that the technical standards and specifications currently being used are the latest version. As such, the Safety Management System should describe the process for ensuring that all amendments and new editions are recorded and an up to date list of standards is maintained and published.

I.4.3 Asset Lifecycle Safety

The Safety Management System should contain sufficient information to demonstrate the safe management of the undertaking's assets across their lifecycle. Information should be provided on the following areas:

4.3.1 Design

The Safety Management System should describe in detail the design principles applied to ensure that all identified hazards and risks are eliminated or reduced to a level as low as reasonably practicable during the life cycle of the assets. The design requirements should include the physical assets. Any associated monitoring and control systems for the, and any associated standards. It should, as required, cover the following:

4.3.1.1 Design Inputs

Key inputs to the design process should include:

- a list of identified design hazards and risks;
- a statement of the design policy;
- a description of the system design parameters for all assets – e.g. pressure-reducing installations, meters, compressors and other CNG assets; and
- identification of the various codes, standards and recommendations adopted.

4.3.1.2 Design Process Controls

Controls over the design process should include a description of:

- the policies and procedures used for CNG station design;
- the risk mitigating measures adopted;
- the systems and tools used for design and modelling; and
- the design validation and approval process.

4.3.1.3 Design Outputs

The outputs from the design should include:

- construction plans and specifications;
- performance standards, both in terms of risks and operational performance; and
- specific operational procedures required for safe operation.

4.3.2 Construction, Testing & Commissioning and Work Recording

The Safety Management System should describe in detail how the Operator manages the processes of any construction, including testing and commissioning in accordance with the adopted codes, standards and specifications. The Operator should provide demonstration of the processes for:

- ensuring that construction activities are undertaken by staff and/or contractors who possess the requisite qualifications, training, skills & experience and competencies to undertake the work in a safe manner;

- assessing and verifying that the construction work undertaken complies with the specifications;
- ensuring that post-construction and pre-commissioning testing is undertaken in a safe and competent manner and is sufficient to prove that the installed asset is suitable for its intended use;
- ensuring that assets are commissioned as per an agreed procedure; and
- as-installed records are submitted, checked for accuracy and completeness and approved prior to being recorded on the company's asset database.

4.3.3 Operation and Maintenance

The Safety Management System should describe in detail how the Operator undertakes the operation and maintenance of the CNG assets. It should take into account the particular risks posed by the asset under consideration. This should also extend to any associated systems that are in place to support the operation and maintenance of the assets –The Operator should provide demonstration of the arrangements in place and processes for undertaking the activities listed below by asset group wherever possible:

4.3.3.1 Preventative Maintenance, which includes such activities as:

- third party damage prevention;
- leakage survey;
- pressure monitoring;
- gas quality monitoring;
- Planned and periodic maintenance activities;
- non-routine operations procedures; and
- permit-to-work systems.

4.3.3.2 Corrective Maintenance, which includes such activities as:

- attending public reported escapes (PREs) from the CNG assets, including 3rd party damages, reports of 'no gas', fires and explosions etc;
- responding to gas system operating pressure related incidents – i.e. low pressure or high pressure in the system; and

- other asset-related emergency maintenance that may be required to be undertaken as identified in the Formal Safety Risk Assessment.

4.3.3.3 Supporting Systems Maintenance, which includes such activities as:

- storing and updating asset records – i.e. drawings, plans, databases etc; and
- maintenance of communication systems for example DCS or SCADA.

4.3.4 Modification, Replacement and Reinforcement

The Safety Management System should describe in detail the processes that the Operator uses for undertaking modifications, replacements and reinforcements to the CNG station including the processes for:

- identifying the need for modification, replacement or reinforcement;
- developing, designing and selecting the chosen approach to modification, replacement or reinforcement;
- approving the selected design; and
- updating asset records.

4.3.5 De-Commissioning and Abandonment

The Safety Management System should describe in detail the processes that the Operator uses for de-commissioning and abandoning CNG station assets including:

- identifying the need for de-commissioning and abandonment of an asset;
- assessing the impact of the decision to de-commission and abandon an asset; and
- recording of de-commissioned and abandoned assets on the company's asset database.

I.4.4 Procurement

The Safety Management System should provide a description of the controls which will be applied to ensure that contractual arrangements entered into with third parties give appropriate assurance of safety. In particular, to ensure that no person is exposed to unacceptable risk from the actions and services or from the equipment and products provided to the CNG supplier undertaking by external providers. The controls should include processes for:

- undertaking pre-contract checks on competency of personnel and conformity of products and equipment with relevant standards and specifications;
    - ensuring that supplies of gas meet the required gas quality

- assessing the overall safety management systems of the provider

- arrangements for monitoring of compliance with agreed safety standards.

- procuring sufficient quantity of gas to meet the undertaking's aggregate customer demand.

I.4.5 Human Factors

The Safety Management System should describe how the CNG supplier undertaking addresses the human factors that are important to the management of the supply of CNG. In particular, the Safety Management System should include processes for:

- identifying safety critical roles, responsibilities and tasks at all levels in the organisation, including management, operational staff and contractors;

- identifying the role specific competencies and capabilities that are required to ensure the safe management of the supply & shipping of gas;

- selecting & recruiting, training, assessing and re-assessing staff and contractors; and

    - This is particularly important for forecourt site staff in the training and understanding of the nature / hazards of CNG and the emergency response function

- demonstrating that there is adequate availability of competent personnel (including contractors) for the safe management of the supply of CNG.

I.4.6 Communication

The Safety Management System should describe the processes for the communication of gas safety information both internally and externally to the organisation. This should include a description of the processes for the communication of safety information:

- upwards and downwards within the undertaking;
- to and from the CRU;
- to and from end-use customers and the general public.
- to and from the CNG compressor skid operator where such operator is not the same entity as the CNG supplier

There should also be a description of the process for the passing of gas safety related reports and information to the gas transporter when received by the CNG supplier undertaking. For example, if a member of the public contacts the CNG supplier undertaking to report a smell of gas, there should be a robust process in place for passing of such information to the gas transporter who will provide the emergency response service.

I.4.7 Change Management

The Safety Management System should describe the systems and procedures implemented to ensure that the risks arising from changes to the CNG supplier undertaking are assessed and properly controlled both during the change process and after its completion. Examples of such changes include:

- major organisational changes that impact key safety related roles and responsibilities;
- changes to operating policies and procedures;
- outsourcing of key activities and
- changes in external risk profile as a result of external developments

The Safety Management System should also contain procedures for analysing proposed changes through the Formal Safety Risk Assessment process. Where a change is deemed by the undertaking to be 'material', the CRU should be notified in accordance with the guidance on 'Safety Case Modifications' as explained earlier in these Guidelines.

I.4.8 Customer Gas Safety Awareness

The Safety Management System should describe how the CNG supplier undertaking supports and promotes customer gas safety awareness to its end use customers. There should be clear demonstration of how CNG supplier undertakings:

- establish and maintain systems for communicating information to consumers regarding the safety of CNG filling, for example, in the form of signage;

- provide published material with information and adequate warnings about the potentially hazardous properties of CNG,

I.4.9 Safety Reporting

The Safety Management System should provide details of the safety reporting framework that the CNG supplier undertaking uses to monitor the effectiveness of its Customer Safety Awareness measures as described in 4.7 above. This should include:

- the reporting regime for CNG emergency incidents, a definition of the various categories of incident that may arise and the process and person interfaces involved in incident reporting and subsequent investigation;

- the structure and contents of the quarterly safety reports that the gas undertaking will be required to submit to the CRU. This should include a description and explanation of the safety key performance indicators (KPIs) that are used in measuring CNG safety performance; and

- KPI's should include but are not limited to: number of technical or safety inspections completed, training delivery, details of Emergency Safety Device (ESD) activation, false alarms, maintenance activities including non-routine operations, impact damage, vandalism.

- the structure and content of the annual safety report that the gas undertaking will be required to submit to the CRU. This should include a detailed description of the overall safety performance of the CNG undertaking during the year and the actions that the undertaking proposes to take to improve gas safety. Annual safety reports must be submitted to the CRU before 31st March each year.

I.4.10 Audit and Inspection

Under the Gas Safety Regulatory Framework, the CRU considers that there are three forms of audit and inspection involving the safety case and any associated safety activities. These are:

- Internal safety audit and inspections, as carried out by the undertaking;

- External safety audit and inspections, carried out by the CRU; and,
- The 5 year audit, which is a detailed independent external review of an undertakings' safety case, carried out by an independent external body every 5 years. The report from this review is submitted to the CRU.

For the purposes of the safety case, the "Audit and Inspection" section of the Safety Management System should describe the arrangements for safety audit and inspections as a continuing management and monitoring tool and the resources which will be applied to it. The audit and inspections regime should be based on the assessment of risk as it applies to the activity under consideration. There should be a description of the approach to undertaking audit and inspection, which should include:

- the timing of routine audits and inspections;
- the structure of audits and inspections – activity v. process; and
- persons undertaking audits and inspections.

There should be a description of how the results of audits and inspections are fed back into the performance monitoring and review process.

I.4.11 Performance Monitoring and Review

The Safety Management System should describe how the CNG supplier undertaking monitors and reviews the implementation of the safety policies, objectives, procedures and performance standards specified in the Safety Management System, for example:

- the approach to setting customer CNG safety awareness objectives and targets and the details of the intended frequency of monitoring progress towards the targets and who will be directly involved in reviewing the results;

- the methodology used to process data in order to monitor trends and progress towards safety performance objectives and targets and identification of the resources used to undertake such data processing and analysis;

- the process for determining whether the customer CNG safety Awareness performance objectives and targets are being achieved; and

- the process for making recommendations on the corrective actions to be taken, approving the proposed corrective actions and monitoring outcomes for the results of corrective actions.

I.4.12 Continual Improvement

The Safety Management System should provide a description of the procedures for the regular and ongoing re-evaluation of the Safety Management System and the initiation of any necessary improvements.

I.5 Emergency Procedures

Undertakings should note that where more than one party is involved in the CNG activities, for example, one party operating a dispenser only and other party having responsibility for the remaining CNG assets, the safety case should adequately describe how all parties have inputted into the development of the Emergency Procedures.

I.5.1 National Gas Emergencies

The Emergency Procedures section should describe in detail how the CNG Supplier will fulfil its duties and obligations as required by the National Gas Emergency Manager.

Potential triggers for gas emergencies are set out in the CER's National Gas Supply Emergency Plan (Ref: CER/14/784) and the Natural Gas Emergency Plan (NGEP), as prepared by Gas Networks Ireland. However it should be noted that an emergency may arise due to a situation outside the "triggers" described in these documents; the undertaking's emergency procedures should take account of this.

The actions required of the supplier undertaking are currently described in the Natural Gas Emergency Plan (NGEP) as issued by Gas Networks Ireland. The emergency procedures should describe clearly the specific actions that the shipper and supplier will perform at

each step of the gas emergency situation and how, and by whom, these actions will be carried out. The various steps in the gas emergency process are as shown below:

The emergency procedures should describe clearly the specific actions that the CNG supplier will perform at each step of the gas emergency situation and how, and by whom, these actions will be carried out. The various steps in the gas emergency process are as shown below:

Step 1: Potential Emergency
Step 2: Declaration and Load Shedding
Step 3: Allocation of Gas and Isolation
Step 4: Restoration

The emergency procedures should also identify:

- the structure of the emergency management team that will coordinate the overall response to the gas emergency incident, and the means of communication employed between the various participants during an emergency;
- details on how an emergency management team is established;
- the individual persons that will undertake the emergency management roles required of a shipper and supplier;
- the contact details of the personnel on the emergency standby rota;
- detail of the training that is given to ensure that these roles can be fulfilled safely and competently;
- the resources (personnel and facilities) that will be employed in providing an effective emergency response if necessary; and
- the frequency of testing of the emergency response capability that the undertaking carries out in order to assure itself that an effective emergency response can be provided both during and out of normal working hours.

The emergency procedures should also contain detail on how the undertaking responds to individual incidents and emergencies at a local level, if required. It should outline what processes and procedures are in place for responding to incidents that are reported to it, and how these are implemented.

I.5.2 Local Gas related Emergencies

A local site specific Emergency Plan should be developed for each site location into which all parties who are involved in the CNG activity should input. . This structure of this document should follow that of the HSA Emergency Response Plans for Petrol Stations, available here.[10]

[10] http://www.hsa.ie/eng/Your_Industry/Petrol_Stations/Emergency_Response_for_Petrol_Stations.pdf

APPENDIX 1 - TECHNICAL SPECIFICATIONS

The following list of relevant technical specifications as proposed by the National Standards Authority for Ireland (NSAI) is considered suitable and relevant to the activities falling within the scope of this document.

This list contains undated references. The user is expected to use the latest version together with all amendments and corrections if any. It should be noted that the list is not exhaustive and there may be other specifications relevant to the scope.

1. I.S 265 : Parts 1 and 2
   Installation of Gas Service Pipes.

2. I.S 266 Polyethylene (PE) Pipes and fittings for Natural Gas, Manufactured Gas and LPG

3. I.S.328 :
   Code of Practice for Gas Transmission Pipelines and Pipeline Installations

4. I.S 329 :
   Gas distribution mains

5. I.S EN 331:
   Manually operated ball valves and closed bottom taper plug valves for gas installations for buildings

6. I.S EN 334:
   Gas pressure regulators for inlet pressures up to 100 bar

7. I.S/EN 549:
   Rubber Materials for Seals and Diaphragms for Gas Appliances and Gas Equipment

8. I.S EN 682:
   Elastomeric seals - Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids

9. I.S/EN 751-1:
   Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 1: Anaerobic jointing compounds

10. I.S/EN 751-2:
    Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 2: Non-hardening jointing compounds

11. I.S/EN 751-3:
    Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 3: Unsintered PTFE tapes

12. I.S 808 :
    Specification for CNG Fuelled Vehicles

13. I.S 813:
    Domestic gas installations

14. I.S 820:
    Non-domestic gas installations

15. I.S/EN 1057:
    Copper and copper alloys - seamless, round copper tubes for water and gas in sanitary and heating applications

16. I.S EN 1106:
    Manually operated taps for gas burning appliances

17. I.S./EN 1160:
    Installations and equipment for liquefied natural gas - General characteristics of liquefied natural gas

18. I.S EN 1359:
    Gas meters - Diaphragm gas meters

19. I.S EN 1473:
    Installation and equipment for liquefied natural gas – Design of onshore installations

20. I.S EN 1474:
    Installation and equipment for liquefied natural gas – Design and testing of loading/unloading arms

21. I.S EN 1532:
    Installation and equipment for liquefied natural gas – Ship to shore interface

22. I.S EN 1555-1:
Plastics piping systems for gaseous fuels supply - Polyethylene (PE) – General

23. I.S EN 1555-2:
Plastics piping systems for gaseous fuels supply - Polyethylene (PE) – Pipes

24. I.S EN 1555-3:
Plastics piping systems for gaseous fuels supply - Polyethylene (PE) – Fittings

25. I.S EN 1555-4:
Plastics piping systems for gaseous fuels supply - Polyethylene (PE) – Valves

26. I.S EN 1555-5:
Plastics piping systems for gaseous fuels supply - Polyethylene (PE) – Fitness of purpose of the system

27. I.S EN 1594:
Gas supply systems - Pipelines for maximum operating pressure over 16 bar - Functional requirements

28. I.S EN 1643:
Valve proving systems for automatic shut-off valves for gas burners and gas appliances

29. I.S EN 1775:
Gas supply - Gas pipework for buildings - Maximum operating pressure less than or equal to 5 bar - Functional recommendations

30. I.S EN 1776:
Gas supply systems - Natural gas measuring stations - Functional requirements

31. I.S EN 1918-1:
Gas supply systems - Underground gas storage – Part 1: Functional recommendations for storage in aquifers

32. I.S EN 1918-2:
Gas supply systems - Underground gas storage – Part 2: Functional recommendations for storage in oil and gas fields

33. I.S EN 1918-3: Gas supply systems - Underground gas storage – Part 3: Functional recommendations for storage in solution-mined salt cavities

34. I.S EN 1918-4: Gas supply systems - Underground gas storage – Part 4: Functional recommendations for storage in rock caverns

35. I.S EN 1918-5: Gas supply systems - Underground gas storage - Part 5: Functional recommendations for surface facilities

36. IS 3216: Part 1

Code of Practice for the Bulk Storage of Liquefied Petroleum Gas

37. BS 4250: Specification for commercial butane and commercial propane

38. ISO 4437: Buried polyethylene (PE) pipes for the supply of gaseous fuels -- Metric series -- Specifications

39. I.S EN ISO 6326-3: Natural gas - Determination of sulfur compounds - Determination of hydrogen sulfide, mercaptan sulfur, and carbonyl sulfide sulfur by potentiometry

40. I.S EN ISO 6326-5: Natural gas – Determination of sulfur compounds - Part 5: Lingener combustion method

41. I.S EN ISO 6974-1: Natural gas - Determination of composition with defined uncertainty by gas chromatography - Part 1: Guidelines for tailored analysis

42. I.S EN ISO 6974-2: Natural gas - Determination of composition with defined uncertainty by gas chromatography - Part 2: Measuring-system characteristics and statistics for processing of data

43. I.S EN ISO 6974-3: Natural gas - Determination of composition with defined uncertainty by gas

chromatography - Part 3: Determination of hydrogen, helium, oxygen, nitrogen, carbon dioxide and hydrocarbons up to C8 using two packed columns

44. I.S EN ISO 6974-4:
Natural gas - Determination of composition with defined uncertainty by gas chromatography - Part 4: determination of nitrogen, carbon dioxide and C1 to C5 and C6+ hydrocarbons for a laboratory and on-line measuring system using two columns

45. EN ISO 6974-5:
Natural gas - Determination of composition with defined uncertainty by gas chromatography - Part 5: Determination of nitrogen, carbon dioxide and C1 to C5 and C6+ hydrocarbons for a laboratory and on-line process application using three columns (ISO 6974- Describes a gas chromatographic method for the quantitative determination of natural gas constituents using a three-column system

46. I.S EN ISO 10440-1:
Petroleum and natural gas industries – rotary-type positive displacement compressors – Part 1: Process compressors (oil-free)

47. I.S EN ISO 10440-2:
Petroleum and natural gas industries - Rotary-type positive-displacement compressors - Part 2: Packaged air compressors (oil-free)

48. I.S EN ISO 10715:
Natural gas - Sampling guidelines

49. I.S EN ISO 10723:
Natural gas - Performance evaluation for on-line analytical systems

50. I.S EN 12007-1:
Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar – Part 1: General functional recommendations

51. I.S EN 12007-2:
Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar – Part 2: Specific functional recommendations for polyethylene (MOP up to and including 10 bar)

52. I.S EN 12007-3:
Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar – Part 3: Specific functional recommendations for steel

53. I.S EN 12007-4:
Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar – Part 4: Specific functional recommendations for renovation.

54. I.S EN 12186:
Gas supply systems - Gas pressure regulating stations for transmission and distribution - Functional requirements (

55. I.S EN 12261:
Gas meters - Turbine gas meters

56. I.S EN 12279:
Gas supply systems - Gas pressure regulating installation on service lines - Functional requirements

57. I.S EN 12308:
Installations and equipment for LNG - Suitability testing of gaskets designed for flanged joints used on LNG piping

58. I.S EN 12327:
Gas supply systems - Pressure testing, commissioning and decommissioning procedures - Functional requirements

59. I.S EN 12405-1:
Gas meters - Part 1: Volume conversion

60. I.S EN 12480:
Gas meters - Rotary displacement gas meters

61. I.S EN 12583:
Gas supply systems - Compressor stations - Functional requirements

62. I.S EN 12567:
Industrial valves - Isolating valves for LNG – Specification for suitability and appropriate verification tests

63. I.S EN 12669:
Direct gas-fired hot air blowers for use in greenhouses and supplementary non-domestic space heating

64. I.S EN 12732:
Gas supply systems - Welding steel pipework – Functional requirements

65. I.S EN 12838:
Installations and equipment for liquefied natural gas – Suitability testing of LNG sampling systems

66. I.S EN 13090:
Means for resealing threaded joints of gas pipework in buildings

67. I.S EN 13423:
Compressed natural gas vehicle operations

68. I.S EN ISO 13734:
Natural gas - Organic sulphur compounds used as odorants - Requirements and test methods

69. I.S EN 13774:
Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements

70. I.S EN 13787:
Elastomers for gas pressure regulators and associated safety devices for inlet pressures up to 100 bar

71. I.S EN 13942:
Petroleum and natural gas industries – Pipeline transportation systems – Pipeline valves

72. I.S EN ISO 14111:
Natural gas - Guidelines to tractability in analysis

73. I.S EN 14141:
Valves for natural gas transportation in pipelines – Performance requirements and tests

74. I.S ENV 14236:
Ultrasonic domestic gas meters

I.S EN 14382:

Safety devices for gas pressure regulating stations and installations – Gas safety shut-off devices for operating pressure up to 100 bar

APPENDIX 2 – SUGGESTED KEY PERFORMANCE INDICATORS

No.	Key Objective	Gas Safety Performance Indicator (SPI)
1	Minimising the Risk of Loss of Containment	1.1. No. of public reported escapes: a) external; and b) internal 1.2. No. of 3rd party damages to: a) transmission pipelines b) distribution mains; and c) distribution services 1.3. No. of joint leaks 1.4. No. of mains leak repairs/km 1.5. No. of outstanding leaks 1.6. No. of buried metallic pipes / fittings found on LPG networks 1.7. Length of network leakage surveyed (kms) 1.8. Nos. of survey leaks/km 1.9. No. of gas in building events 1.10. o. of evacuations undertaken 1.11. o. of actionable transmission pipeline corrosion defects detected
2	Maintaining Safe System Operating Pressures	2.1 No. of verified low pressure complaints (transmission & distribution) 2.2 No. of over-pressure events (transmission & distribution) 2.3 No. of unplanned gas outages affecting: a) > 5 customers b) > 20 customers c) > 100 customers

3	Minimising the Risk of Injecting Gas on Non-Conforming Quality	3.1 No. of gas odorant checks undertaken 3.2 No. of non-compliant gas odorant samples found 3.3 No. and type of gas quality 'excursions' detected
4	Providing an Efficient and Coordinated Response to Gas Emergency Reports and Incidents	4.1 % of uncontrolled PRE's attended within 1 hour 4.2 % of controlled PRE's attended within [4] hours 4.3 No. of transmission system related gas supply emergencies attended 4.4 No. of distribution system related gas supply emergencies attended 4.5 No. of gas quality related gas supply emergencies 4.6 No. of emergency exercises undertaken
5	Minimising the Risks Associated with the Utilisation of Gas	5.1 No. of non-residential installations inspected 5.2 Average number of defects per non-residential installation inspected 5.3 No. of metering tampering events discovered 5.4 No. of internal gas related incidents attended: a) fires b) explosions c) CO related 5.5 No. of emergency shutdowns of CNG assets
6	Promoting Public Awareness of Gas Safety	To be discussed with individual undertakings