

**Hazardous Installations Directorate
Gas & Pipelines Unit**

**Major Hazard Safety Performance Indicators in the UK
Onshore Gas and Pipelines Industry**

Annual Report 2005/06

Executive Summary.....	3
1.0 Introduction	4
1.1 Safety Performance Indicators	4
1.2 This Report.....	4
1.3 The UK Gas and Pipelines Industry	4
1.4 The Gas & Pipelines Unit	4
2.0 Gas and Pipelines Unit Safety Performance Indicators	5
2.1 Background	5
2.2 Public Service Agreement Targets.....	5
2.3 Additional Safety Performance Indicators	5
3.0 Safety Performance in 2005/06	6
3.1 COMAH Site Dangerous Occurrences	6
Graph 3.1.1: Contribution by Gas & Pipelines Unit to HSE's PSA2 Target.....	6
3.2 UKOPA Infringement Database	6
Table 3.2.1: UKOPA Infringement Risk Categories.....	7
Table 3.2.2: UKOPA Infringement Location Categories	7
Graph 3.2.1: Third Party Infringements by Location and Risk Category	7
3.3 UKOPA Pipeline Fault Database.....	8
Graph 3.3.1: UK Product Loss Incidents 1962 – 2004	8
3.4 Gas National Transmission System Gas Quality and Pressure Excursions	9
3.4.1 Gas Quality	9
Table 3.4.1: Summary of Terminal Flow Advice issued for Gas Quality reasons.....	9
3.4.2 Pipeline Maximum Operating Pressure (MOP)	9
Table 3.4.2: Summary of Pipeline Maximum Operating Pressure Events.....	10
3.4.3 Distribution Network Entry Pressure	10
3.5 Gas Safety (Management) Regulations 1996 Reports.....	10
Graph 3.5.1: Annual GS(M)R Reports 2002/03 to 2005/06 (by incident cause)	11
3.6 Iron Mains Replacement Programme.....	11
Graph 3.6.1: Profile for replacement of 101 000 km of Iron gas mains by 2032	11
Table 3.6.1: Transco plc Mains Replacement Performance 1 Jan 2002 to 31 March 2005.....	12
Table 3.6.2: All Distribution Networks Mains Replacement Performance 1 April 2005 to 31 March 2006	12
3.7 Gas Distribution Network Reports	12
3.7.1 Iron Mains Remaining	12
Table 3.7.1: Total Iron Mains Remaining on each Distribution Network on 31 March 2006.....	13
3.7.2 Gas in Buildings Incidents.....	13
Graph 3.7.2: Annual reported Gas in Buildings data 1990 to 2004	13
Table 3.7.2: Number of Gas in Buildings (GIB) incidents across all Distribution Networks between 1 April 2005 and 31 March 2006	14
3.7.3 Number of Mains and Service Related Major Incidents	14
Graph 3.7.3: Number of Mains and Service Related Major Incidents and Resulting Fatalities between 1 April 1990 and 31 March 2006	14
Table 3.7.3: Number of mains and service related incidents across all Distribution Networks between 1 April 2005 and 31 March 2006	15
3.7.4 Public Reported Escapes Permanently Repaired	15
Table 3.7.4: Number of Gas Escapes Requiring Repair and Permanent Repairs made within 12 hours following receipt of a PRE across all Distribution Networks between 1 April 2005 and 31 March 2006.....	16
3.7.5 Third Party Damage Incidents.....	16
Table 3.7.5: Number of third party damage incidents caused by related and unrelated third parties across all Distribution Networks between 1 April 2005 and 31 March 2006.....	16
4.0 Conclusions	16
Appendix 1 - DNO Annual SPI Reporting Definitions	18

Executive Summary

This is the first annual Safety Performance Indicator (SPI) report compiled by HSE's Gas & Pipelines Unit. The report covers the period from April 2005 to March 2006 with the exception of SPI data provided by National Grid Gas plc for the National Transmission System which covers the 2005 calendar year. The purpose of this report is to present a broad range of major hazard safety performance indicators across the UK's gas transmission, distribution and major accident hazard pipelines sectors. It follows a major restructuring in the onshore gas distribution sector in June 2005 when Transco plc sold four of its eight gas distribution networks.

HSE propose to publish this report annually, both to monitor and compare industry safety performance year-on-year. As this is the first report of this kind, it is not possible to draw absolute conclusions on the industry major hazard safety performance at this time.

HSE is required under its Public Service Agreement (PSA2) to monitor the number of Dangerous Occurrences (DOs) at onshore sites subject to the Control of Major Accident Hazards Regulations 1996 (COMAH). These form part of the Gas & Pipeline Unit's SPI monitoring process. In addition to these the Gas & Pipelines Unit has adopted a broad range of other SPIs to reflect the principal risks in the sector.

The sector's contribution to HSE's Public Service Agreement continues to be above target and it is expected that, even with the significant increase in the number of top tier gas storage COMAH sites, the reduction to 16 Dangerous Occurrences by 2007/08 from the baseline of 19 in 2001/02 will be met.

With respect to the additional SPIs, the data does not yet exist for previous years' performance for all of the reporting categories used in this report. However, the data does exist for reports of incidents required under the Gas Safety (Management) Regulations 1996 (GS(M)R) reports, Mains Replacement Programme progress, annual gas in buildings incidents and mains and service related incidents. Using these categories, there appears to be no significant change in the safety performance of the Distribution Network Operators since the industry restructured in 2005. Additionally the UKOPA pipeline fault report for 2004 shows that overall the failure frequency per 1000 km per year for UK pipelines has approximately halved since 1962.

The Unit has identified gaps in the way some SPIs are monitored by the industry, in particular the recording of GS(M)R public reported gas escapes (PRE). And we expect further refinements in the SPI categories as we learn from this process.

It is hoped that this report, by providing the basis for annual comparison, will stimulate continuous improvements in safety performance in the industry, particularly amongst the Distribution Network Operators.

1.0 Introduction

1.1 Safety Performance Indicators

Major hazard incidents in the UK gas and pipelines industry occur infrequently and as such do not provide sufficient data with which to monitor the sector safety performance. Safety Performance Indicators (SPIs) are used to monitor trends, provide assurance that the arrangements to minimise the risk of a major accident are effective and give early warning that things may not be working properly. SPIs can be chosen from near-miss data such as low-level incidents or from precursors which might, in combination, give rise to a major incident.

1.2 This Report

This is the first annual Safety Performance Indicator report compiled by HSE's Gas & Pipelines Unit. The report covers the period from April 2005 to March 2006 with the exception of SPI data provided by National Grid Gas plc for the National Transmission System and pipeline data provided by the UK Onshore Pipeline Operators' Association (UKOPA), which cover calendar years. The purpose of this report is to monitor and present a broad range of major hazard safety performance indicators across the UK's gas transmission, distribution and major accident hazard pipelines sectors.

1.3 The UK Gas and Pipelines Industry

The UK gas and pipelines industry operates both natural gas and other pipelines across the country. It also includes natural gas import and storage facilities. In the UK there are approximately 22,000 km of Major Accident Hazard Pipelines (MAHPs - as defined by the Pipelines Safety Regulations 1996) of which approximately 20,000 km transport natural gas above 7 barg in pressure. The remainder transport ethylene and other dangerous fluids. In addition to the MAHPs, the eight major gas Distribution Networks (DNs) in the UK transport natural gas at pressures below 7 barg.

Before June 2005, Transco PLC operated nearly all of the natural gas MAHPs in the UK and owned the eight major gas distribution networks (DNs). However on 1 June 2005 four of the eight DNs were sold (to Southern Gas Networks plc, Scotland Gas Networks plc, Wales & West Utilities Ltd and Northern Gas Networks Ltd). Subsequently, Transco plc became National Grid Gas plc, retaining DNs in London, the West Midlands, the East of England and the North West. National Grid Gas plc also retained operatorship of the natural gas National Transmission System which delivers high pressure gas throughout the country to each of the DNs and other direct off-takes such as power stations.

1.4 The Gas & Pipelines Unit

As a part of HSE the Gas and Pipelines Unit regulates Health and Safety in the UK's gas and pipelines industry. The Unit's activities form part of HSE's Major Hazards Strategic Programme the goals of which are:

- To deliver at 2008 the Public Service Agreement (PSA2) targets for the Nuclear, Offshore and Onshore (COMAH) sectors
- To improve the utility of the high level targets for measuring performance in these sectors, including their understanding, ownership and value to all our stakeholders.
- To deliver continuous improvement in the efficiency and effectiveness of our regulation of major hazards.
- To deliver goals 1 – 3 in ways which maintain and enhance wider public confidence in the control and management of major hazards.

More information about the Gas & Pipeline Unit can be found on HSE's website at:
<http://www.hse.gov.uk/pipelines/hseandpipelines.htm>

2.0 Gas and Pipelines Unit Safety Performance Indicators

2.1 Background

HSE is required under its Public Service Agreement (PSA2) to monitor the number of Dangerous Occurrences (DOs) reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995 at onshore COMAH sites and these form a good foundation for the Gas & Pipeline Units SPI monitoring process. However, DOs in the gas and pipelines' sector occur in limited numbers and do not provide a sufficiently broad base against which to monitor the safety performance. As a result the Gas & Pipelines Unit has adopted an additional range of Safety Performance Indicators (SPIs) to reflect the principal risks in the sector.

Some of the additional SPIs take account of recent changes to the gas distribution industry. The SPIs also include damage and loss data provided by the UK Onshore Pipeline Operators' Association (UKOPA), as well as information which is required to be sent to the Gas & Pipelines Unit under the Gas Safety (Management) Regulations 1996 (GS(M)R) and the Iron Mains Replacement Programme.

HSE held extensive discussions with duty holders and other stakeholders in the gas and pipelines sector to ensure that the SPIs contained in this report are:

- Indicative of the principal risks generated and faced by the sector,
- Reasonably practicable for the dutyholders to produce,
- Where possible, using information already provided to other regulators such as Ofgem.

2.2 Public Service Agreement Targets

HSE's Public Service Agreement (PSA2) target requires a 15% reduction in the number of relevant RIDDOR reportable dangerous occurrences at upper and lower tier Control of Major Accident Hazard (COMAH) sites by the end of 2007/08 set against a 2001/2 baseline.

The RIDDOR categories relevant to the Gas & Pipelines Unit are:

- i. Electrical short circuit or overload;
- ii. Pipelines or pipeline works;
- iii. Explosion or fire;
- iv. Escape of flammable substances;
- v. Escape of substances.

2.3 Additional Safety Performance Indicators

Additional Safety Performance Indicators have been selected to be indicative of the sector's safety performance and relate to the potential occurrence of a major hazard incident. They are -

- i. The number of Major Accident Hazard Pipeline infringements caused by third parties and recorded by UKOPA in their Infringement Database.
- ii. The number of pipeline failure incidents arising from corrosion and other causes and reported bi-annually by UKOPA in their Pipeline Fault Database.
- iii. Numbers of incidents on the UK National Transmission System where:
 - a. Terminal Flow Advice has been issued to prevent off specification gas entry onto the UK National Transmission System.
 - b. Gas transmission pressure has risen above 102.5% of the pipeline maximum operating pressure.
 - c. Off-take pressure has fallen below the 38-barg "drop-off" point.
- iv. The number of Gas Safety (Management) Regulations (GS(M)R) reports submitted by gas Distribution Network Operators.

- v. Annual reports on progress with the Mains Replacement Programme made by all five gas Distribution Network Operators.
- vi. Annual SPI reports made by all five major gas Distribution Network Operators. This includes:
 - a. Total km of iron mains remaining in each Distribution Network,
 - b. Numbers of gas in buildings (GIB) incidents,
 - c. Number of mains and service related major incidents
 - d. Numbers of public reported escapes (PREs) permanently repaired within and after 12 hours,
 - e. Numbers of third party damage to pipelines and mains incidents.

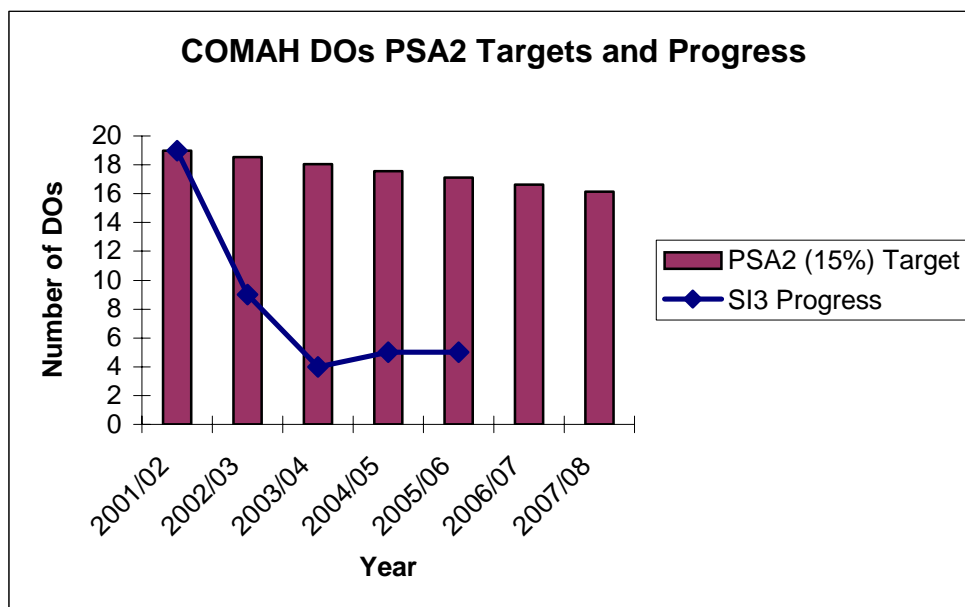
Note: Each of the reporting categories within the Distribution Network Operators' SPI reports are subject to the definitions contained in Appendix 1.

3.0 Safety Performance in 2005/06

3.1 COMAH Site Dangerous Occurrences

The graph below illustrates the Gas & Pipelines Unit's progress towards meeting its PSA2 target of 16 relevant COMAH DOs in 2007/08. As can be seen for 2005/06 there continues to be a substantial reduction in the number of DOs in excess of that required by the PSA2 target.

Graph 3.1.1: Contribution by Gas & Pipelines Unit to HSE's PSA2 Target



3.2 UKOPA Infringement Database

Third party infringement is one of the largest causes of pipeline damage and rupture in the UK and abroad. An infringement is any activity that either causes damage to a pipeline or pipeline coating or may be a precursor to such damage. UKOPA collects data on infringements within the legal easement around a pipeline or in the pipeline operator's declared zone of interest and includes activities such as excavation; ditch digging; post-hole boring; directional drilling and earth movement or levelling activities in general. Not all of the data included by UKOPA in the infringement database derives from pipelines defined by the Pipeline Safety Regulations 1996 as Major Accident Hazard Pipelines (MAHPs). However, all pipelines included by UKOPA in the infringement database have the potential to give rise to a major incident if ruptured.

The UKOPA infringement database provides a framework for recording third party infringements and enables the collection of pipeline data on a national basis. The purpose of the database is to build on year-

by-year data to identify trends in pipeline infringement and key factors leading to damage incidents. The first UKOPA infringement database report was compiled from data up to the end of 2004. The complete reports for both 2004 and 2005 can be found at on the UKOPA internet web site at the following address: UKOPA :: ukopa excavation safety ::.

The third party infringement data shown below is an extract from the report published by UKOPA and is confined to incidents categorised in the following ways:

- i. Actual damage or potential risk of damage to pipelines
- ii. Location of excavation in relation to pipelines

Tables 3.2.1 and 3.2.2 describe these categories in greater detail.

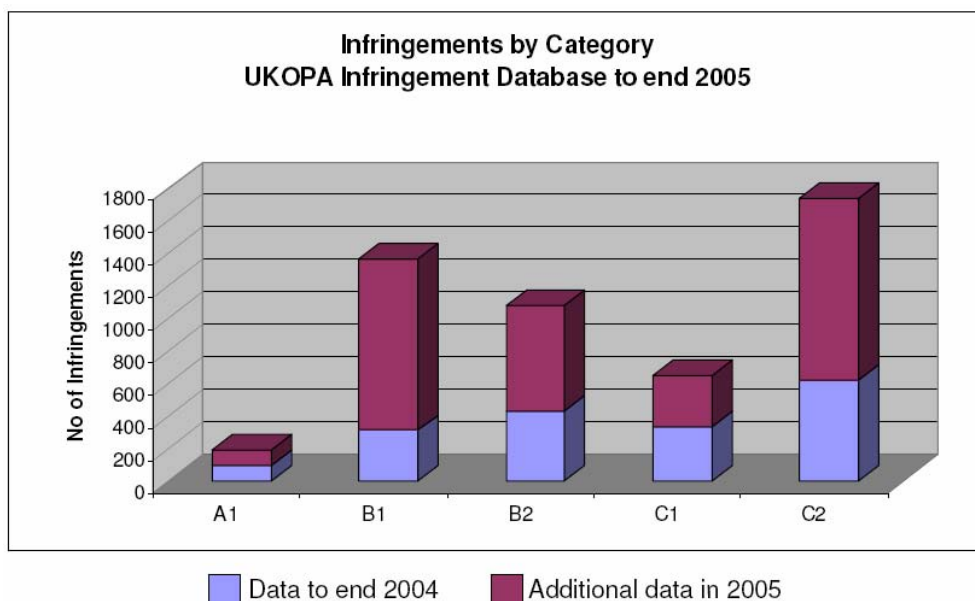
Table 3.2.1: UKOPA Infringement Risk Categories

Risk Index	Infringement Type	Infringement Description
A	Pipeline Damage or Leak	Includes damage to wrap or protective sleeve
B	Serious Potential for Damage	Methods or equipment used could have resulted in significant damage had excavation taken place at pipeline
C	Limited Potential for Damage	Methods or equipment would not have resulted in serious damage

Table 3.2.2: UKOPA Infringement Location Categories

Location Index	Location Description
1	Within the pipeline wayleave or easement. Typically, this is the zone within which the pipeline operator has legal rights, including a requirement by the landowner to notify planned work (although may be different for non-Pipelines Act lines laid by Statutory Undertakers).
2	Within the pipeline operators zone of interest, but outside the pipeline wayleave or easement. It is the area within which the operator would have reasonably expected a competent third party to have given notification in the prevailing circumstances.

Graph 3.2.1: Third Party Infringements by Location and Risk Category



Note: The data shown in the graph above should only be interpreted in the context of the UKOPA infringement database report for 2005 as a whole.

Beginning October 2004 data for high-pressure natural gas pipelines was introduced to the infringement database. The infringement data to the end of 2004 therefore contains three months of this data whereas the infringement data to the end of 2005 contains all 12 months of this data. Since the high-pressure natural gas pipeline networks now represent the overwhelming majority of source data for the infringement database it is unsurprising that an apparent increase in the overall number of infringements is seen between 2004 and 2005. The 2005 data should therefore provide a baseline for future third party infringement trend analysis.

3.3 UKOPA Pipeline Fault Database

One of the key objectives of UKOPA is to develop a comprehensive view on risk assessment and risk criteria as they affect Land Use Planning aspects adjacent to high hazard pipelines.

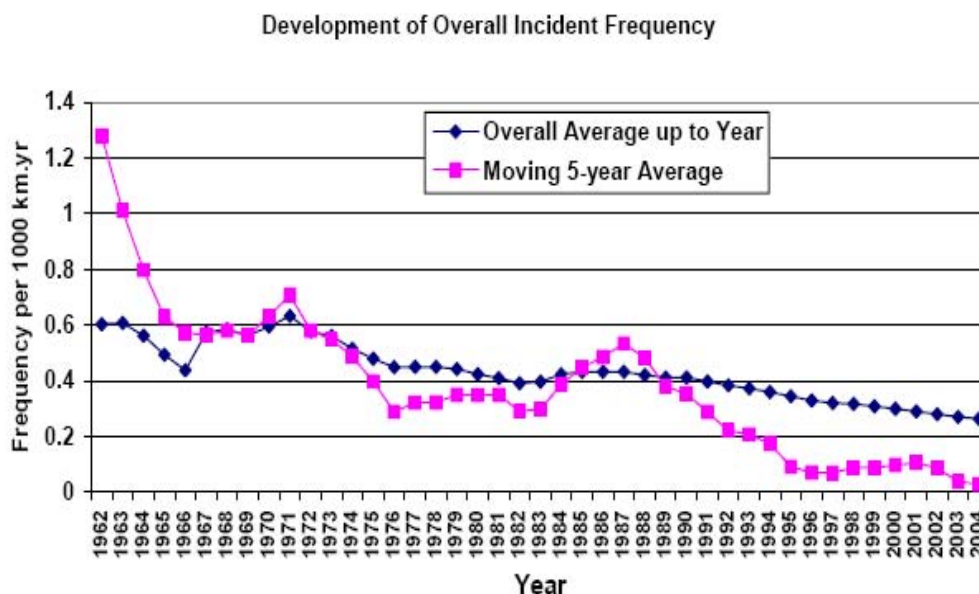
The purpose of the UKOPA pipeline fault database is to:

- Estimate leak and pipeline rupture frequencies for UK pipelines, based directly on historical failure rate data for UK pipelines
- Provide the means to estimate failure rates for UK pipelines for risk assessment purposes based on analysis of damage data for UK pipelines
- Provide a more realistic and rigorous approach to the design and routing of pipelines
- Provide the means to test design intentions and determine the effect of engineering changes (e.g. wall thickness of pipe, depth of burial, diameter, protection measures, inspection methods and frequencies, design factor etc.)

UKOPA has published four pipeline fault reports since in November 2000. The most recent report is an update of the previous data, covering product loss incidents from 1962 to the end of 2004 and can be found on the UKOPA website at the following internet address: <http://www.ukopa.co.uk/publications/pdf/UKOPA-05-0095.pdf> . The next UKOPA pipeline fault report will be published in mid-2009 and will reflect product loss data to the end of 2008.

The pipeline fault data shown below is an extract from the report published by UKOPA and covers the period 1962 to 2004. Over this period a clear decrease in the frequency of pipeline failures is seen.

Graph 3.3.1: UK Product Loss Incidents 1962 – 2004



Note: The data shown in the graph above should only be interpreted in the context of the UKOPA pipeline fault report for 2004 as a whole.

3.4 Gas National Transmission System Gas Quality and Pressure Excursions

The information provided by National Grid Gas plc for the National Transmission System covers the period 1 January 2005 to 31 December 2005.

3.4.1 Gas Quality

National Grid manages the quality of gas entering the National Transmission System by issuing Terminal Flow Advice (TFA) communications to the Delivery Facility Operators (DFO). If the gas supplied to the NTS by a DFO has the potential to fall below the standard required by the Gas Safety Management Regulations GS(M)R, a TFA is issued requesting the DFO to reduce or cease supply.

In the calendar year 2005 National Grid issued thirty-seven TFAs for the following reasons.

Table 3.4.1: Summary of Terminal Flow Advice issued for Gas Quality reasons

Gas Characteristic	No of TFAs Issued for Gas Quality Reasons
Hydrocarbon Dewpoint	13
Hydrogen Sulphide	7
Carbon Dioxide *	3
Incomplete Combustion Factor	7
Wobbe Number	5
Calorific Value **	1
Water Dewpoint	1
TOTAL	37

* not required under GS(M)R Schedule 3.

** not required under GS(M)R Schedule 3 but used to calculate Wobbe Number.

3.4.2 Pipeline Maximum Operating Pressure (MOP)

The Institution of Gas Engineering Recommendations on Transmission and Distribution Practice for Steel Pipeline for High Pressure Gas Transmission, IGE/TD/1 Edition 4 states "The sustained operating pressure for a pipeline system should not exceed Maximum Operating Pressure (MOP)". However, the sustained operating pressure is the maximum set pressure for the pressure regulating devices, and when operating at or near the MOP, this pressure may be exceeded by no more than 2.5% of its value due to the variations of pressure regulating devices and instruments. IGE/TD/1 Edition 4 also allows for an incidental pressure rise, above MOP plus 2.5%, provided the pressure does not reach the Maximum Incidental Pressure (MIP) of the pipeline. When an event of this nature occurs it should not last for more than 5 hours in excess of MOP at any one time or for more than 20 hours per year. The MIP described in IGE/TD/1 Edition 4 is 10% above the MOP.

The table below shows the number of events where pipeline pressure has risen above MOP and how many pipelines were affected.

Table 3.4.2: Summary of Pipeline Maximum Operating Pressure Events

Operating Pressure Level	Number of Events	Number of Pipelines Affected
Operating Pressure reached MIP	0	0
Operating Pressure exceeded MOP+2.5% for no more than 5 hours	1	3
Operating Pressure exceed MOP but was less than MOP+2.5%	9	15

Note: This data does not include any events where instruments have been identified as faulty or where the pipeline pressure was increased to facilitate a planned operation for testing prior to up-rating a pipeline.

3.4.3 Distribution Network Entry Pressure

National Grid monitors the pressure at the inlet to Distribution Network Offtakes to ensure it does not fall below the recognised normal design operating pressure of 38 Barg. There was one event in 2005 that affected three Offtakes where the inlet pressure fell below 38 Barg.

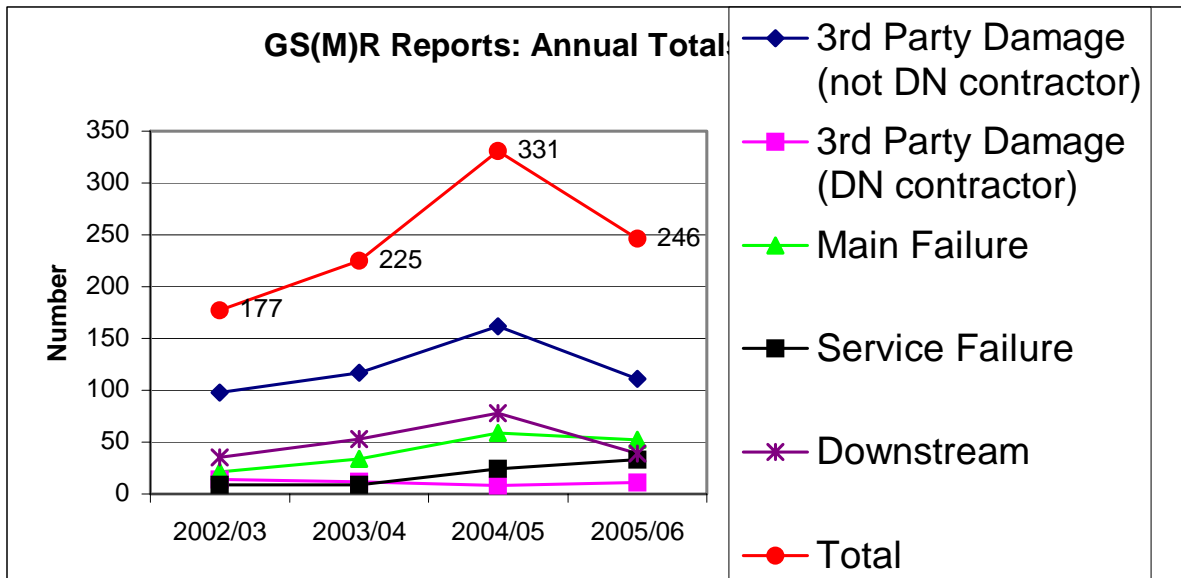
3.5 Gas Safety (Management) Regulations 1996 Reports

Gas Conveyors have a duty under the Gas Safety (Management) Regulations 1996 (GS(M)R), regulation 7(13), to investigate and report certain gas escapes that occur on their networks, i.e. those escapes that have, or are likely to have resulted in a fire or explosion. The investigation should be carried out to establish the source of the escape and, so far as is reasonably practicable, the reason for it. The criteria used by gas conveyors to decide whether to make a GS(M)R report are where the following have occurred:

- i. A Gas In Building (GIB) event where the gas concentration has exceeded 20% of the Lower Explosive Limit (LEL) or where more than 10Kg has been released, or,
- ii. An external release exceeding 500Kg, or,
- iii. An escape of gas, either within a building or on a Network, which has resulted in a fire or explosion.

From 1 April 2005 to 31 March 2006, 246 GS(M)R reports were made to HSE by gas distribution network operators. The graph below show the annual total of reports made from 2002/03 to 2005/06 and includes incident cause.

Graph 3.5.1: Annual GS(M)R Reports 2002/03 to 2005/06 (by incident cause)

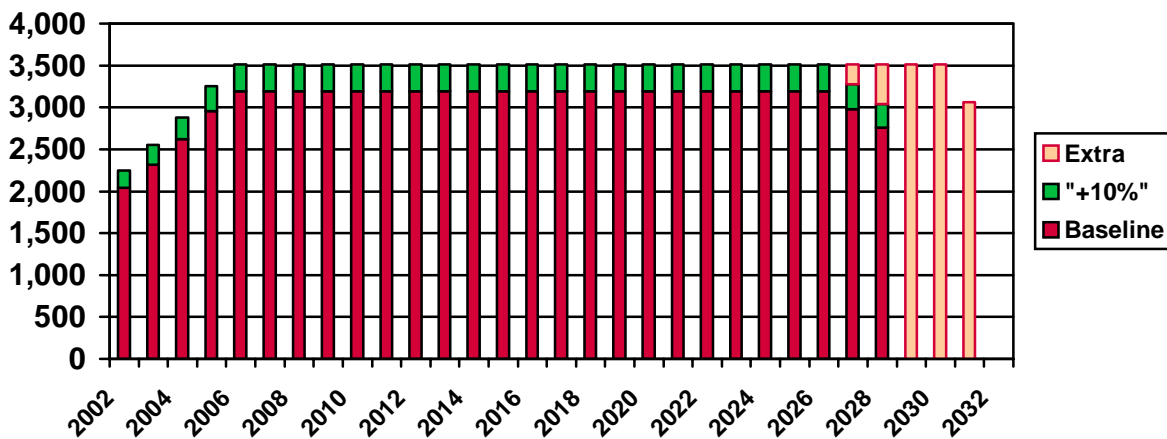


3.6 Iron Mains Replacement Programme

In September 2001 HSE published its enforcement policy for the replacement of iron gas mains for the 30 year period 2002 - 2032. This followed a high level of societal concern about the potential consequences of gas mains failure. At that time records showed there were about 91 000 km of iron mains within 30m of property which may be a risk to people. Subsequently, a review of records in 2004, showed that there were some 101 000 km of mains at risk at the start of the programme. The policy is often referred to as the 30/30 Mains Replacement Programme (MRP) due to requirement to remove all iron gas mains within 30m of property in 30 years.

The graph below shows the profile for replacement of all 101 000 km of iron gas mains by 2032. Since the changes that occurred to the ownership of the UK's gas Distribution Networks in June 2005 the responsibility for meeting the requirements of the MRP now belongs to all five Distribution Network Operators.

Graph 3.6.1: Profile for replacement of 101 000 km of Iron gas mains by 2032



The table below shows the performance of Transco plc for the three-year period 1 January 2002 - to 31 March 2005.

Table 3.6.1: Transco plc Mains Replacement Performance 1 Jan 2002 to 31 March 2005

30/30 iron mains to be decommissioned (km)	Jan 02 - March 03	April 03 - March 04	April 04 - March 05
Baseline + 10% target	2575	2549	2882
Actual	2846	2673	2847
Variance	271	124	-35

Table 3.6.2: All Distribution Networks Mains Replacement Performance 1 April 2005 to 31 March 2006

30/30 iron mains to be decommissioned (km) 1 April 2005 to 31 March 2006	Baseline + 10% target	Actual	Variance
National Grid Gas plc – North West	469	466	-3
National Grid Gas plc – East of England	634.5	640	+5.5
National Grid Gas plc – West Midlands	330.0	336	+6
National Grid Gas plc – London	290.5	282	-8.5
(National Grid Gas plc – Total)	(1724)	(1724)	(0)
Northern Gas Networks Ltd	482	482	0
Scotland Gas Networks plc	250	250	0
Southern Gas Networks plc	497	497	0
Wales & West Utilities Ltd	333	334	+1
Total of all Distribution Networks	3286	3287	1

Note: In 2005/06 National Grid Gas plc met its overall target under the MRP across its four DNs.

Further information on the Iron Mains Replacement Programme can be found on HSE's Gas Industry Website at the following address: <http://www.hse.gov.uk/gas/supply/mainsreplacement/irongasmains.htm>

3.7 Gas Distribution Network Reports

The reports for the period from April 2005 to March 2006 include the first two months of the year when Transco plc operated all the eight distribution networks. Each report from the gas Distribution Networks which were sold (i.e. to Southern Gas Networks plc, Scotland Gas Networks plc, Wales & West Utilities Ltd and Northern Gas Networks Ltd respectively) therefore include two months of SPI data during which Transco plc operated these networks.

Full definitions for the terms and reporting categories used in this section of the report are given in Appendix 1.

3.7.1 Iron Mains Remaining

As of 31 March 2006, the length of iron mains remaining within each Distribution Network is shown in Table 3.7.1. The data presented includes all iron mains within a Distribution Network regardless of proximity to a building.

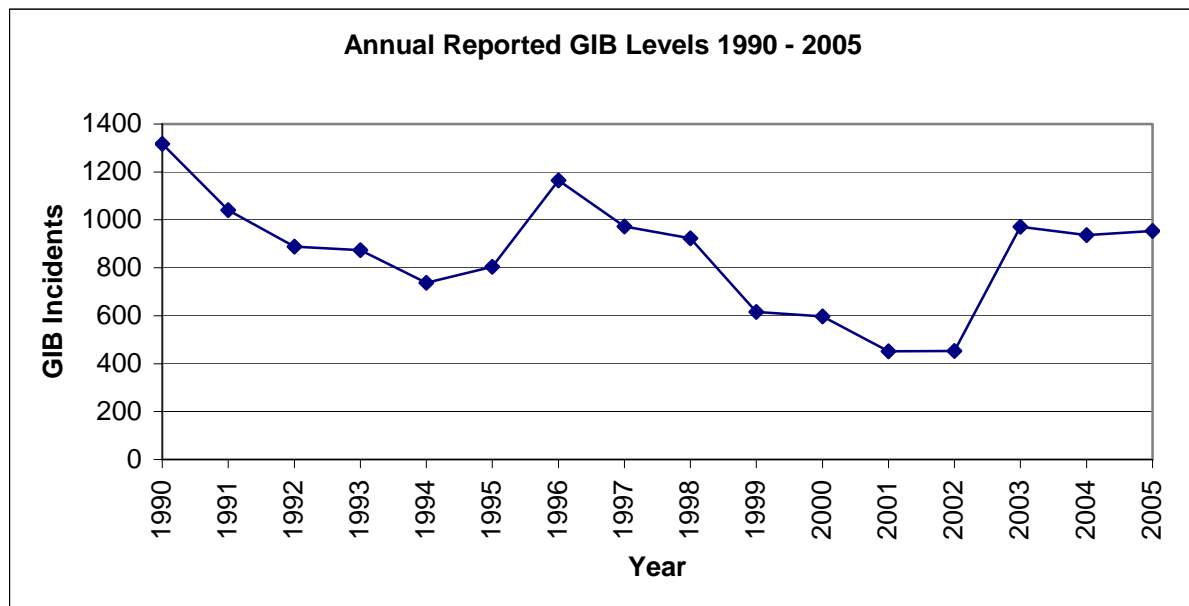
Table 3.7.1: Total Iron Mains Remaining on each Distribution Network on 31 March 2006

Remaining Iron Mains (Km)	Total
National Grid Gas plc – North West	13241
National Grid Gas plc – East of England	17000
National Grid Gas plc – West Midlands	10337
National Grid Gas plc – London	10713
(National Grid Gas plc – Total)	(51291)
Northern Gas Networks Ltd	14571
Scotland Gas Networks plc	7599
Southern Gas Networks plc	19695
Wales & West Utilities Ltd	10471
Total of all Distribution Networks	103627

3.7.2 Gas in Buildings Incidents

Prior to the 30/30 Mains Replacement Programme, Transco plc reported on average approximately 23 000 fractures and corrosion failures each year leading to about 600 Gas in Buildings (GIB) incidents. The graph below shows the annual GIB reporting levels from 1990 to 2004.

Graph 3.7.2: Annual reported Gas in Buildings data 1990 to 2004



It is clear from the graph that a significant increase in reported GIB incidents occurred during 2003. The increase is attributed to data capture improvements and is not considered to indicate a general system deterioration.

The table below shows the number of Gas in Buildings incidents across all Distribution Networks between 1 April 2005 and 31 March 2006. Subsequent years' data will allow for a year-on-year comparison to be made for each Distribution Network. However, since each DN is comprised of varying mixtures of urban and rural pipelines it is not possible to compare fairly the GIB performance of the different DNs on the basis of the length of mains they operate.

Table 3.7.2: Number of Gas in Buildings (GIB) incidents across all Distribution Networks between 1 April 2005 and 31 March 2006

GIB Incidents	Number
National Grid Gas plc – North West	143
National Grid Gas plc – East of England	198
National Grid Gas plc – West Midlands	68
National Grid Gas plc – London	56
(National Grid Gas plc – Total)	(465)
Northern Gas Networks Ltd	207
Scotland Gas Networks plc	64
Southern Gas Networks plc	99
Wales & West Utilities Ltd	119
Total of all Distribution Networks	954

3.7.3 Number of Mains and Service Related Major Incidents

Shown in the graph below are the numbers of mains and service related incidents causing death, major injury or significant structural damage which occurred between 1 April 1990 and 31 March 2006. The numbers of fatalities arising from those incidents are also shown.

Graph 3.7.3: Number of Mains and Service Related Major Incidents and Resulting Fatalities between 1 April 1990 and 31 March 2006

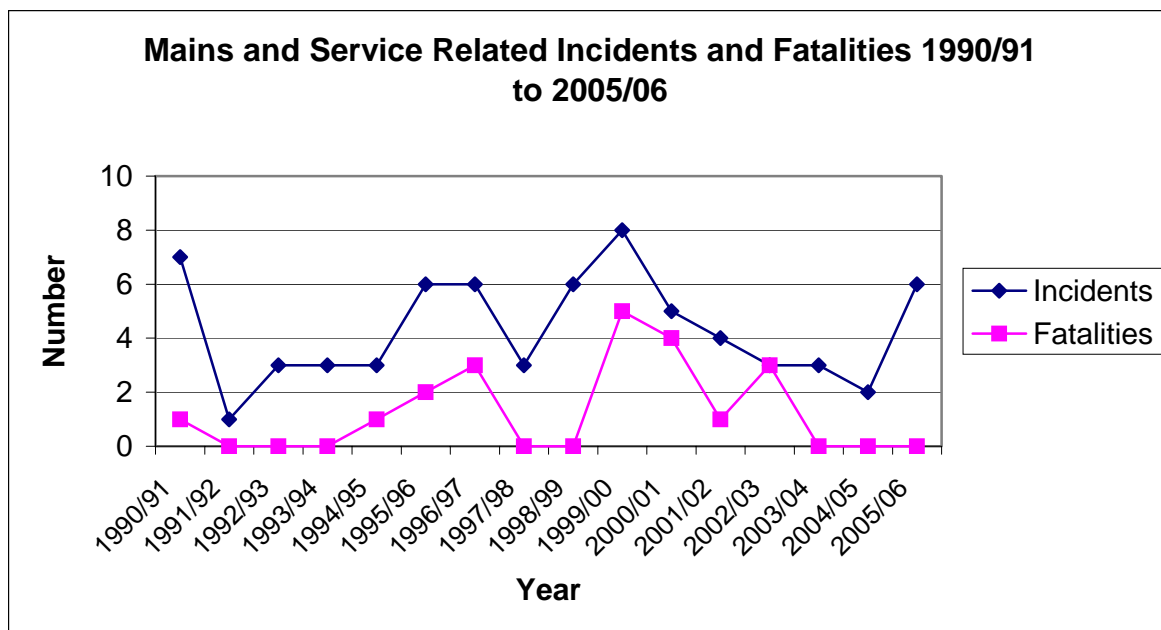


Table 3.7.3: Number of mains and service related incidents across all Distribution Networks between 1 April 2005 and 31 March 2006

Mains and Service Related Incidents	Number	Fatalities
National Grid Gas plc – North West	0	0
National Grid Gas plc – East of England	0	0
National Grid Gas plc – West Midlands	0	0
National Grid Gas plc – London	1	0
(National Grid Gas plc – Total)	(1)	(0)
Northern Gas Networks Ltd	2	0
Scotland Gas Networks plc	1	0
Southern Gas Networks plc	0	0
Wales & West Utilities Ltd	2	0
Total of all Distribution Networks	6	0

3.7.4 Public Reported Escapes Permanently Repaired

When a member of the public makes an emergency call to report a gas escape a Public Reported Escape or PRE is logged by the relevant Distribution Network Operator (DNO). The DNO then dispatches an engineer to investigate any potential leak. If the engineer finds a leaking gas main or service then a repair will be 'actioned' by the DNO.

Each DNO has to comply with the Gas Safety (Management) Regulations (GS(M)R). This requires that after a PRE has been reported any gas leak should be attended as soon as is reasonably practicable and prevented within 12 hours, again where reasonably practicable. Occasionally no trace of escaping gas is found and sometimes a number of PREs are found to relate to a single gas leak. The PRE safety performance of each DNO is therefore based only on those gas escapes which required actual repair.

However DNOs frequently make safe by carrying out temporary repairs to prevent gas leaks within 12 hours of a PRE which complies with GS(M)R. Since the DNOs do not currently have internal reporting systems which allow them to record temporary repairs they are not yet reported here. For future reports all DNOs have been asked to report on GS(M)R compliant temporary repairs which have been made within 12 hours of receiving a PRE. The table below shows the PRE safety performance of each DNO against these criteria.

Table 3.7.4: Number of Gas Escapes Requiring Repair and Permanent Repairs made within 12 hours following receipt of a PRE across all Distribution Networks between 1 April 2005 and 31 March 2006

Number	Gas Escapes Requiring Repair	Permanent repairs made within 12 hours	Permanent Repairs (%)
National Grid Gas plc – North West	16899	5767	31.1
National Grid Gas plc – East of England	21143	6710	31.7
National Grid Gas plc – West Midlands	8842	3461	39.1
National Grid Gas plc – London	15644	4773	30.5
(National Grid Gas plc – Total)	(62528)	(20711)	(33.1)
Northern Gas Networks Ltd	23131	13073	56.5
Scotland Gas Networks plc	12575	8451	67.2
Southern Gas Networks plc	40173	16959	42.2
Wales & West Utilities Ltd	19562	8490	43.4
Total of all Distribution Networks	157969	67684	42.8

3.7.5 Third Party Damage Incidents

The table below shows the number of third party damage incidents occurring to mains and pipelines on each Distribution Network. The data is further broken down by whether the damage was caused by a contractor working for the Distribution Network Operator or by an unrelated party.

Table 3.7.5: Number of third party damage incidents caused by related and unrelated third parties across all Distribution Networks between 1 April 2005 and 31 March 2006

Number of Third Party Damage Incidents	Own Contractor	Unrelated 3rd Party	Total
National Grid Gas plc – North West	1	38	39
National Grid Gas plc – East of England	1	28	29
National Grid Gas plc – West Midlands	0	11	11
National Grid Gas plc – London	0	9	9
(National Grid Gas plc – Total)	(2)	(86)	(88)
Northern Gas Networks Ltd	0	24	24
Scotland Gas Networks plc	0	18	18
Southern Gas Networks plc	1	14	15
Wales & West Utilities Ltd	0	28	28
Total of all Distribution Networks	3	170	173

4.0 Conclusions

This is the first year that the Gas & Pipelines Unit has reported on major hazard Safety Performance Indicators (SPIs) in the UK Gas and Pipeline industry. Accordingly, no absolute assessment of the state of the industry's major hazard safety performance can be made on the basis of this report. However this report should allow for comparisons with future years' performance to be made.

In addition to the Dangerous Occurrences monitored under HSE's Public Service Agreement the Unit has also monitored a broad range of additional SPIs which reflect the principal risks generated and faced by the sector.

The sector's contribution to HSE's Public Service Agreement continues to be above target and it is expected that, even with the significant increase in the number of top tier gas storage COMAH sites, the reduction to 16 Dangerous Occurrences by 2007/08 from the baseline of 19 in 2001/02 will be met.

With respect to the additional SPIs the data does not yet exist for previous years' performance for all of the reporting categories used in this report. However, previous years' performance data does exist for GS(M)R reports, Mains Replacement Programme progress, annual Gas in Buildings incidents and Mains and Service Related incidents. Using these categories alone, there appears to be no significant change in the safety performance of the Distribution Network Operators since they were sold. Additionally the UKOPA pipeline fault report for 2004 shows that overall the failure frequency per 1000 km per year for UK pipelines has approximately halved since 1962.

The Unit has identified gaps in the way some SPIs are monitored by the industry, in particular the recording of GS(M)R compliant PRE temporary repairs. As such this report marks the start of a learning process for the Unit which may lead to future refinements in the SPI categories reported upon.

It is hoped that this report, by providing the basis for annual comparison, will have the potential for stimulating improved safety performance in the industry, particularly amongst the Distribution Network Operators.

Appendix 1 - DNO Annual SPI Reporting Definitions

1. IRON MAINS REMAINING

DNOs are asked to provide the total iron mains population (in km) for each network regardless of proximity to a building.

This information should be useful in allowing HSE to compare safety performance across each DN. However, since the ratio of the $\pm 30m$ populations will vary across DNs, this will not provide the basis for a precise measure of residual risk.

2. GAS IN BUILDINGS

DNOs are asked to report the number of 'Gas in Buildings' (GIB) events where any gas readings have been detected within a building as a result of an iron distribution mains pipe failure, specifically:

- i. A fracture or corrosion of a cast/spun iron main
- ii. Corrosion of a ductile iron main

Reportable GIB events will exclude incidents arising from:

- iii. Non-iron materials (polyethylene, steel, etc)
- iv. Non-pipe specific components (e.g. joints, clamps, encapsulations, internal appliances, etc.)
- v. Services
- vi. Other failure causes such as third party interference

Note: To be consistent with the data already reported to Ofgem, GIB events will be reported regardless of the LEL concentration level.

3. MAINS & SERVICE RELATED INCIDENTS

DNOs are asked to report the number of failures upstream of the emergency control valve (ECV) leading to gas entering a building, where subsequent ignition causes death, major injury (as defined by RIDDOR 1995) or significant structural damage. This category covers only those incidents arising from mains fractures and corrosion and does not include third party damage.

Note: National Grid has previously defined significant structure damage where the estimated cost of repair is in excess of £10,000. Incidents not meeting this criterion but where the concentration of gas is $\geq 20\%$ LEL inside buildings (when evacuation is required) or where 500kg has been released externally will continue to be reported under RIDDOR and GS(M)R.

4. PUBLIC REPORTED ESCAPES

a) DNOs are asked to report on the number of 'actioned repairs' made on their Networks instead of the number of 'Escapes on the Network'. The reason for this is to remove any inflation of numbers caused by multiple 0800 111 999 calls. This also removes any need for the DNOs to report on "No Trace" incidents.

A reportable actioned repair is a permanent repair made to a distribution mains or service pipe following a gas escape.

- i. This includes Third Party Damage
- ii. This excludes temporary repairs
- iii. This excludes leaks and repairs downstream of the ECV

Note: This is consistent with the definition used for providing historical external PRE information to Ofgem.

b) DNOs are also asked to report on the number of escapes on their Networks prevented by a permanent repair within 12 hours from receipt of the first emergency call.

Note: Since this data will be extracted from the emergency call centres it may include situations where multiple calls have been received for a single escape.

5. THIRD PARTY DAMAGE

DNOs are asked to report on the number of third party damage incidents on their Networks. In this case, "Third Party" excludes the DNO's own employees but includes the DNO's contractors and any other unrelated parties. Only the following categories will be reported:

- a) Incidents on mains operating below 7 barg, and
- b) Incidents where a report of a dangerous occurrence has (or should) have been made under RIDDOR Schedule 2, paragraph 14, parts (a), (b) and (c), specifically where, using GS(M)R criteria:
 - i. Damage resulting in a GIB event where > 20% LEL concentration or >10Kg has occurred,
 - ii. Damage resulting in an external release > 500Kg,
 - iii. Damage and release leading to the ignition of gas.

Note: The DNO should follow a gas measurement procedure which provides the best indication of the risk of ignition in GIB events where > 20% LEL concentration or >10Kg has occurred.

DNOs are also asked to categorise the number of incidents in two ways, these being:

- c) Incidents caused by the DNO's own contractors
- d) Incidents caused by unrelated parties.