

Hazardous Installations Directorate

Gas & Pipelines Unit

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

Annual Report 2006/07

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Executive Summary

This is the second annual Safety Performance Indicator (SPI) report compiled by HSE's Gas & Pipelines Unit. 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. HSE publishes this report annually, both to monitor and compare industry safety performance year-on-year.

The majority of data used in this report arises from the period 1 April 2006 to 31 March 2007 although in some cases the data used relates to the 2006 calendar year.

In 2006/07 no significant, overall, change is seen in the safety performance of the UK gas and pipelines industry. In particular there is no evidence to suggest in this report that the overall safety performance of the gas Distribution Networks has significantly changed since the changes of ownership that took place in June 2005. The key findings of this report are:

- The Gas & Pipelines Unit continued to make good progress on its PSA2 target and is expected to exceed the reduction to 16 Dangerous Occurrences on its COMAH sites by 2007/08.
- Reports made under the Gas Safety (Management) Regulations have continued to rise. This trend since 02/03 is partly due to damage cause by third party contractors not employed by the gas Distribution Networks. Service failures have also continued to rise.
- Collectively all of the gas Distribution Networks progress with the Mains Replacement Programme was 1.4% above target.
- There has been a nearly 10% fall in all Gas In Buildings incidents across all of the gas Distribution Networks. This is first significant fall since 2000/01.
- Mains and Service related incidents across all of the gas Distribution Networks have halved and no fatalities occurred in 2006/07.
- Overall the gas Distribution Networks have seen a small decrease in the percentage of permanent repairs made within 12 hours to gas escapes requiring repair. This fell to 43.0% from 43.8% in 2005/06.
- Significant increases in the number of unrelated third party damage incidents occurred in the London Distribution Network and the Southern Distribution Network.

Where necessary the Gas & Pipelines Unit will incorporate the findings from this report into its operational strategy for 2007/08 and beyond.

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 second annual Safety Performance Indicator report compiled by HSE's Gas & Pipelines Unit. The report covers the period from April 2006 to March 2007 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 at above 7 barg. 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 work of the Gas & Pipeline Unit can be found on HSE's website – [Gas supply industry health and safety](http://www.hse.gov.uk/gas/supply/) (http://www.hse.gov.uk/gas/supply/) and [Pipelines health and safety](http://www.hse.gov.uk/pipelines/index.htm) (http://www.hse.gov.uk/pipelines/index.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 HSE 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, and
- Where possible, use 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 every four years 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 entering 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. Number of gas in buildings (GIB) incidents,
 - c. Number of mains and service related major incidents
 - d. Number of public reported escapes (PREs) permanently repaired within and after 12 hours,
 - e. Number of third party damage incidents to pipelines and mains.

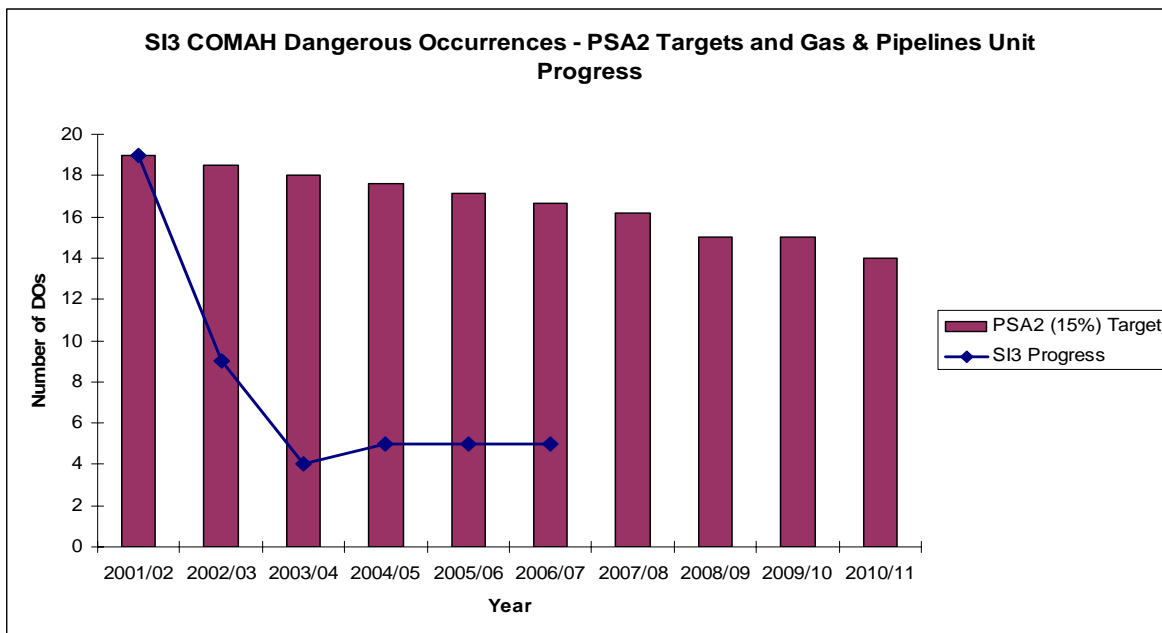
Note: These categories within the Distribution Network Operators' SPI reports are defined in Appendix 1.

3.0 Safety Performance in 2006/07

3.1 COMAH Site Dangerous Occurrences

In 2006/07 there were 5 reported relevant DOs at upper and lower tier COMAH sites covered by the Gas & Pipelines Unit. The graph below illustrates the Gas & Pipelines Unit's progress towards meeting its PSA2 target of 16 relevant COMAH DOs by 2007/08.

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



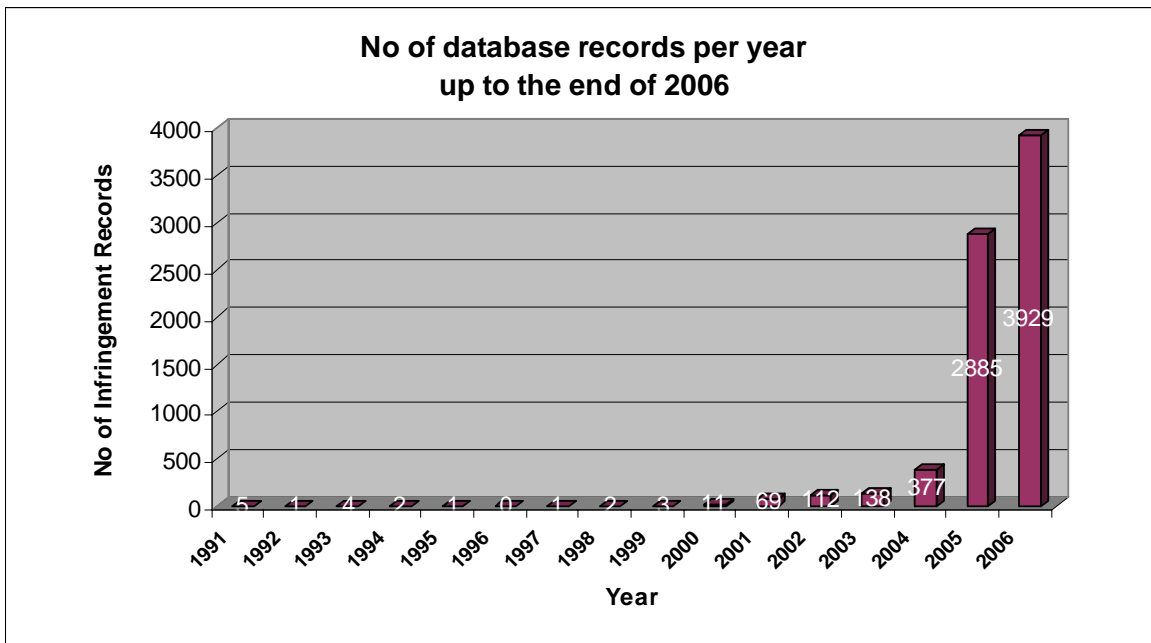
3.2 UKOPA Infringement Database

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 in the UKOPA infringement database derives from pipelines defined by the Pipeline Safety Regulations 1996 as Major Accident Hazard Pipelines (MAHPs). However, all pipelines included 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 UKOPA infringement database report is compiled from data annually, the first report having been produced for 2004. The complete UKOPA reports can be found at on the UKOPA internet website - [UKOPA Excavation Safety Index](http://www.ukopa.co.uk/pipeline-safety-excavation.html) (<http://www.ukopa.co.uk/pipeline-safety-excavation.html>)

Graph 3.2.1 shows the number of incidents of third party infringement recorded on the UKOPA database from 1991 to 2006. Prior to 2005 contributions to the database from chemical and oil sector pipeline operators only. With the addition of records from the high-pressure natural gas pipeline operators from 2005 the database content has increased significantly. The high-pressure natural gas pipeline networks now represent the overwhelming majority of source data for the infringement database and this accounts for the increase in the overall number of infringements seen since 2005.

Graph 3.2.1: Numbers of Third Party Infringements Recorded on the UKOPA Database – 1991 to 2006



The third party infringement data shown below is 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

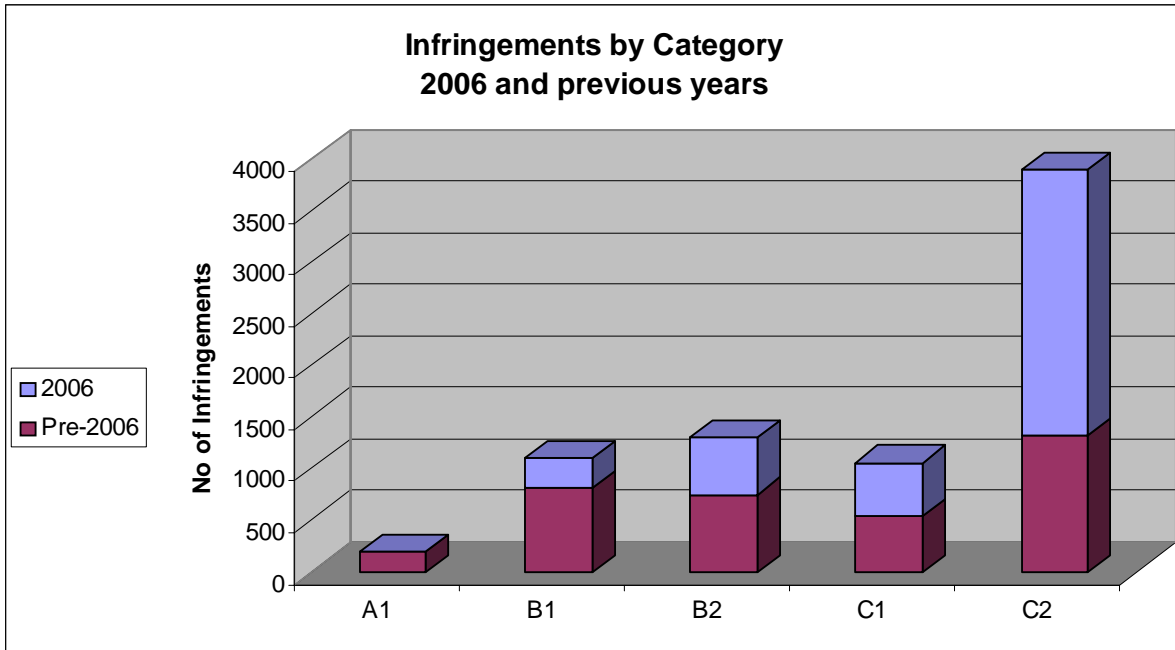
Risk Index	Infringement Type	Infringement Description
A	Pipeline Damage or Leak	Includes damage to wrap or protective sleeve
B	Serious Potential for Damage	Methods or equipment used could cause significant damage had excavation taken place
C	Limited Potential for Damage	Methods or equipment would not 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 3.2.2: Third Party Infringements by Location and Risk Category – 2006



Note: The data shown in the graphs above should only be interpreted in the context of the UKOPA infringement database report for 2006.

Graph 3.2.2 shows that only a small number of the highest risk category of infringements (A1) occurred in 2006. There is an overall increase in the other categories of infringement and this is accounted for by improvements in the incident recording procedures of the high-pressure natural gas pipeline operators. As such it is not possible to make any comparison with previous years' data.

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:

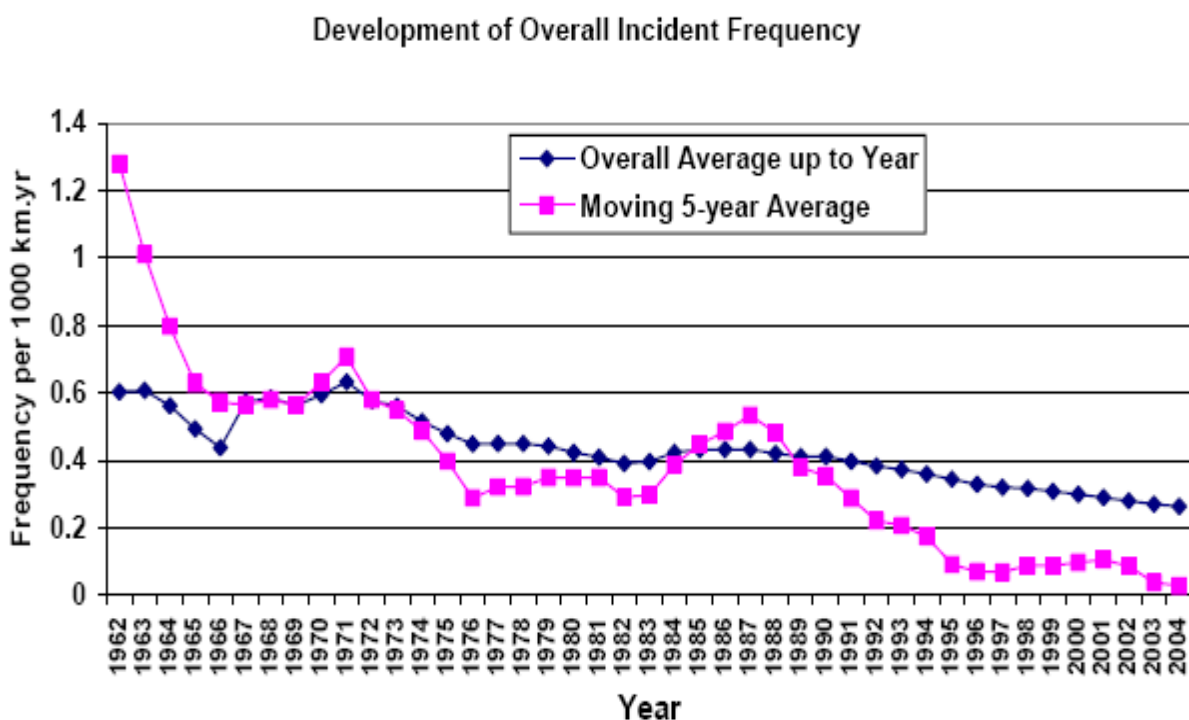
- Estimate leak and pipeline rupture frequencies for UK pipelines, based directly on historical failure rate data for UK pipelines
- Provide the means to estimate failure rates for UK pipelines for risk assessment purposes based on analysis of damage data for UK pipelines
- Provide a more realistic and 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 for the National Transmission System (NTS) covers the period 1 January 2006 to 31 December 2006.

3.4.1 Gas Quality

National Grid Gas 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 2006 calendar year National Grid Gas issued thirty-six 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	
	2005	2006
Hydrocarbon Dewpoint	13	17
Hydrogen Sulphide	7	4
Carbon Dioxide *	3	4
Incomplete Combustion Factor	7	4
Wobbe Number	5	2
Calorific Value **	1	3
Water Dewpoint	1	2
TOTAL	37	36

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

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

No significant change is seen between 2005 and 2006 in the number of TFAs issued by National Grid Gas, although there is some variance in the categories under which they were issued.

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	
	2005	2006	2005	2006
Operating Pressure reached MIP	0	0	0	0
Operating Pressure exceeded MOP+2.5% for no more than 5 hours	1	0	3	0
Operating Pressure exceeds MOP but was less than MOP+2.5%	9	29	15	46

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.

In 2006 there were no incidents where the MOP was exceeded by more than 2.5% on NTS pipelines compared to one incident in 2005.

Between 2005 and 2006 the number of events where the operating pressure on NTS pipelines rose above the MOP but by less than 2.5% increased by 222%. Further inquiry with National Grid Gas revealed that a large number of these incidents occurred at only two pipeline locations. In order to alleviate this National Grid Gas has lowered the pressure override setting at one of the locations and at the other recent pipeline up-rating has taken place. National Grid Gas have now also put in place a process to monitor and review all MOP excursion events so that appropriate action is taken when such events occur.

3.4.3 Distribution Network Entry Pressure

National Grid Gas 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 were no such events in 2006 compared to one event in 2005.

3.5 Gas Safety (Management) Regulations 1996 Reports

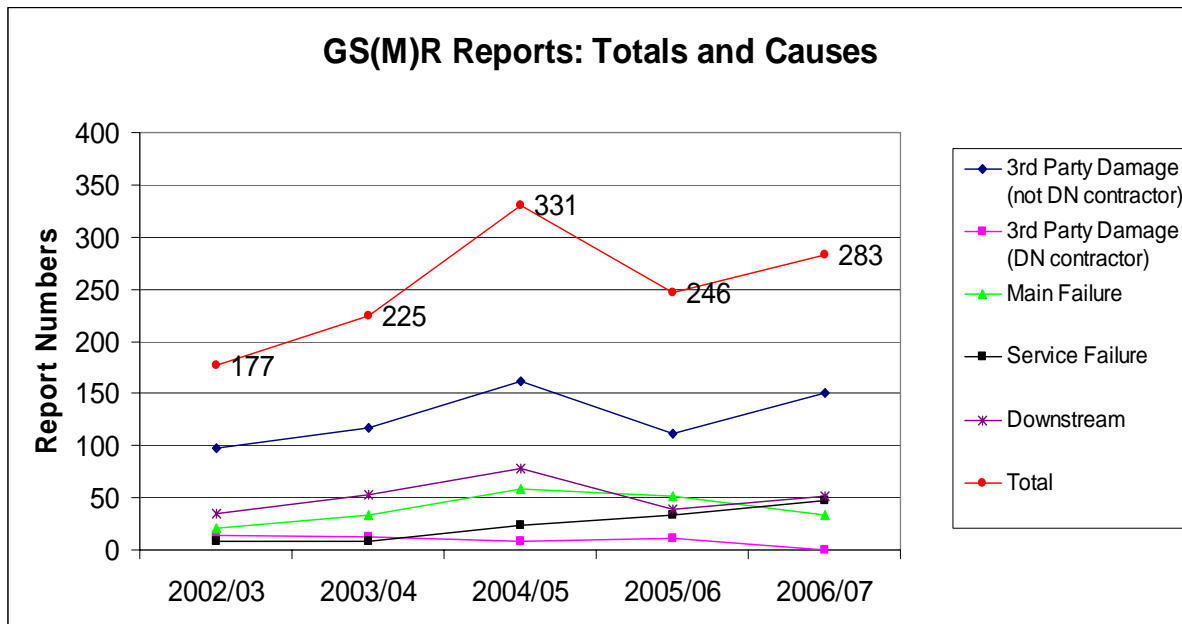
Gas Conveyors have a duty under the Gas Safety (Management) Regulations 1996 (GS(M)R), regulation 7(13), to investigate and report certain gas escapes that occur on their networks, i.e. those escapes that have, or are likely to have resulted in a fire or explosion. The investigation should be carried 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.

The graph below show the annual total of reports made from 2002/03 to 2006/07 and includes incident cause.

Graph 3.5.1: Annual GS(M)R Reports 2002/03 to 2006/07 (by incident cause)



The total number of GS(M)R reports made in 2006/07 rose from 246 to 283 in 2005/06; an increase of 15%. The trend in the total number of GS(M)R reports made to HSE since 2002/03 shows a steady year-on-year increase.

Third party damage caused by contractors not employed by the DNOs were responsible for a rise from 111 to 150 GS(M)R reports made between 2005/06 and 2006/07. Over the same period the number of GS(M)R reports made because of third party damage incidents caused by contractors employed by the DNOs fell from 11 to zero.

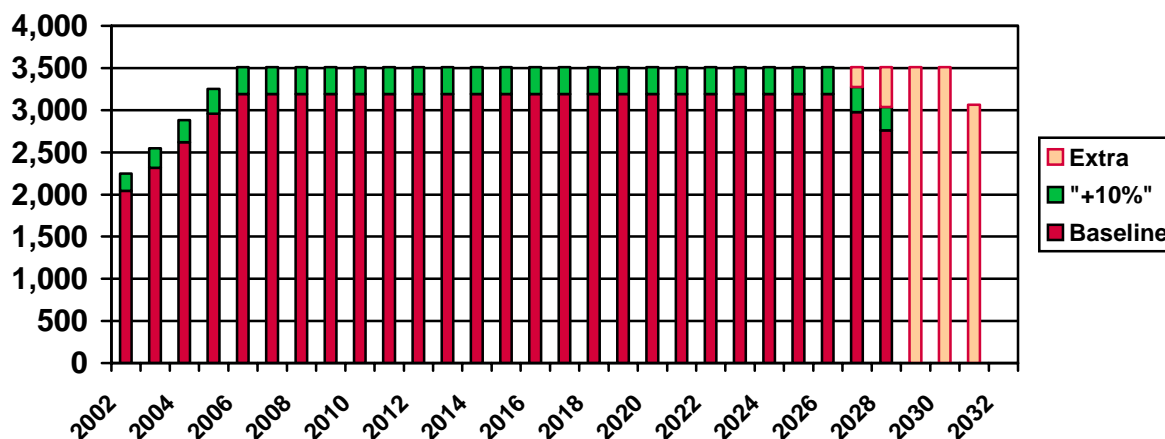
The number of GS(M)R reports caused by service failures shows a steady rise from 9 to 48 reports made between 2003/04 and 2006/07. The number of GS(M)R reports made because of mains failures shows a gradual fall from 59 to 34 between 2004/05 and 2006/07.

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 concern about the potential consequences of gas mains failure. At that time records showed there were about 91,000km of iron mains within 30m of property. Subsequently, a review of records in 2004 showed that there were some 101,000km of such mains 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 30/30 iron mains replacement performance for the period 1 January 2002 to 31 March 2006. The iron mains decommissioned during the period 1 January 2002 to 31 May 2005 were under Transco plc ownership and afterwards were under the ownership of the five new gas Distribution Network Operators.

Table 3.6.1: Mains Replacement Performance 1 Jan 2002 to 31 March 2006

30/30 iron mains to be decommissioned (km)	Jan 02 - March 03	April 03 - March 04	April 04 - March 05	April 05 - March 06
Baseline + 10% target	2,575	2,549	2,882	3,286
Actual	2,846	2,673	2,847	3,287
Variance	271	124	-35	1

Table 3.6.2: All Distribution Networks Mains Replacement Performance 1 April 2006 to 31 March 2007

30/30 iron mains decommissioned (km) 1 April 2006 to 31 March 2007	Baseline + 10% target	Actual	Variance
National Grid Gas plc – North West	504.0	507.0	3.0
National Grid Gas plc – East of England	613.0	621.0	8.8
National Grid Gas plc – West Midlands	372.0	386.0	14.0
National Grid Gas plc – London	331.0	337.0	6.0
<i>(National Grid Gas plc – Total)</i>	<i>(1,820.0)</i>	<i>(1,851.0)</i>	<i>(31.0)</i>

Northern Gas Networks Ltd	520.6	521.7	1.1
Scotland Gas Networks plc	272.0	289.5	17.5
Southern Gas Networks plc	540.0	536.7	-3.3
<i>(Scotia Gas Networks plc – Total)</i>	<i>(812.0)</i>	<i>(826.2)</i>	<i>(14.2)</i>
Wales & West Utilities Ltd	361.0	363.0	2.0
Total of all Distribution Networks	3,513.6	3,561.9	48.3

In 2006/07 the mains replacement performance for the combined gas distribution networks has exceeded the target by approximately 1.4%.

Further information on the [Iron Mains Replacement Programme](#) can be found on HSE's Gas Industry Website:

(<http://www.hse.gov.uk/gas/supply/mainsreplacement/irongasmain.htm>)

3.7 Gas Distribution Network Reports

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 2007, 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.

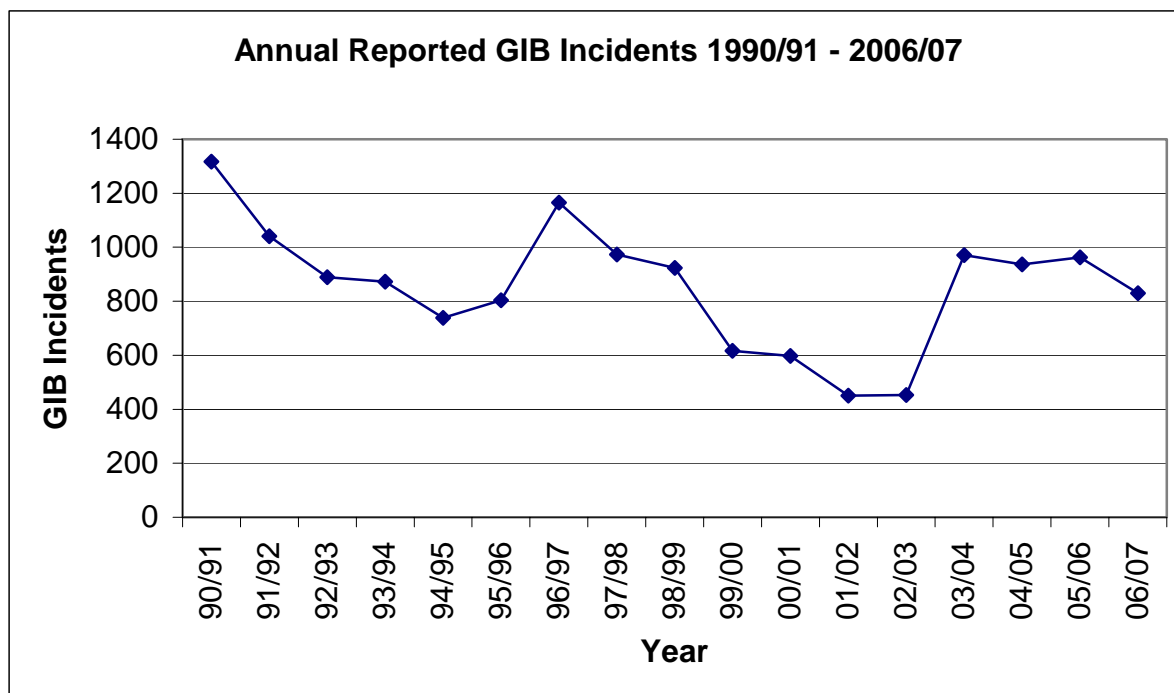
Table 3.7.1: Total Iron Mains Remaining on each Distribution Network on 31 March 2006 and 2007

Remaining Iron Mains (km)	2005/06	2006/07
National Grid Gas plc – North West	13,241	12,681
National Grid Gas plc – East of England	17,000	16,363
National Grid Gas plc – West Midlands	10,337	9,890
National Grid Gas plc – London	10,713	10,400
<i>(National Grid Gas plc – Total)</i>	<i>(51,291)</i>	<i>(49,334)</i>
Northern Gas Networks Ltd	14,571	14,085
Scotland Gas Networks plc	7,599	7,238
Southern Gas Networks plc	19,695	18,941
<i>(Scotia Gas Networks plc - Total)</i>	<i>(27,294)</i>	<i>(26,179)</i>
Wales & West Utilities Ltd	10,471	10,174
Total of all Distribution Networks	103,627	99,772

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. These in turn led to about 600 Gas in Buildings (GIB) incidents. The graph below shows the number of GIB incidents reported between 1990 and 31 March 2007.

Graph 3.7.2: Annual reported Gas in Buildings incidents 1990/91 to 2006/07



A significant increase in reported GIB incidents occurred during 2003. The increase is attributed to data capture improvements and is not considered to indicate 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 2007. A year-on-year comparison can 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 2007

GIB Incidents	2005/06	2006/07
National Grid Gas plc – North West	143	104
National Grid Gas plc – East of England	198	149

National Grid Gas plc – West Midlands	68	97
National Grid Gas plc – London	56	72
<i>(National Grid Gas plc – Total)</i>	<i>(465)</i>	<i>(422)</i>
Northern Gas Networks Ltd	207	173
Scotland Gas Networks plc	67*	62
Southern Gas Networks plc	105*	99
<i>(Scotia Gas Networks plc - Total)</i>	<i>(274)*</i>	<i>(235)</i>
Wales & West Utilities Ltd	119	74
Total of all Distribution Networks	963*	870

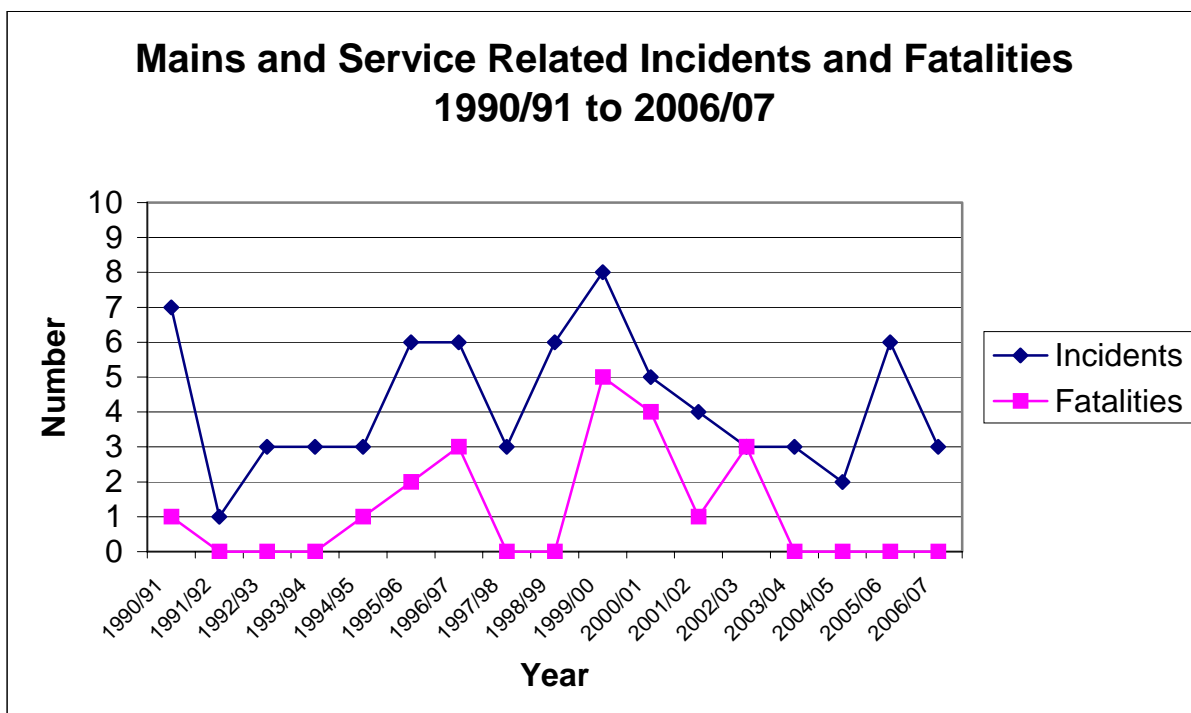
* Corrected from 2005/06 annual report following an operator data cleansing exercise. The previously stated number of GIB incidents for Scotland and Southern Gas Networks were 64 and 99 respectively.

Between 2005/06 and 2006/07 the number of GIB incidents reported across all of the Distribution Networks fell by 9.7%. Individually the London and West Midlands Distribution Networks operated by National Grid Gas experienced the only rises in GIB incidents in 2006/07.

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 2007. 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 2007



In 2006/07 there were no fatalities related to mains and services related incidents. Between 2005/06 and 2006/07 the number of mains and services related incidents fell by 50%. The table below identifies in which Distribution Networks these incidents occurred.

Table 3.7.3: Number of mains and service related incidents across all Distribution Networks between 1 April 2006 and 31 March 2007

Mains and Service Related Incidents	Number		Fatalities	
	2005/06	2006/07	2005/06	2006/07
National Grid Gas plc – North West	0	0	0	0
National Grid Gas plc – East of England	0	0	0	0
National Grid Gas plc – West Midlands	0	1	0	0
National Grid Gas plc – London	1	0	0	0
<i>(National Grid Gas plc – Total)</i>	<i>(1)</i>	<i>(1)</i>	<i>(0)</i>	<i>(0)</i>
Northern Gas Networks Ltd	2	1	0	0
Scotland Gas Networks plc	1	0	0	0
Southern Gas Networks plc	0	0	0	0
<i>(Scotia Gas Networks plc - Total)</i>	<i>(1)</i>	<i>(0)</i>	<i>(0)</i>	<i>(0)</i>
Wales & West Utilities Ltd	2	1	0	0
Total of all Distribution Networks	6	3	0	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, service or Emergency Control Valve (ECV) then a reported gas escape requiring repair will be logged 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 requiring actual repair.

DNOs frequently make safe by carrying out temporary repairs. Since DNOs do not currently have internal reporting systems that 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 i.e. those which have been made within 12 hours of receiving a PRE. The table below shows the PRE safety performance of each DNO.

Table 3.7.4: Number of Reported 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 2007

Gas Distribution Network	Reported Gas Escapes Requiring Repair		Permanent Repairs made within 12 hours (%)	
	05/06	06/07	05/06	06/07
National Grid Gas plc – North West	21,540	21,343	36.7	40.3
National Grid Gas plc – East of England	23,822	21,850	43.2	53.4
National Grid Gas plc – West Midlands	13,996	14,412	37.0	39.8
National Grid Gas plc – London	18,767	18,910	34.8	38.9
<i>(National Grid Gas plc – Total)</i>	<i>(78,125)</i>	<i>(76,515)</i>	<i>(38.3)</i>	<i>(43.6)</i>
Northern Gas Networks Ltd	23,131	28,842	56.5	50.3
Scotland Gas Networks plc	13,150	12,593	64.3	57.6
Southern Gas Networks plc	41,327	38,864	41.0	35.9
<i>(Scotia Gas Networks plc - Total)</i>	<i>(54,477)</i>	<i>(51,457)</i>	<i>(46.6)</i>	<i>(41.2)</i>
Wales & West Utilities Ltd	19,562	18,518	43.4	34.5
Total of all Distribution Networks	175,295	175,332	43.8	43.0

Note:

- i. The 2005/06 and 2006/07 PRE data for National Grid Gas has been amended following a data review. The National Grid Gas data for the prevention of a reported gas escape requiring repair within 12 hours now includes a) repairs to pipelines previously not assigned a pressure tier, b) repairs to ECVs and c) repairs carried out by FCOs.
- ii. The 2005/06 PRE data for Scotland and Southern Gas Networks has been amended following a data review.

Between 2005/06 and 2006/07 the percentage of reported gas escapes requiring repair across all of the Distribution Networks and permanently repaired within 12 hours fell from 43.8% to 43.0%. Over the same period the number of reported gas escapes requiring repair across all the Distribution Networks rose slightly from 175,295 to 175,332.

Between 2005/06 and 2006/07 the percentage of reported gas escapes requiring repair and permanently repaired within 12 hours in the DNs operated by National Grid Gas increased. In the other DNs the percentage of reported gas escapes requiring repair and permanently repaired within 12 hours decreased.

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 2007

Number of Third Party Damage Incidents	Own Contractor		Unrelated 3 rd Party		Total	
	05/06	06/07	05/06	06/07	05/06	06/07
National Grid Gas plc – North West	1	3	38	21	39	24
National Grid Gas plc – East of England	1	3	28	30	29	33
National Grid Gas plc – West Midlands	0	2	11	5	11	7
National Grid Gas plc – London	0	0	9	26	9	26
<i>(National Grid Gas plc – Total)</i>	<i>(2)</i>	<i>(8)</i>	<i>(86)</i>	<i>(82)</i>	<i>(88)</i>	<i>(90)</i>
Northern Gas Networks Ltd	0	1	24	22	24	23
Scotland Gas Networks plc	0	1	18	19	18	20
Southern Gas Networks plc	1	1	14	23	15	24
<i>(Scotia Gas Networks plc - Total)</i>	<i>(1)</i>	<i>(2)</i>	<i>(32)</i>	<i>(42)</i>	<i>(33)</i>	<i>(44)</i>
Wales & West Utilities Ltd	0	0	28	21	28	21
Total of all Distribution Networks	3	11	170	167	173	178

Between 2005/06 and 2006/07 the total number of third party damage incidents across all the Distribution Networks rose from 173 to 178. The number of third party damage incidents caused by the DNOs' own contractors remains small compared to the damage caused by unrelated third parties.

Significant increases in the number of unrelated third party damage incidents occurred in the London Distribution Network operated by National Grid Gas (9 to 26 incidents) and the Southern Distribution Network operated by Southern Gas Networks (15 to 24 incidents). A significant decrease in the number of unrelated third party damage incidents occurred in the North West Distribution Network operated by National Grid Gas (38 to 21 incidents).

4.0 Conclusions

This is the second year that the Gas & Pipelines Unit has reported on major hazard Safety Performance Indicators (SPIs) in the UK Gas and Pipeline industry. No absolute assessment of the state of the industry's major hazard safety performance has been made on the basis of this report although the data collected so far allows for some limited comparisons. As data continues to be collected over subsequent years it is hoped that longer-term safety performance trends will be identified.

In 2006/07 no significant, overall, change is seen in the safety performance of the UK gas and pipelines industry. In particular there is no evidence to suggest in this report that the overall safety performance of the gas Distribution Networks has significantly changed since the changes of ownership that took place in June 2005. However, on some gas Distribution Networks there are significant increases in the number of third party damage incidents caused by contractors unrelated to the DNOs.

More detailed conclusions on individual safety performance indicators are given below. Where necessary these will be incorporated into the Gas & Pipelines Unit's operational strategy for 2007/08 and beyond.

Public Sector Targets:

In 2006/07 the sector's contribution to HSE's Public Service Agreement (PSA2) continues to be above target and it is expected that the reduction to 16 Dangerous Occurrences by 2007/08 will be exceeded.

UKOPA Databases:

The number of records held on the UKOPA Infringement Database increased significantly in 2006 due to improvements in data capture and recording made by the high pressure natural gas pipeline operators. As such it has not been possible to make any comparison with previous years' data.

The next UKOPA Pipeline Loss Report will be updated at the end of 2008 and reported in mid 2009.

National Transmission System:

Safety performance on the gas National Transmission System operated by National Grid Gas is not significantly changed between 2005 and 2006. A threefold increase was seen in the number incidents where pipeline operating pressure rose above the Maximum Operating Pressure (but by less than 2.5%). This is allowable under current gas industry standards (IGE/TD/1 Edition 4).

Gas Safety (Management) Regulations Reports:

The number of GS(M)R reports made to HSE has shown a steady increase since 2002/03. This is in part attributable to the increases in the number of third party damage incidents caused by contractors not employed by the Distribution Networks.

The number of GS(M)R reports made due to service failures has also shown a steady rise since 2002/03. GS(M)R reports made due to mains failures have been decreasing gradually since 2004/05.

Iron Mains Replacement Programme:

DNO Mains Replacement Programme performance in 2006/07 was approximately 1.4% above target when all the Distribution Networks are viewed collectively.

Iron Mains Remaining:

The lengths of all iron mains operated by the gas Distribution Networks has continued to fall due to the Mains Replacement Programme and additional decommissioning works.

Gas in Buildings Incidents:

In 2006/07 the number of gas in buildings (GIB) incidents reported by the gas Distribution Networks annually fell by nearly 10%. This is the first significant fall in GIB numbers since 2000/01.

Mains and Service Related Incidents:

For the fourth year in a row there have been no fatalities arising from gas mains or service failures due to fractures or corrosion. The number of incidents fell from 6 in 2005/06 to 3 in 2006/07.

Public Reported Escapes:

In 2006/07 across all of the gas Distribution Networks the percentage of gas escapes requiring repair that were permanently repaired within 12 hours fell from 43.8% to 43.0%.

Third Party Damage:

Between 2005/06 and 2006/07 the total number of third party damage incidents across all of the gas Distribution Networks rose slightly. However, significant increases in the number of unrelated third party damage incidents occurred in the London Distribution Network operated by National Grid Gas and the Southern Distribution Network operated by Southern Gas Networks. The number of third party damage incidents caused by the DNOs' own contractors remains small compared to the damage caused by unrelated third parties.

Appendix 1 - DNO Annual SPI Reporting Definitions

1 IRON MAINS REMAINING

DNOs report 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 $\pm 30\text{m}$ populations will vary across DNs, this will not provide the basis for a precise measure of residual risk.

2 GAS IN BUILDINGS

DNOs 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 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 Gas 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 report the number of 'reported gas escapes requiring repair' 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 ‘reported gas escape requiring 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 report 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 report 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 also 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.