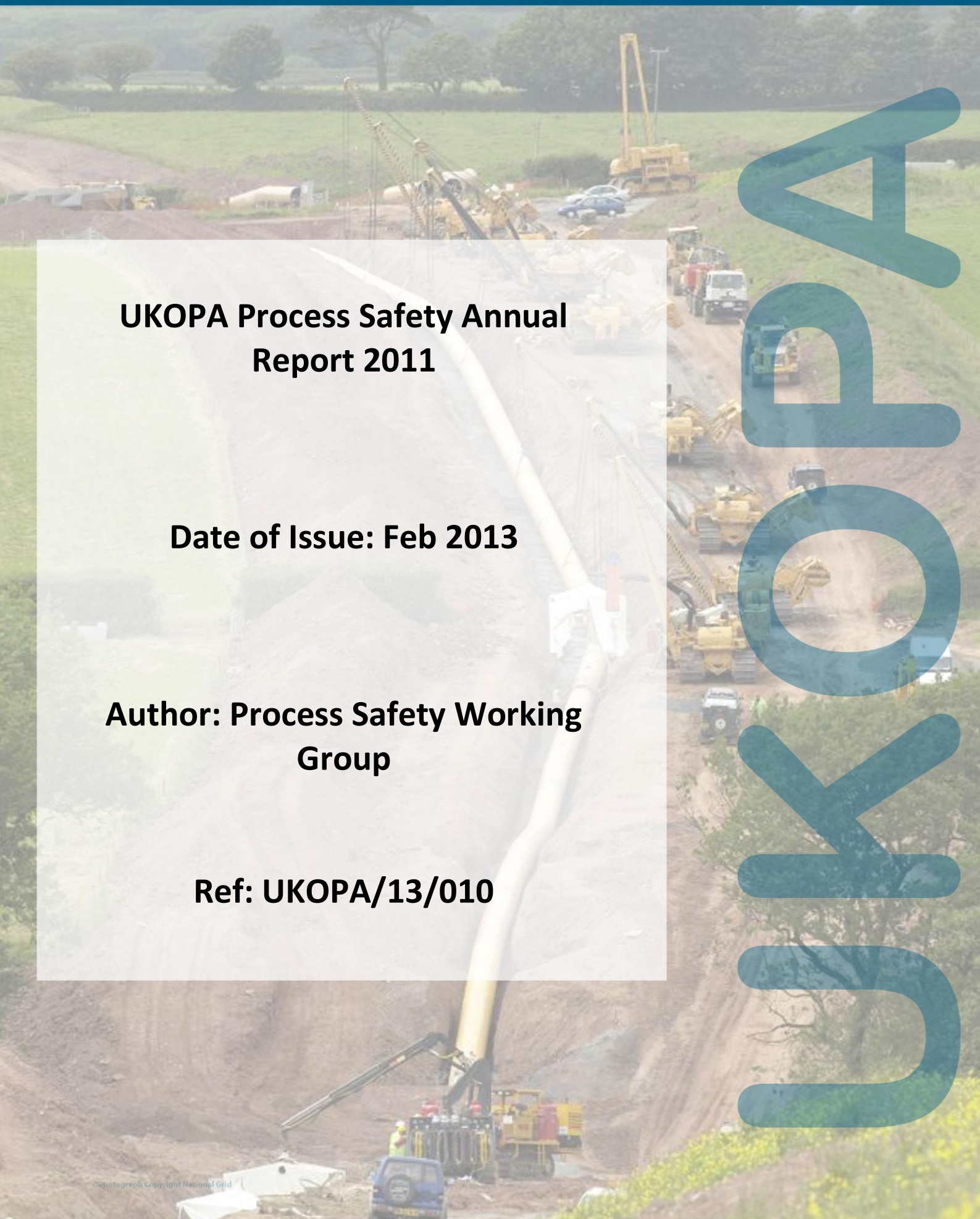
UKOPA

United Kingdom Onshore Pipeline Operators' Association



UKOPA Process Safety Annual Report 2011

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Author: Process Safety Working Group

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UKOPA Disclaimer

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UKOPA members operate approximately 25,000 km of pipelines in the UK and which transport over 75% of the energy used in the UK. These pipelines are generally routed through the rural areas and transport a number of fuels including natural gas, oil, gasoline, aviation kerosene, ethylene, refined oils, spiked crude and natural gas liquids. The pipelines are managed as significant process safety risks and over 85% of the pipelines are classified as Major Accident Hazard Pipelines in accordance with the UK Pipeline Safety Regulations 1996.

This UKOPA Report provides information on how UKOPA members manage Process Safety Risks on UK pipelines. The data is used to compare performance year on year.

UKOPA uses its Process Safety Self Assessment Tool for members to assess their risk control measures and share information on how these measures can be improved. The performance indicators in this report are a sub set of risk control measures which are employed by UKOPA members to manage the pipeline risk and provide an indication of the overall process safety performance.

The performance indicators selected to assess process safety performance are as follows;

1. **Integrity Management** – One of the key risks to a pipeline is internal or external corrosion which reduces the thickness of the pipe wall and can ultimately result in a pipeline failure.

   There are two methods by which operators assess the integrity of a pipeline;

   a. Internal Inspection (in-line inspection) which is carried out by a specialist pipeline inspection gauge (PIG). Planned inspections are carried out on a 5 -15 year frequency, so the number of kms inspected per year is expected to be in the range of 7 – 20% of the total population. Typically around 13.5% of the pipeline population is inspected annually.

      Of the 19,777 km of UKOPA pipelines which can be internally inspected, 3626 km were inspected in 2011 which is 18% of the internally inspectable population. This is within the range of the expected planned lengths of pipeline to be inspected, and is higher than the average length of planned inspection.

   b. External Inspection utilises a number of above ground surveys to assess the effectiveness of the cathodic protection system which provides corrosion protection to the pipeline, and the condition of the pipeline coating. These techniques measure the electrical potential or the voltage gradient of the current applied to the pipeline by the cathodic protection system to prevent corrosion of any metal in direct contact with water in the soil. The external inspection survey, known as a close interval potential survey (CIPS) or a direct current voltage gradient (DCVG) survey, is carried out along the length of the pipeline. Any irregularities in the electrical potential or the voltage gradient are detected at specific locations along the pipeline during the survey, these locations are then exposed and the coating and pipe surface is inspected and repaired as required. External inspections are carried out on a planned 5 – 15 year frequency, which depends upon the in-line inspection frequency. The length of pipelines for which external inspection is planned therefore varies between 7-20% of the total population with an average of 13.5% per year, as for planned in-line inspection.

Of the 23,292 km of UKOPA pipelines which are subject to external inspection, 4243 km were inspected externally in 2011, which is 18.29% of the pipeline population.

The percentage length of pipelines internally and externally inspected in 2011 was greater than would be expected, however it is consistent with the frequency pipelines should be inspected and demonstrates the continued commitment of operators to monitor the integrity of the pipelines on a regular basis.

Since 1999 UKOPA has been recording the number of pipeline failures and faults. A failure is defined as a product loss incident and a fault is defined as a record of damage which has been verified by field investigation.

In 2011, 3 failures and 85 faults were recorded. The 2011 failure data indicates a failure rate of 1.13 $x10^{-4}$ failures per km, which is within the confidence limit boundaries of 1.96 $x10^{-4}$ to 2.64 $x10^{-4}$ failures per km-yr and continues to reduce the overall average for the period 1952 – 2011 confirming a reducing trend.

A review of the fault data reported for 2011 shows that the majority of faults were detected by in-line inspection, (other discoveries were via excavations, CIPS/PSSR/crossing surveys, contact by site contractors, landowners, ground patrol or the public) with only 1 out of the 85 faults reported by other means.

The above data is recorded under PSI Number 8 and PSI Number 6 in the table below.

2. **Route Corridor Management** – Maintaining a safe and undeveloped route corridor is another aspect of pipeline management which is important. UKOPA members carry out a variety of route corridor surveys which include aerial and vantage point surveys.

In 2011 21,741 km of pipeline were surveyed by aerial or ground level (vantage point) survey at a two week frequency.

Pipeline operators monitor 3rd party activities which are carried out within pipeline route corridors and record the occurrence of any activities in the vicinity of the pipeline for which the pipeline operator has not been notified. When such an activity is detected, the operator intervenes to ensure the activity is carried out safely and damage to the pipeline is avoided. Unnotified activities carried out in the vicinity of the pipeline are defined as infringements, and are categorised according their potential to cause damage to the pipeline. The infringement categories, descriptions and numbers which were recorded in 2011 are given in the table below. In 2011, 1099 infringements were recorded and managed safety to avoid pipeline damage.

Infringement Category	Infringement Type	Number of infringements in 2011	Number of infringements in 2010
A	Pipeline Damage or Leak	4	1
B	Serious Potential for Damage	133	135
C	Limited Potential for Damage	963	442

Following the fundamental re-appraisal of the gas operators reporting mechanism, and the apparent dramatic fall in the number of infringement reports in 2010, the system is

now recoding infringements as defined by UKOPA, and thus the increase in infringement category C is not viewed as significant.

The above data is recorded under PSI Numbers 5 and 4 in the table below.

3. **Pipeline Operating Limits** - Ensuring a pipeline does not experience pressures or temperatures or flows above its design limits is a significant aspect of pipeline safety management. To avoid exceeding these operating limits Pipeline Operators monitor these parameters and have protective devices to shut down a pipeline or pipeline section to ensure to the pipeline does not experience a pressure, temperature or flow excursion.

   Note that the monitoring and reporting of pipeline operating conditions varies between operating companies. This identified the need to clarify the definition of the primary protective device for a pipeline to be used for the UKOPA report. A specific definition of key protective devices was applied in 2010 and this has influences the number of exceedances recorded since then.

   In 2011 79 exceedances of the pipeline normal operating pressure were recorded, which affected 42 different pipelines, all of these were within the pipeline safe operating limits.

   Of the 7200 primary protective devices on the UK pipeline systems, 100% were tested under planned maintenance activities in 2011.

   The above data is recorded under PSI Number 3 and PSI Number 7 in the table below.

4. **Emergency Management** – Whilst it is everyone's aim to avoid an emergency, it is important that all Pipeline Operators have contingency plans in place to deal with a pipeline emergency. These plans are shared with the Local Authority Emergency Planners to ensure that in the event of an incident the Pipeline Operator, Emergency Response Services and the Local Authority understand the risks and how they can be effectively managed.

   UKOPA members invest a significant time and effort in training their staff to be able to implement the emergency procedures. A number of UKOPA members hold specific emergency response training courses, in addition to supporting the UKOPA PERO training course provided at the Fire Service College. In 2011, 129 operational staff were trained as Pipeline Emergency Response Officers (PEROs), including 48 who attended the UKOPA PERO training course

   In addition to the training, UKOPA members carried out 48 Emergency Exercises, including 11 live exercises carried out jointly with Local Authorities and Emergency Services to test the emergency plans and 34 internal exercises carried out to test the Pipeline Operators plans and procedures.

   The above data is recorded under PSI Number 1 and PSI Number 2 in the table below,

5. **Safety Alerts** - In order to share learning from incidents, UKOPA members share incident and near miss Safety Alerts and discuss these at UKOPA Meetings. In 2011 11 safety alerts were shared among UKOPA members compared to 28 in 2010 and 13 in 2009. UKOPA member's are commitment to share learning and the PSWG have reinforced the need to ensure that safety alerts are shared and published through UKOPA.

   The above data is recorded under PSI Number 9 in the table below.

UKOPA 2011 Process Safety Indicator Report

PSI Number	Risk Control	Indicator	Safety Performance Indicator
1	Emergency Response	Emergency Testing	Number of Exercises = 48
2	Competency and Training	Emergency Response Training	129 staff trained
3	Operating Procedures	Exceedances of Safe Operating Pressure	0
4	Route Management	Number of infringements safely managed to avoid pipeline damage	1099
5	Surveillance	Pipelines surveyed by aerial or vantage point every 2 weeks (reference UKOPA best practice)	423,862 kms
6	Integrity	Number of product loss reports in year:-	3 product loss $1.13x10^{-4}$ per km
		Number of damage reports in year:-	85 damage incidents 3.20×10^{-3} per km
7	Maintenance	Number of protective devices tested in year (reference UKOPA best practice):-	7200 devices tested
8	Inspection	In-line inspection:-	3625.9 kms inspected 18.3%
		External inspection:-	4243.1 kms inspected 18.3%
9	Safety Alerts	Number of safety alerts shared	11

Comparison of 2009, 2010 and 2011 PSI Reports

PSI Number	Risk Control	Indicator	2011	2010	2009
1	Emergency Response	No Emergency Exercises	48	55	43
2	Competency and Training	No Operational staff trained	129	102	148
3	Operating Procedures	No of Exceedances of Safe Operating Pressure[1]	0	0	0
4	Route Management	Number of infringements[2] safely managed to avoid pipeline damage	1099	578	2459
5	Surveillance	Kms of Pipelines surveyed	423,862	551,515	531,662
6	Integrity	Number of product loss reports in year:-	3	1	4
		Number of damage reports in year:-	85	45	50
7	Maintenance	Protective devices tested in year[1]:-	100%	100%	100%
8	Inspection	Kms In-line inspection:-	3626	2662	1287
		Kms external inspection:-	3415	3530	562.5
9	Safety Alerts	Number of safety alerts shared	11	28	13

Notes:-

1 A more specific definition of key protective devices has been applied since 2010. This influences the number of exceedances recorded however none were above the Safe Operating Pressure of any of the affected pipelines.

2 Infringements are unnotified activities in the vicinity of the pipeline which are managed safely to avoid pipeline damage. A fundamental re-appraisal of the gas operators reporting mechanism 1n 2010 had resulted in the apparent dramatic fall in the number of infringement reports. The reporting has steadied during 2011.