

UKOPA

United Kingdom Onshore Pipeline Operators' Association

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Process Safety Annual Report 2015

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Author:
Process Safety Working Group

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UKOPA - Annual Process Safety Report 2015

Summary

This is the eighth annual Process Safety Indicator (PSI) report, and the findings show continued improvement in many of the key areas.

Although the report highlights a large reduction in the number of Safety Alerts issued via UKOPA, UKOPA is committed to addressing this issue by having incident sharing as an agenda item on all working group and member meetings.

Highlights

- ➤ 0 pipelines were operated above their safe operating limit
- ➤ 5 incidents of product loss – higher than in previous year (includes 1 report missing from 2014 figures)
- ➤ 870 pipeline corridor infringements by 3rd parties – slightly higher than previous years
- ➤ 1 report of damage associated with 3rd party work – less than in previous years
- ➤ 3071 km internal in-line integrity inspection – less than anticipated for the period
- ➤ 2813 km external integrity inspection – slightly lower than anticipated for the period
- ➤ 96 Emergency exercises carried out in the year – higher than in 2014
- ➤ 110 operators trained in Pipeline Emergency Response Officer Role – higher than in 2014
- ➤ 13 Safety Alerts issued on-going sharing taking place

As well as the UKOPA PSI Annual Report, the UKOPA Infringement Working Group (IWG) regularly meets to review infringement data, share good practice between members and participate in external pipeline awareness programmes. The IWG produces an annual report (UKOPA/16/005), which considers the infringement data in detail and shares learning from incidents reported in 2015.

Background

The process safety indicators are used to monitor the performance of UKOPA and its members to achieve its aim of ensuring the ongoing safety of the UK pipeline infrastructure. The data is used to compare year on year performance and helps to influence UKOPA's future work programme.

The information in this report is provided by the member companies and is collated centrally. This year 21 member companies completed the survey; a list of all members who contributed to the report is provided in Appendix 3.

In 2015, UKOPA members reported operating over 27695 km of pipelines in the UK (10% more than in 2014, primarily due to 3 more companies who submitted data in 2015) which transports 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.

There were no changes to the questions asked in 2015 to those asked in 2014 and 2013, and as such there is a direct comparison between the three years. The table in Appendix 2 shows all the measures used over the last 7 years, when they were introduced and when any have been removed. It also provides the data from those 7 years for comparison purposes.

The 2015 PSI data (See Appendix 1) shows members continue to operate and maintain the pipelines within their specification. There were only 5 product loss incidents reported during the year. Members continue to train staff and test emergency plans regularly. However there has been a drop in the sharing of safety back down to the same level as 2012, with just 13 Alerts being shared. One of UKOPA's key objectives is to share safety learning amongst its members and we are committed to increasing this figure back to the numbers seen in the previous two years. A comparison of the annual report figures is provided in Appendix 2.

In addition to this annual report UKOPA uses its Process Safety Self-Assessment Tool (PSAT) for members to assess their risk control measures and share information on how these measures can be improved. This bi-annual survey will again be conducted at the end of 2016 with the results shared with the UKOPA membership. 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.

Performance Measures

1. **Integrity Management** – The integrity of pipelines is of utmost importance to UKOPA members. 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. Data is therefore collected in 5 areas with regards to Integrity Management, these are a) pipeline damage or product loss, b) corrosion repairs, c) pipelines affected by ground movement, d) pipeline inspections – pipelines can be internally and / or externally inspected and e) cathodic protection

- a. UKOPA via the Fault Management and Risk Assessment Working Group (FARWG) records 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 2015, from the length of pipe in operation (recorded in the database as 22,160 km) there were 5 failures and 102 faults. Compared with previous years, the failures figure has increased slightly to 5 when previously there had been between 1 and 4 failures per year. The number of faults recorded has again increased slightly.

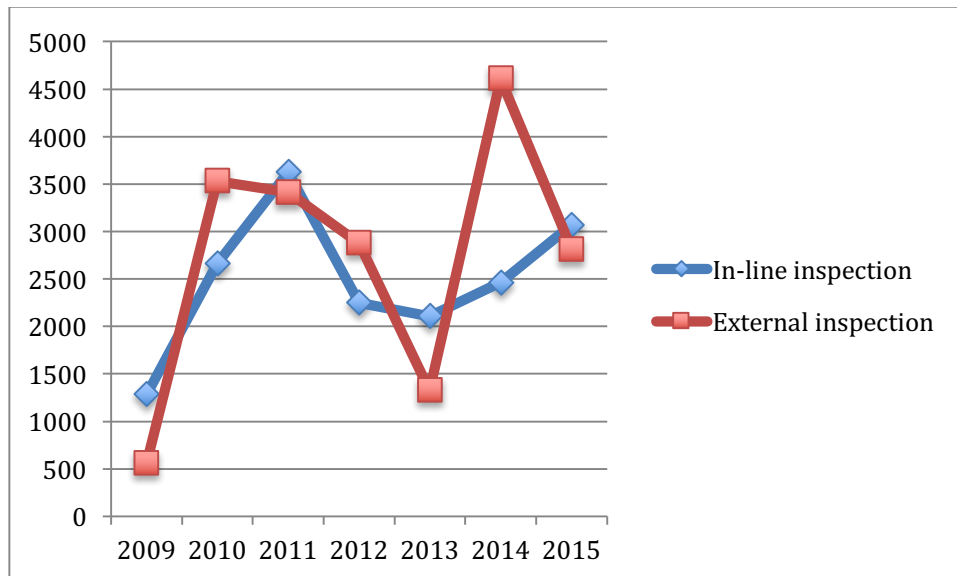
The annual failure frequency for 2015 is 2.26×10^{-4} which is slightly above the total average rate of 2.18×10^{-4} per km yr for the period 1962 – 2015.

The fault rate for 2015 is 4.6×10^{-3} per km.

The FARWG produce an annual report with fully explains the primary causes of the 102 faults, however as an overview, 64% were due to external corrosion, 12% were due to external interference, 10% were due to original construction damage, and 5% were due to material defects. The other 9% were due to other / unknown reasons such as ground movement, material defects and girth weld defects.

- b. In 2012, a new measure was added to the PSI report to consider the number of corrosion repairs carried out to a pipeline that required additional measures to assure integrity other than just a repair to the coating system (for example; a repair shell, a cut out, etc.). The introduction came because some members were identifying repair requirements and wanted to know if other members were experiencing the same issues. The number of corrosion repairs carried out during 2015 was 185 compared with 2014 was 92. One member organisation carried out a major project to repair over 90 corrosion faults, which account for over half of the repairs reported.
- c. In 2012, a new measure was added to the PSI report to consider, pipelines affected by ground movement. The introduction came because of the number of members who were reporting incidents of ground movement and the impact this was having on their assets. This measure was amended in 2013 to review pipelines that, prior to 2013, were affected by ground movement and already being subject to extra monitoring by UKOPA members and those pipelines that have been newly affected during 2014. From the data collected, UKOPA members are aware of, and are monitoring, 12 pipelines that have been subjected to ground movement prior to 2015. During 2015, 7 different pipelines have been subjected to ground movement and are now included in UKOPA members monitoring processes.

- d. Internal and external corrosion measures continue to be recorded in this report, to review the amount of inspection carried out by members to assess the integrity of their pipelines.



Graph 1 – km of pipeline Inspections carried out per year

- i. Internal Inspection (in-line inspection) 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 kilometres 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.

Members reported operating over 27596 km of pipeline in 2015. Of this length, 23,429 km can be internally inspected. 3071 km of pipelines were inspected in 2015 which is 13.1% of the internally inspectable population. This is within the range of the expected planned lengths of pipeline to be inspected.

UKOPA members reported that 3488 km of pipelines were due to be internally inspected during 2015 and the actual figure was 12% less than was originally planned. One UKOPA member had planned a cross country ILI run to take during the year, however for operational reasons this could not take place and the inspection had to be postponed. The run has been rescheduled for a future year.

- ii. 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 27,696 km of UKOPA pipelines reported which are subject to external inspection; 2813 km were inspected externally in 2015, which is 10.2% of the pipeline population. The anticipated length of pipeline to be inspected was 2767 km, so 101% of planned inspection took place, thus slightly more than was expected by 46 km.

The percentage length of pipelines internally and externally inspected in 2015 was 21.2%, which is slightly higher than the 7-20% expected. The on-going use of both internal and external inspections continues to demonstrate the commitment of operators to monitor the integrity of the pipelines on a regular basis.

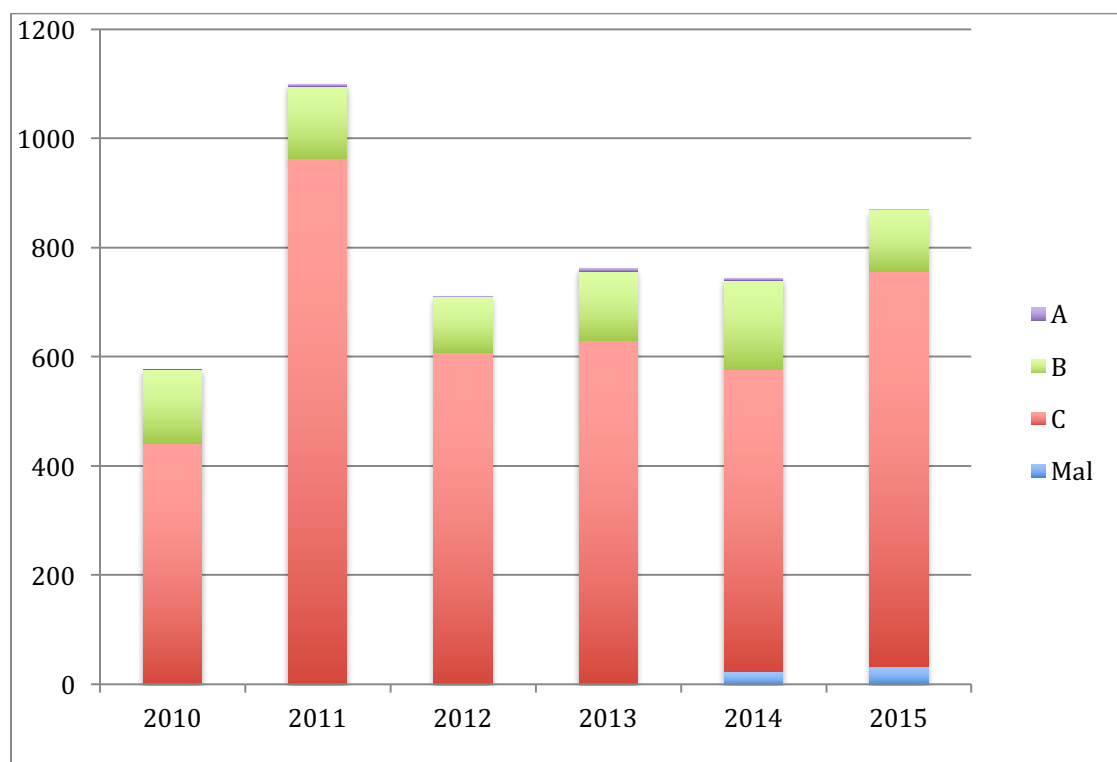
- e. Cathodic Protection Systems – This measure was introduced in 2013 and is intended to monitor the CP systems which are used to protect metallic pipelines from corrosion. UKOPA Members use and monitor CP systems on their assets. Where pipelines are not using CP, UKOPA members ensure their pipes are subjected to extra monitoring. During 2015, of the 27,696 km of pipelines included in the PSI report, 24.12 km had not been subjected to CP for more than 6 months. This figure is higher than the 3.8 km in 2014 and work continues by operators to restore protection on these sections.

The above data is recorded under PSI Number 6, PSI Number 7, PSI Number 8, PSI Number 9 and PSI Number 11 respectively in Appendix 1.

- 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.

UKOPA member pipelines are surveyed by aerial or ground level (vantage point) survey on at least a two-week frequency. This report does not include the length of pipelines surveyed because members had previously reported that all pipelines were surveyed 100% as planned, however the outcome and findings of these surveys is monitored.

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. Un-notified activities carried out in the vicinity of the pipeline are defined as infringements, and are categorised according to their potential to cause damage to the pipeline. The infringement categories, descriptions and numbers which were recorded in 2015 are given in the table 1 below. In 2015, 870 infringements were recorded, which is an 8% increase in the 799 recorded in 2014. There was however a decrease in the number of A1 category infringements (actual damage to a pipeline) to 1, whereas 4 were recorded in 2014.



Graph 2 – Number of 3rd Party Infringements by Year

Infringe- ment Category	Infringe- ment Type	Number of infringe- ments in 2010	Number of infringe- ments in 2011	Number of infringe- ments in 2012	Number of infringe- ments in 2013	Number of infringe- ments in 2014	Number of infringe- ments in 2015
A	Pipeline Damage or Leak	1	4	2	7	4	1
B	Serious Potential for Damage	135	133	102	128	133	112
C	Limited Potential for Damage	442	963	608	629	639	726
Mal	Malicious Damage	Not recorded	Not recorded	Not recorded	Not recorded	23	32

NB: if malicious damage did result in a leak, it is not recorded as a category A event

Table 1 – Number of 3rd Party Infringements by Year

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 report system was reviewed in 2011 and now recodes infringements as defined by UKOPA, and thus the increase in infringement category C since 2010 is not viewed as significant.

The IWG Infringement report for 2015 (UKOPA/16/005) summaries the data more fully and give explanations of the findings.

In 2013, a new measure was added to the PSWG Annual Report, to investigate the average length of time it took UKOPA members to respond to an initial response for a 3rd party enquiry. It should be noted that UKOPA members have different methods of responding to 3rd party enquiries and also are under different regulatory requirements regarding response times. From the data collected 2015, the average response times vary from between 1 hour to 14 days. The most commonly reported response times from members are between 24 hrs and 3 days.

The data above is recorded under PSI Number 4 and PSI Number 5 respectively in Appendix 1.

- 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 that the pipeline does not experience a pressure, temperature or flow excursion.

It should be noted 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 influenced the number of exceedances recorded since.

In 2015, no pipeline operated outside its safe operating limit, however there were recorded 97 exceedance of the pipeline normal operating pressure, all of which exceeded the pipeline maximum operating pressure, but did not exceed any of the pipelines safe operating limits. This is a significant reduction from the 257 exceedances in 2014 and back to the below 100 exceedances figure from previous years.

The above data is recorded under PSI Number 3 in Appendix 1.

- 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 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 2015, 110 operational staff were trained as Pipeline Emergency Response Officers (PEROs), by attending the UKOPA PERO training course or enhanced in-house training courses. This figure is once again comparable with many previous years despite a low figure in 2014. However, as the course has a 5 year renewal schedule, the attendance number will vary from year to year.

The UKOPA Emergency Planning Working Group (EPWG) reviewed and updated the PERO course in 2013 and new scenarios are due to be added to the training package this year.

In addition to the training, UKOPA members carried out 96 Emergency Exercises. 42 of these were internal table-top exercises; 12 were external table-top exercises; 29 were live internal exercises and 13 were live external exercises. External exercises, whether table top or live are carried out jointly by UKOPA members with Local Authorities and Emergency Services to test the emergency plans and procedures. Findings from many external exercises are shared with UKOPA members via the EPWG.

The above data is recorded under PSI Number 2 and PSI Number 1 respectively in Appendix 1.

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. During 2013 UKOPA focused on increasing awareness of the need to share and discuss incident and near miss Safety Alerts, and as such there was a dramatic increase in the number of Safety Alerts shared across the organisation. In 2015, there was a drop in Safety Alerts issued with only 13 being shared. This compares with 40 in 2014, 41 in 2013, 13 in 2012, 11 in 2011, 28 in 2010 and 13 in 2009. The PSWG and the UKOPA Board will continue to encourage members to send in their alerts for sharing.

UKOPA continues to be committed to sharing learning and the PSWG reinforced the need to ensure that safety alerts are shared and published. Safety Alerts are now a regular item on each of the UKOPA working groups and members meeting agendas. The above data is recorded under PSI Number 10 in Appendix 1.

Appendix 1

UKOPA 2015 Process Safety Indicator (PSI) Report

PSI Number	Risk Control	Indicator	Safety Performance Indicator
1	Emergency Response	Emergency Testing	No of Table Top = 54 No of Live Exercises = 42
2	Competency and Training	Emergency Response Training	110 staff trained
3	Operating Procedures	Exceedances of Safe Operating Pressure	0
4	Route Management	Number of infringements safely managed to avoid pipeline damage	870 (including 32 malicious damages)
5	Route Management	Average Response time to 3 rd Party Enquiries	Immediate – D+14 (majority 24 – 72 hrs)
6	Integrity	Number of product loss reports in year:-	5 (inc 1 from 2014)
		Number of damage reports in year:-	102
7	Integrity	Number of corrosion repairs	185
8	Integrity	Pipelines affected by ground movement	12 already known 7 found in 2015
9	Inspection	In-line inspection:-	3070.5 inspected (88% of planned)
		External inspection:-	2812.5 kms inspected (101.6% of planned)
10	Safety Alerts	Number of safety alerts shared	13
11	Integrity	CP Systems-KM of pipeline not protected by CP for a period more than 6 months	24.12

Appendix 2

Comparison of 2009 to 2015 PSI Reports

PSI No.	Risk Control	Indicator	2015	2014	2013	2012	2011	2010	2009
Length of pipeline included in report in km			27696	24836	22213	22912	21742	21468	20469
1	Emergency Response	No. Emergency Exercises	96	88	66	46	48	55	43
2	Competency & Training	No. Operational staff trained	110	82	128	127	129	102	148
3	Operating Procedures	No of Exceedances of Safe Operating Pressure ¹	0	0	0	0	0	0	0
4	Route Management	No. of infringements ² safely managed to avoid pipeline damage	870	799	764	712	1099	578	2459
5	Route Management	Average Response time to 3 rd Party Enquiries	Immedi ate to D+14	Immediat e to D+14	Immediat e to D+14	New measure not reported in this period			
6	Integrity	No. of product loss	5	1	2	2	3	1	4
		No. of damage reports	102	84	95	71	85	45	50
7	Integrity	No. of corrosion repairs requiring additional measures to correct other than just a recoat	185	92	103	86	New measures not reported this period		
8	Integrity	No. of pipelines affected by ground movement – already known and monitored	12	17	25	7	New measure not reported this period		
		No. of pipelines affected by ground movement – found this year	7	3	5	New measure not reported this period			
	Maintenance	Protective devices tested in year ¹ :-	Measure removed in 2012				100%	100%	100%
9	Inspection	Kms In-line inspection:-	3071	2464	2109	2249	3626	2662	1287
		Kms external inspection:-	2813	4611	1326	2878	3415	3530	562.5
10	Safety Alerts	Number of safety alerts shared	13	40	41	13	11	28	13
11	Integrity	CP Systems - KM of pipeline not protected by CP for a period more than 6 months	24.12	3.86	21.44	New measure not reported this period			

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 un-notified 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 in 2010 had resulted in the apparent dramatic fall in the number of infringement reports.

Appendix 3
UKOPA Members contributing to the 2015 Report

BP

British Pipeline Agency (BPA)

CATS

CLH-PS

Essar

Gas Networks Ireland

IGas

Ineos

National Grid Gas Distribution

National Grid Gas Transmission

Northern Gas Networks

Penspen

Perenco

Petrolneos

Sabic

SGN

Shell Exploration and Production

Total

Uniper (EON in 2015)

Valero – Mainline Pipelines

Wales & West Utilities Ltd