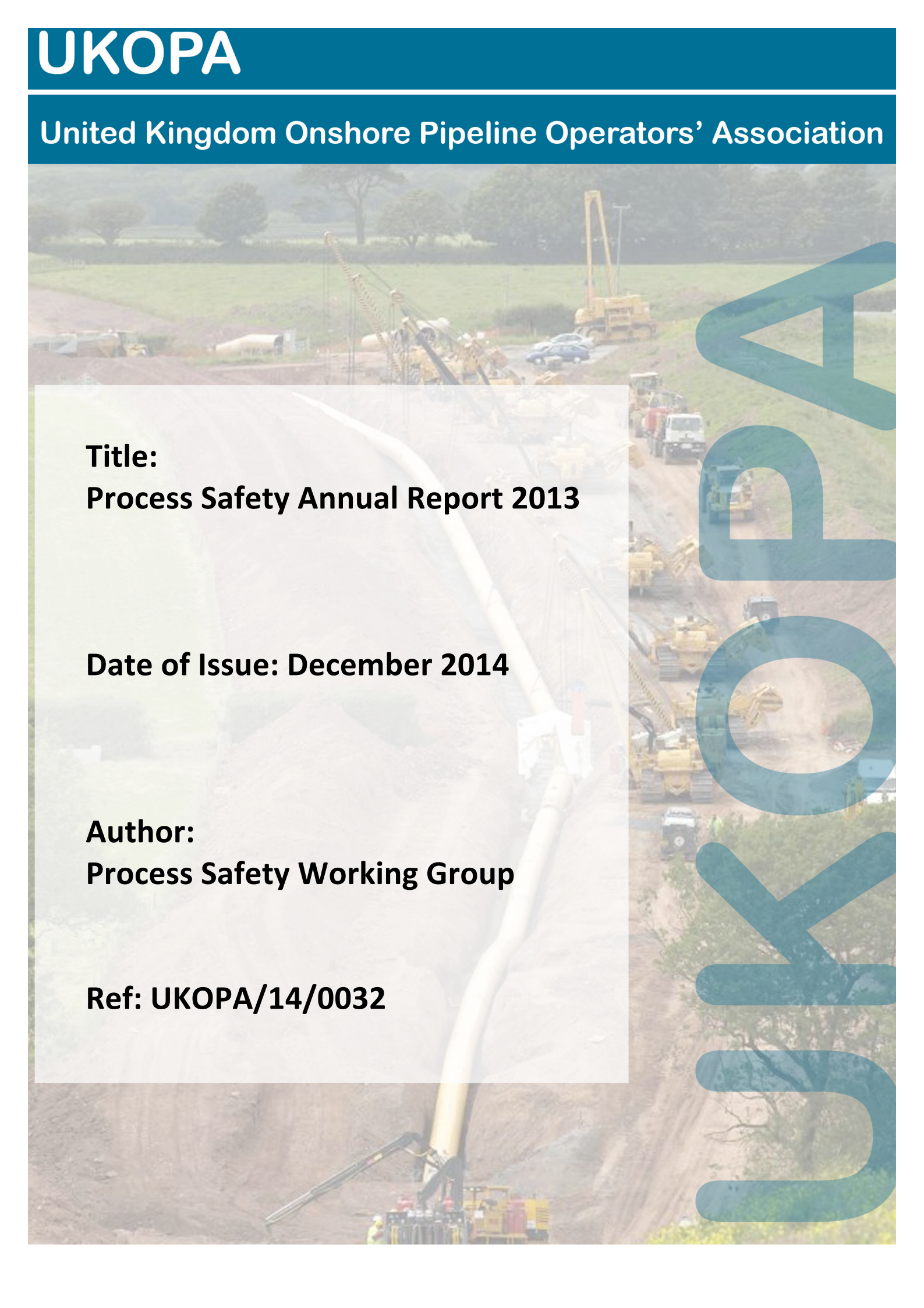




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Process Safety Annual Report 2013

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UKOPA - Annual Process Safety Report 2013

Summary

This is the fifth annual Process Safety Indicator (PSI) report it shows continued improvement in many of the key areas, however, there was an increase in damage associated with 3rd party activities even though the number of 3rd party infringements reported were similar to previous years.

Highlights

- Zero pipelines were operated above their safe operating limit.
- 2 incidents of product loss (pin holes on girth welds) similar to previous years
- 764 pipeline corridor infringements by 3rd parties consistent with previous years.
- 7 reports of damage associated with 3rd party - work higher than previous years.
- 2,109 km internal in-line integrity inspection within expected limits.
- 1,326 km external integrity inspection was lower than anticipated for the period.
- 66 highest ever number of Emergency Exercises carried out in year
- 128 operators trained in Pipeline Emergency Response Officer Role.
- 41 Safety Alerts issued significant improvement on previous years sharing.

UKOPA Infringement Working Group (IWG) regularly meets to review infringement data, share good practice between members and participates in external pipeline awareness programme. The IWG produces an annual report (UKOPA/14/0031), which considers the infringement data in detail and shares learning from incidents reported in 2013.

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 sixteen members completed the survey; a list of all members who contributed to the report is provided in Appendix 3.

UKOPA members operate over 22,000 km of pipelines in the UK 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.

This year UKOPA Members took the opportunity to review how they measure route management, integrity management and Cathodic Protection (CP) Systems; this has resulted in the introduction of additional measures. The table in Appendix 2 shows all the measures used over the last 5 years, when they were introduced and when any have been removed. It also provides the data from those 5 years for comparison purposes.

The 2013 PSI data (See Appendix 1) shows members continue to operate and maintain the pipelines within their specification (despite an increase in the number of faults discovered)

and the number of product loss incidents remained static; with only 2 reports in 2013 which was the same figure as recorded in 2012. Members continue to train staff and test emergency plans regularly, however the sharing of safety alerts has improved significantly with 41 alerts being issued in 2013 compared to just 13 in 2012. One of UKOPA's key objectives is to share safety learning amongst its members and we are pleased to report that there has already been this increase in shared alerts during 2014. A comparison of the annual reports 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. 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 their 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, e) cathodic protection (new measure added this year) – pipelines can be internally and / or externally inspected.

- a. UKOPA via the Fault Data Management Group (FDMG) 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 2013 from the length of pipe in operation (recorded in the database as 22,113 km) there were 2 failures (both pinhole leaks at girth welds) and 95 faults. Compared with 2012, failures have remained the same. The number of faults recorded has increased from 71 to 95 (whilst in 2011 the figure was 85).

The annual failure frequency for 2013 is 9.04×10^{-5} per km which is below the total average rate of 2.27×10^{-4} per km yr for the period 1962 – 2012.

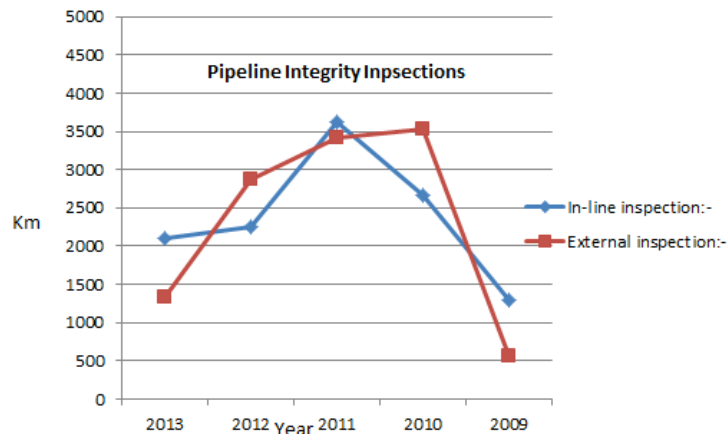
The fault rate for 2013 is 4.30×10^{-3} per km

A review of the fault data reported for 2013 shows that the majority of faults were detected by in-line inspection at 88.4%, (other discoveries were via CIPS/Pearson surveys, contact by landowners or the public and visual report).

- b. The number of corrosion repairs carried out during 2013 (that required additional measures to assure integrity, other than a repair to the coating system) was 103. This is an increase of 17 (or 16.5%) from the 2012 figure of 86 corrosion repairs reported. Although there is an increase in corrosion repairs carried out, it should be noted that a greater number of UKOPA members provided data to the survey in 2013.
- 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 incident 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 2013. From the data collected, UKOPA members are aware of and are monitoring, 25 pipelines that have been subjected to ground movement prior to 2013. During 2013, 5 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) 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 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.

Of the 19,081 km of UKOPA pipelines reported which can be internally inspected, 2109 km were inspected in 2013 which is 11.01% of the internally inspectable population. This is within the range of the expected planned lengths of pipeline to be inspected, but was less than the average length of planned inspection. UKOPA members reported that 2444 km of pipelines were due to be internally inspected during 2013; operational reasons lead to the actual figure of 2109 km being inspected (or 86.2% of the pipeline length planned to be inspected). Those pipelines not inspected have been rescheduled for inspection in subsequent years.

- 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 22,213 km of UKOPA pipelines reported which are subject to external inspection; 1326 km were inspected externally in 2013, which is 5.97% of the pipeline population. The anticipated length of pipeline to be inspected was 4380 km, so 30.1% of planned inspection took place. Those pipelines not inspected have been rescheduled for inspection in subsequent years.

The percentage length of pipelines internally and externally inspected in 2013 was a little less than the average, 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.

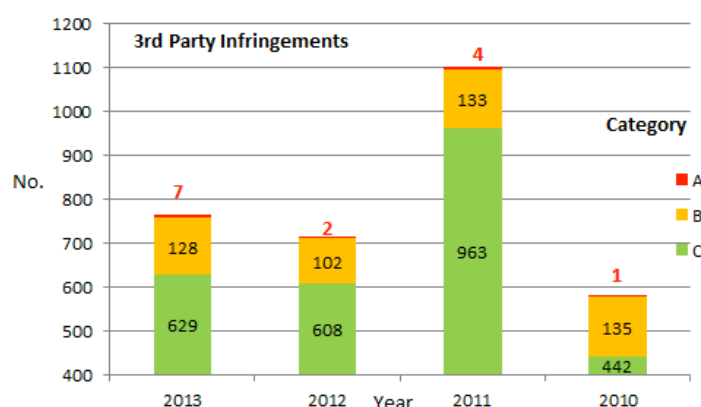
- e. Cathodic Protection Systems – This is a new measure intended to monitor the CP systems which are used to protect metallic pipelines from corrosion. UKOPA Members use and monitor CP systems on their assets. Where pipelines are not using CP, UKOPA members ensure their pipes are subjected to extra monitoring. During 2013, of the 22, 213 km of pipelines included in the PSI report, only 21.4 km had not been subjected to CP for more than 6 months, actions were being taken to restore protection on these pipeline sections.

The above data is recorded under PSI Number 6, PSI Number 7, PSI Number 8 and 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 km of pipeline surveyed because the members reported that all pipelines were surveyed 100% as planned however the outcome 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 2013 are given in the table below. In 2013, 764 infringements were recorded and there was an increase in infringements resulting in damage to 7 of the pipelines, which is significantly higher than in previous years see details below.



Graph 2 – Number of 3rd Party Infringements by Year

Infringement Category	Infringe-ment Type	Number of infringements in 2013	Number of infringements in 2012	Number of infringements in 2011	Number of infringements in 2010
A	Pipeline Damage or Leak	7	2	4	1
B	Serious Potential for Damage	128	102	133	135
C	Limited Potential for Damage	629	608	963	442

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.

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, it can be seen that average response times vary from within 1 hour to 14 days. The most commonly reported response times are between 24 hrs and 2 days.

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

- 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 influenced the number of exceedances recorded since.

In 2013 there were no pipelines operated outside their safe operating limits however there were recorded 66 exceedance of the pipeline normal operating pressure. Of these 66, 27 exceeded the pipeline maximum operating pressure, but did not exceed any of the pipelines safe operating limits.

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 2013, 128 operational staff were trained as Pipeline Emergency Response Officers (PEROs), by attending the UKOPA PERO training course or enhanced in-house training courses.

The UKOPA Emergency Planning Working Group reviewed and updated the PERO course in 2013.

In addition to the training, UKOPA members carried out 66 Emergency Exercises, including 19 live exercises carried out jointly with Local Authorities and Emergency Services to test the emergency plans and 47 internal / table top exercise carried out to test the Pipeline Operators plans and procedures.

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 2013, 41 Safety alerts were issued. This compares with 13 in 2012, 11 in 2011, 28 in 2010 and 13 in 2009.

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

Appendix 1

UKOPA 2013 Process Safety Indicator (PSI) Report

PSI Number	Risk Control	Indicator	Safety Performance Indicator
1	Emergency Response	Emergency Testing	No of Table Top = 47 No of Live Exercises = 19
2	Competency and Training	Emergency Response Training	128 staff trained
3	Operating Procedures	Exceedances of Safe Operating Pressure	0
4	Route Management	Number of infringements safely managed to avoid pipeline damage	764
5	Route Management	Average Response time to 3 rd Party Enquiries	Immediate – D+14
6	Integrity	Number of product loss reports in year:-	2 product loss 9.04×10^{-5} per km
		Number of damage reports in year:-	95 damage incidents 4.30×10^{-3} per km
7	Integrity	Number of corrosion repairs	103
8	Integrity	Pipelines affected by ground movement	25 already known 5 found in 2013
9	Inspection	In-line inspection:-	2108.9 kms inspected (86.3% of planned)
		External inspection:-	1325.7 kms inspected (30.3% of planned)
10	Safety Alerts	Number of safety alerts shared	41
11	Integrity	CP Systems-KM of pipeline not protected by CP for a period more than 6 months	21.44

Appendix 2

Comparison of 2009 to 2013 PSI Reports

PSI No.	Risk Control	Indicator	2013	2012	2011	2010	2009
Length of pipeline included in report in km			22213	22912	21742	21468	20469
1	Emergency Response	No. Emergency Exercises	66	46	48	55	43
2	Competency & Training	No. Operational staff trained	128	127	129	102	148
3	Operating Procedures	No of Exceedances of Safe Operating Pressure ¹	0	0	0	0	0
4	Route Management	No. of infringements ² safely managed to avoid pipeline damage	764	712	1099	578	2459
5	Route Management	Average Response time to 3 rd Party Enquiries	Immediate to D+14	New measure not reported in this period			
6	Integrity	No. of product loss	2	2	3	1	4
		No. of damage reports	95	71	85	45	50
7	Integrity	No. of corrosion repairs requiring additional measures to correct other than just a recoat	103	86	New measures not reported this period		
8	Integrity	No. of pipelines affected by ground movement – already known and monitored	25	7	New measure not reported this period		
		No. of pipelines affected by ground movement – found this year	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:-	2109	2249	3626	2662	1287
		Kms external inspection:-	1326	2878	3415	3530	562.5
10	Safety Alerts	Number of safety alerts shared	41	13	11	28	13
11	Integrity	CP Systems - KM of pipeline not protected by CP for a period more than 6 months	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 2013 Report

British Pipeline Agency (BPA)

EON

Essar

Esso

IGas

National Grid Gas Distribution

National Grid Gas Transmission

Northern Gas Networks

Oil and Pipelines Agency

Penspen (Greystar in 2013)

Perenco

Sabir

Shell Exploration and Production

Total

Valero – Mainline Pipelines

Wales & West Utilities Ltd