UKOPA

United Kingdom Onshore Pipeline Operators' Association

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11-07-12

Ref: UKOPA/12/0028

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RESPONSE TO HSE COMMENTS ON UKOPA DEPTH OF COVER REPORT R10074

Dear Dr Harper,

This letter is in response to your comments on the UKOPA depth of cover study that was undertaken on behalf of UKOPA by GL Noble Denton. We were pleased to note that you believed that the document appeared to be comprehensive and well structured and that the resulting reduction factors seem to be reasonable basis for moving this issue forward.

I am hoping that the attached Appendix adequately addresses the issues you raised in your response. In summary we accept that there are a number of factors that could affect the analysis but we wanted to use the whole dataset in a transparent way to determine a relationship between depth of cover and likelihood of third party interference. Whilst we accept that using the corrosion data is not a perfect method for determining a depth of cover profile for the UK pipeline network it is we believe currently the best available approach. We believe that excluding data because it is associated with older smaller diameter pipelines or S area pipelines will result in a reduced overall accuracy in the proposed relationship between depth of cover and likelihood of damage as the number of relevant data points in the dataset will be significantly reduced.

It should also be noted that current analysis uses a much larger dataset than that considered in R4132 and follows a more recent approach published by Gasunie (the Dutch gas company) since the work in R4132 was performed.

Please contact me if you have any further questions. Also UKOPA would be happy to meet with you if you believe that further discussions would be better done face to face. I can arrange for the relevant technical experts within UKOPA to attend.

Yours faithfully

Neil Jackson

UKOPA RAWG Chairman

APPENDIX

Response to HSE Comments

1) *In the work by Fearnehough and Corder (ERS R4132) there is a discussion on page 2 of the effect of age of pipeline on corrosion rates. Older/smaller pipelines may have been laid at shallower depths than later pipelines. Has this been accounted for in the analysis?*

   UKOPA accept that there are a number of factors that could affect the distributions derived in the study that are not treated in the analysis. The approach that was taken was to use the all the available data in an open and transparent way. All the relevant corrosion incidents are included in the analysis in order to make use of the full dataset. Arbitrarily removing groups of pipelines reduces the amount of data from which meaningful statistical conclusions can be drawn.

   Since this report was written, UKOPA have added many kilometres of pipelines belonging to operators other than British Gas and have had an additional 25 years operating experience so the overall exposure represented in the database is now much higher than when the Fearnehough and Corder study was undertaken. As the database also includes external inference incidents for these smaller/older pipelines it is considered relevant to include them. It is worth noting that the average depth of cover calculated in the analysis has increased using the full UKOPA dataset (from 1.3 m to 1.4 m), confirming that the contribution of older/smaller pipelines potentially laid at shallower depths is reducing as the pipeline exposure increases.

   Consequently, UKOPA has taken the view that all the data should be used, and that arbitrarily removing S area or small diameter or older pipelines will also distort the distribution. The latest analysis includes all the relevant corrosion incidents, whilst it is accepted that inferring a general depth of cover distribution from corrosion incidents is not perfect it is considered to be the best interpretation of the available data.

2) *The R4132 report concludes that there is a difference in rates between rural and suburban pipelines. The current report appears to treat the pipelines as being the same (i.e. the basis for Figure 1). What is the rationale for this change of methodology?*

   R4132 recommends use of R area data only to produce the influence of depth of cover factors. The depth of cover relationship presented in the Corder IMechE paper in 1995 does not show a distinction between R and S areas and is based on the R are curve in ERS 4132. This is also consistent with FFREQ.

   As explained above because the total number of corrosion data points are relatively few, splitting the data into R and S for the purposes of this study would result in large error bars on the results. UKOPA have made the decision to use the whole dataset again recognising that whilst not perfect, on balance it is better to use the full dataset rather than limiting the amount of data that can be used. It should be noted however that when the likelihood of damage is calculated TD/2 and the FFREQ failure frequency model apply a higher hit rate for S areas compared with the hit rate applied for R areas, as detailed in the UKOPA product loss report.

3) *The type of soil may have an influence on the likelihood of a corrosion event. Is it possible that the corrosion events in the UKOPA database are concentrated in particular geographic areas. If this coincided with areas of generally shallower (or deeper) depth of cover, this may skew the results. Plotting the corrosion incidents on a map may show that this is not the case.*

Soil conditions with an influence on pipeline corrosion rates can vary significantly over small distances. The UKOPA product loss report represents corrosion data for different soil types. The influence of soil conditions on the assessment of the relationship between depth of cover and external interference damage is considered to be second order at best. Consequently, the assessment of the geographical distribution of soil type plus depth of cover suggested is unlikely to add to the current analysis of the influence of depth of cover on external interference hit rate, and is not planned.

4) *The above questions the suitability of using corrosion to determine depth of cover distributions used in the current report. R4132 states at the top of page 2 that "There is direct evidence that corrosion frequency is not uniquely related to pipeline exposure".*

It is acknowledged that inferring a general depth of cover distribution from corrosion incidents is not perfect, and that there are other factors that may influence the distribution, but it is an appropriate use of the data available that models a real effect that has long been accepted by industry and HSE.

The comment on page 3 of R4132, referring to evidence that corrosion frequency is not uniquely related to exposure, relates to smaller diameter (older) pipelines with poor quality coating and CP. We would stress that the current analysis uses a much larger dataset than that considered in R4132 and follows a more recent approach published by Gasunie (the Dutch gas company) since the work in R4132 was performed. UKOPA consider it is reasonable to assume that the majority of the corrosion data in the UKOPA database is independent of depth, and therefore provides the best estimate of the average depth of cover of the pipeline population.