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Chemical Industries Division
Head of Unit John Murray

Date: 26th September
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Dear Mr. Jackson

REDUCTION OF PIPELINE RISK DUE TO SLABBING

I am writing to you as Chairman of UKOPA and Chair of the UKOPA Risk Assessment Working Group to inform you of the decision made by the HID CI5 Panel (HSE's internal peer review system for land use planning (LUP) issues) regarding the credit that can be given in risk assessments of major accident hazard pipelines where slabbing has been/is to be installed.

Pipeline slabbing is an issue which was raised in a UKOPA briefing note and which has been the subject of a number of discussions between UKOPA and HSE/HSL. Several research reports have been produced by Germanischer Lloyd Noble Denton (GLND) and we have provided technical and editorial comments on these.

On 3rd February 2011, a review of the latest GLND research was sent to you by Dr. Keeley at HSL (Draft MSU/LET/2011/). This review was considered for UKOPA by GLND and a revised review produced by HSL to include those elements of the UKOPA response that were deemed relevant.

Risk reduction due to pipeline slabbing was also included in the IGEM and British Standards documents which dealt with land use planning around pipelines. You are aware that HSE were critical of the values given in these documents and asked that they be updated to reflect more recent work carried out by GLND.

The issue of pipeline slabbing and the reduction in pipeline third party activity (TPA) failure rates that could be achieved was presented to Panel on 5th September 2011.

Panel concluded that, **in principle**, credit could be given for slabbing and the reduction in TPA failure rates would be based on the cautious best estimate values suggested by HSL.

However, Panel were concerned that there does not appear to exist, in the public domain, a standard to which these slabs would be designed, constructed and installed. Without such a standard, HSE could not be certain that the installed slabbing would be of equal, or greater, strength to those on which the Advantica/GLND experimental/analytical work was based. Consequently, HSE could not assign a level of risk reduction suggested by Advantica/GLND or HSL to the slabbed pipeline. In summary, until such a standard is in place, HSE will continue to give no credit for slabbing of pipelines in its risk assessments.

HSE is aware that National Grid Gas (NGG) has its own, internal standard for slabbing (T/SP/CE/12) which we believe was based on earlier standards developed by British Gas. HSE/HSL has previously been supplied with a copy of this document.

Following Panel, a request was made to HSE's Gas and Pipelines Unit (HID SI3) to review T/SP/CE/12 and comment on its suitability as an "industry standard" for slabbing. SI3 were also in possession of an equivalent document used by Northern Gas Networks (NGN/SP/CE/12) and it is assumed that the other gas distribution network operators have similar documents. It is unclear what standards are used by operators of pipelines which carry substances other than natural gas. A summary of the most relevant observations and conclusions of the SI3 review are attached to this letter.

In conclusion, if the issues outlined in the SI3 review can be resolved, and a document of a similar scope similar to T/SP/CE/12 can be published and adopted as an "industry standard" by all major accident hazard pipeline operators (including those operating pipelines conveying substances other than natural gas), then HSE would change its current policy and accept that slabbing can be used to reduce pipeline failure rates (and therefore risks) due to third party activity in its land use planning risk assessments.

Based on the cautious best estimate approach adopted by HSE over many years of involvement in land use planning, HSE would intend to use the following risk reduction factors in its risk assessments when considering pipeline slabbing:

Barrier Type	Probability that Barrier Fails
Concrete Slab Only	0.15
Slab and Marker Tapes	0.125

We would respectfully suggest that these values are adopted by IGEM and British Standards when updating the IGEM TD/2 and BS PD8010:Part 3 documents which deal with land use planning around pipelines. We would request that these documents are updated at the earliest possible time.

Yours faithfully

Dr. Peter J Harper

**HM Principal Specialist Inspector
Major Accident Risk Assessment Unit**

Annex: HID SI3 Review of NGG Document T/SP/CE/12: Observations and Conclusions

Observations

1. The document is adequately detailed to deal with slabs used for different purposes (impact protection, crossing points, separation between pipelines and services).
2. The document has 'standard slab designs' as well as adequately identifying when a case-specific slab design is required.
3. Sections 3.6 and 3.7 in the document provide the basis in identifying the issues around use of slabbing to prevent 3rd party damage; and is summarised well.
4. There are a number of shortcomings in section 3.9 of the document:
 - a. It is weak in requiring that a Close Interval Protection Survey (CIPS) or a Coating Defect Survey (CDS) is carried out before installation of a slab occurs. Whilst this weakness will not have an affect on the 3rd party impact protection issue; it does not minimise the need for the Pipeline Operator having to access the pipeline at a later date to carry out a coating or other repair. Such a repair could give rise to pipeline damage by the Pipeline Operator whilst removing slabbing and exposing the pipeline.
 - b. No mention is given to consideration of In Line Inspection (be it to review results of the past surveys for any defects below the reporting or action trigger levels; or to consider bringing the next ILI forward so it is carried out before the slabbing installation). Again, this would be to minimise the potential for pipeline damage by the Pipeline Operator whilst removing slabbing and exposing the pipeline.
 - c. There is lack of consideration as to the age of the pipeline with respect to known problems with pre-1972 girth welds and if they need to be fully exposed and inspected prior to installing a slab above them.
 - d. There is no mention of consideration to the introduction of reference cells and coupons below the slab to aid the ongoing management of the Cathodic Protection system.
5. The use of 'GAS' marker tape is clearly required (section 5.4); and this is in line with current and immediate past editions of IGEM/TD/1. However, SI3 Inspectors are aware that this was not always applied to in-situ casting of concrete slabs for pipelines compliant to earlier versions of IGE/TD/1 Edition 1 and 2 (even if this may have been in the publications). This does give rise to a potential problem of a 3rd party coming across the slab and not knowing that a pipeline is underneath it – would they bring in larger plant to break the concrete up?
6. In the 1970's a solution to IGE/TD1 'infringements', in some areas of the former British Gas, was to install what were called 'TD1 slabs'. It is believed that they may show on record drawings as 'TD1', but they are of substantially smaller dimensions than those in T/SP/CE/12. They are more akin to large paving slabs and it is felt that these will give substantially less risk reduction to 3rd party interference than the T/SP/CE/12 design. It is believed that this practise ceased at the end of the 1970's when pipeline diversions or heavy wall lift and relays became the favoured options.

Conclusions

T/SP/CE/12 (and its 're-badged' versions used by other high pressure gas pipeline operators) would be a suitable design document if it is amended to take into account improved reference to:

- CIPS
- CDS
- ILI
- CP reference cells

for future slabs.

For existing slab protection the question "what is the earliest date of installation is it reasonable to accept that the design is so similar to a current T/SP/CE/12 slab to be regarded as suitable protection?" needs to be considered. There are three areas of concern in relation to this date:

- Lack of marker tape; whilst this is an issue, I do not consider it is a significant one. If Panel consider it a significant issue then it may be useful to review old editions of TD/1 to see if they require marker tape above the slab. I only have Editions 4 and 5 and they both refer to the installation of marker tape.
- Taking T/SP/CE/12 as a suitable design document, then it may need to be determined at what date it was being widely used across the pipeline industry; the Brief History on page iii suggests it may be 2002. However, it is probable that a similar document was in existence before that date. NGG could be asked to identify such a document from their records. There would need to be review of old editions of TD/1 to identify the actual date.
- The existence of the 1970's 'TD1 slabs' (i.e. large paving slabs) would need to be identified and then excluded from being regarded as a slab for LUP purposes.