LEARNING FROM INCIDENTS
AWARENESS ALERT

High Risk Incident – Natural Gas Distribution Pipeline Rupture

GP/AW/2009/02 **Gas & Power** **05th May 2009**

What happened

On the 10th September 2008, a pipeline rupture occurred at a 4'' branch-off from a 6'' gas distribution line (normal operating pressure 22 barg) after 7 years of operation, resulting in a release of circa 1.5 MMscf of natural gas. Following notification of the incident the gas supply was shut off and a crew was sent out for inspection of the pipeline. The area was condoned off to restrict access to the site. Fortunately nobody was hurt or injured and resumption of gas supply to customers in the area was successfully restored after isolation of the defective line the day after.

Key findings:

Analysis of the incident concluded that the most probable cause for the pipeline failure was a high stress level at the failure location attributed to uneven settlement, in combination with the presence of a welding defect:

- The high stress level at the tee can be explained by differential settlement of the well-supported 6'' distribution line constructed along the elevated road embankment (dry stiff soil and a nearby valve pit providing additional support as well) and the 4'' branch line constructed in seasonally swampy terrain, outside the elevated road embankment at a significantly lower level.
- The welding defect could be due to use of off-spec material and/or the quality of welding performed during construction.

Lessons learned

The investigation of the incident was significantly hampered due to the fact that proper as-built documentation (pipeline drawings, material certificates, X-ray of welds) could not be located. Hence it could not be confirmed whether differences in soil conditions were taken into account during design and construction of the pipeline, whether materials selected and used were of the right specification and whether the welding activities were performed with the right craftsmanship.

What to do

- Design and construction of pipelines must take into account apparent differences in soil conditions (settlement) to avoid situations with localised high stress levels at T-joints.
- As-built and up to date documentation must be kept in a secure place during the complete life time of the project as defined in the Asset Integrity-Process Safety Application Manual.
- Before resuming operations following a process safety incident, a statement of fitness must be developed by the asset manager as mandated by the Asset Integrity-Process Safety Application Manual.

Goal Zero: Zero injuries, Zero fatalities