Learning Brief

DEVELOPMENT WITHIN PIPELINE EASEMENT WITHOUT OPERATOR KNOWLEDGE

What happened?

- A landowner undertook development works within a gas pipeline easement without the operator's knowledge or permission. A 415v cable was also laid over the pipeline
- The operator undertook investigations to establish that the pipeline hadn't been damaged

Findings and key learning points

- A landowner constructed a barn, parking area and access roadway within a pipeline easement. A 415v cable was also laid over the pipeline. The barn foundation depth was 0.5 m
- The operator's pipeline contractor was aware of the development but assumed that it was outside the easement and that the operator was aware.
- The operator became aware of the development during a routine contract meeting between the operator and pipeline contractor
- The landowner had not responded to annual liaison letters and the operator had not followed this up
- Neither the landowner or landowner's contractor contacted the operator, took note of the marker posts or contacted LinesearchbeforeUdig (LSBUD)
- Once aware, the operator took action to ensure that the pipeline hadn't been damaged – the pipeline coating was inspected, and a depth survey was undertaken. Further investigations are planned.

Recommendations

- Operators are advised to visit or phone landowners that do not respond to annual letters
- Operators to consider the level of reliance placed on their contractors to identify infringements
- Operators to reinforce the message to landowners that it is their responsibility to check for pipelines on their land and that they need to contact the operator prior to any works near pipelines

Learning Brief

MOVEMENT OF OIL PIPELINE PIPE SUPPORTS

What happened?

- A 28” diameter oil pipeline moved due to removal of an ‘anchor’
- The pipe supports also moved causing damage

Findings and key learning points

- The over-ground section of a 28” diameter oil pipeline is supported on saddles
- Thermal expansion is not a major factor due to the oil being at a constant temperature
- A road crossing (formed off soil and hardcore) was present over the pipeline at the next bend downstream.
- The road crossing was removed for unrelated works and not reinstated. The unintentional consequence was that the pipeline was no longer fixed.
- The force on the bend due to internal pressure caused the pipeline to move once the ‘anchor’ that the road crossing had provided was removed
- Damage to and movement of several pipe supports occurred
- A plan has been prepared to repair/replace the damaged pipe supports and check the pipeline for damage

Recommendation

- Operators should be aware that removing ground cover from an above ground pipeline may allow it to move causing damage to supports

Learning Brief

CRACKING OF PIPELINE CONCRETE CASING

What happened?

- Thermal expansion and contraction caused cracking of the concrete casing on multiple pipelines, despite the presence of expansion loops
- A programme of remediation is ongoing

Findings and key learning points

- Six pipelines were built in the 1960s and run above ground - two remain in use
- It is assumed that the pipelines weren't buried due to marshy ground conditions
- The exact reason for the concrete encasement is unknown but may be to provide protection from external impact or act as ballast to prevent the pipelines from floating
- Although the pipelines have expansion loops, thermal movement has caused cracking of the concrete
- A programme of remediation has been planned. This includes removal of the concrete and coating, inspection of the pipe, repair if necessary and re-coating
- The need for the concrete is being assessed

Recommendation

- Operators are to be made aware that concrete casing may fail when pipelines are exposed to thermal change

Learning Brief

DEAD VEGETATION CAUSED A FIRE HAZARD

What happened?

- Tall vegetation in an above-ground pipeline easement was killed with weedkiller. The resulting ‘hay’ caused a fire hazard
- The dead vegetation was removed

Findings and key learning points

- Due to a change of contract, grass cutting on an above-ground pipe route was overlooked (one cut was missed)
- Due to the height of the vegetation, it was sprayed with weed-killer
- The dead vegetation turned to ‘hay’, presenting a fire hazard
- The dead vegetation had to be removed

Recommendation

- Operators are advised to check that vegetation management contracts for above ground pipelines include removal of dead material

Learning Brief

THOROUGH PREPARATION OF PIPELINES FOR ROAD CROSSING

What happened?

- A road crossing was installed across two oil pipelines (built 1966 & 1974)
- The pipelines were fully inspected and re-wrapped before the crossing was installed

Findings and key learning points

- A significant concrete road crossing was installed across two oil pipelines
- Time was built into the project schedule to allow inspection and remediation of the pipelines
- CIPS and DCVG surveys were carried out and breakdown of the coal tar coating was detected
- The coating was removed and the pipes shot-blasted
- Several minor defects were found but did not require repair due to the effectiveness of the cathodic protection
- The pipelines were re-wrapped

Recommendation

- When major works are planned over existing pipelines, a schedule should be agreed with the developer to allow for pipeline inspection and remediation

Learning Brief

DAMAGE TO PIPELINE BY UNAUTHORISED DRAINAGE WORKS

What happened?

- A landowner dug a drainage ditch damaging a 24 barg 2” pipeline
- The landowner contacted the operator to report the damage
- The damage was repaired

Findings and key learning points

- A landowner decided to dig a drainage ditch without checking whether a pipeline was present. The landowner did not consult the operator or check LinesearchbeforeUdig (LSBUD)
- A mini-digger was used which caused damage to the pipeline coating and bent the pipe
- The excavation was spotted by the operator’s field operative who reported the damage
- The operator held discussions with the landowner, highlighting the safety consequences of pipeline damage/release of content. The operator also went through the required procedures for works in the vicinity of their pipelines
- The coating damage was repaired

Recommendation

- Operators to reinforce the message to landowners that it is:

  a) their responsibility to check for pipelines on their land

  b) that they need to contact the operator prior to any works near pipelines

Learning Brief

DAMAGE TO PIPELINE BY UTILITY CONTRACTOR

What happened?

- Whilst installing an overhead cable pole, a utility contractor struck an 18” 25 barg pipeline with a screw auger
- The pipeline was damaged and had to be repaired

Findings and key learning points

- The utility company had carried out a LinesearchbeforeUdig (LSBUD) search, but the company’s contractor ignored the findings and did not inform the operator of the works. No site drawings were checked, and nearby aerial markers were ignored
- A hole was bored with a screw auger. On hitting the pipeline (feeling resistance), the contractor stopped drilling, contacted the operator to report a near miss and continued with reinstatement
- The operator’s pipeline team carried out safety checks and DCVG (Direct Current Voltage Gradient) surveys and identified coating damage
- The operating pressure of the pipeline was reduced by 15%, in line with procedures.
- The utility company hand excavated the pipeline under operator supervision to allow assessment of the damage (see photo). The pipeline was easy to locate with standard equipment.
- The operators' procedures for working in the vicinity of pipelines were shared on-site. A further meeting was held with the utility company to review the incident, share findings and suggest improvements
- The operator carried out an assessment of the damage and repaired the pipeline with a steel sleeve. Calculations to justify reinstating the pressure to 25barg were undertaken

Recommendation

- Operators to reinforce the message to landowners and contractors that it is:
  a) their responsibility to check for pipelines on their land
  b) that they need to contact the operator prior to any works near pipelines

AUTOMATED CATHODIC PROTECTION MONITORING

What happened?

- An operator has improved corrosion monitoring by installing automated Electrical Resistance (ER) probes which remotely transmit continuous data to a central computer
- The system has replaced the need to prepare periodic manual reports which were just a ‘snap-shot’

Findings and key learning points

- An operator had concerns that the existing method of carrying out periodic manual checks on Cathodic Protection (CP) systems was not giving adequate data for corrosion monitoring
- A pilot project was carried out to install new automated ER Probes. 29 ‘high risk’ locations were selected for installation
- As AC corrosion was of particular concern, ER probes with the capability to monitor AC as well as DC were selected
- The new installation consists of a purpose-made post with logger and transmitter, ER probe, reference electrode and AC electrode. The ER probe is constructed of the same material as the pipeline. The thickness of the ER probe is continuously monitored
- The system transmits AC and DC real-time data to a central computer. The information is presented in a user-friendly format via a web page. It is possible to automatically monitor trends and set alarms
- The project has proven to be a great success. The data is more accurate, continuous and the need to carry out site visits and install temporary data loggers to prepare CP reports has been eliminated.

Recommendation

- Operators may wish to consider the benefits of automating their CP monitoring systems with state-of-the-art ER probe technology

USING AUTOMATED ER PROBES TO IDENTIFY AC CORROSION THREATS

What happened?

- An operator has used automated Electrical Resistance (ER) probes to monitor AC induced corrosion threats to a pipeline
- High risk locations were mitigated by the installation of zinc ribbons

Findings and key learning points

- The guideline for mitigation against AC induced corrosion is to act when the AC current density is greater than 30 amps/m2
- The operator used their newly installed automated ER probes to continuously monitor AC current density. Eight locations were identified as high risk and 120-metre-long zinc ribbons were installed to reduce AC current density (see lower photo)
- Subsequent monitoring by the ER probes has indicated that the AC induced corrosion risk is now acceptable
- When a new development (e.g. solar farm) is proposed to be built adjacent to a pipeline, the operator requires that the developer covers the cost of new ER monitoring probes either side of the development

Recommendation

- Automated ER probes have proven to be an effective means of identifying areas of risk of AC corrosion and providing ongoing monitoring following risk mitigation