

### Description of incident : Oil leak 2014

The bend into the flare header on the plant had been replaced twice previously due to erosion. During the last replacement more than 10 years ago, a 2" to 3" reducer was installed and the bend was modified from 90° to 45°. No root cause analysis or necessary measures were implemented to prevent recurrence.

Start-up of a 'dead' well was initiated. The method for the attempt to start-up was reviewed. There were some difficulties getting the well started and the inlet was closed to empty the liquid part of the test separator. With low wellhead pressure, a minor well stream was maintained through the depressurisation line. Sand in the well stream caused a fracture due to erosion in the weld in the 45° bend in the depressurisation line, and a gas- and oil leak occurred. The initial leak rate was estimated to 0,12 kg/s, with a duration of 30 minutes. See the figure below.



*Figure: Depressurisation line with leakage. The arrow indicates the direction of the flow.*

### Causes

#### Direct cause:

Sand in the well stream caused a fracture in the depressurisation line due to erosion.

#### Root causes:

- The depressurisation line was not designed for sand content.
- Lack of procedure/work description for start-up of 'dead' wells.
- Insufficient risk assessment of the chosen start-up method.
- Lack of documentation for operation of the depressurisation line.
- No valid sand strategy.

### Learning points and recommendations:

- Stop this practice for operation of wells.
- Evaluate a more robust design of the depressurisation line.
- Finalise and document a sand treatment strategy for the plant.
- Consider to establish guidelines for start-up of wells with sand content.
- Execute erosion calculations for depressurisation lines.
- Revise the inspection program for depressurisation lines.
- Ensure adequate systems for management of change when the plant is operated in other conditions than it is designed for.