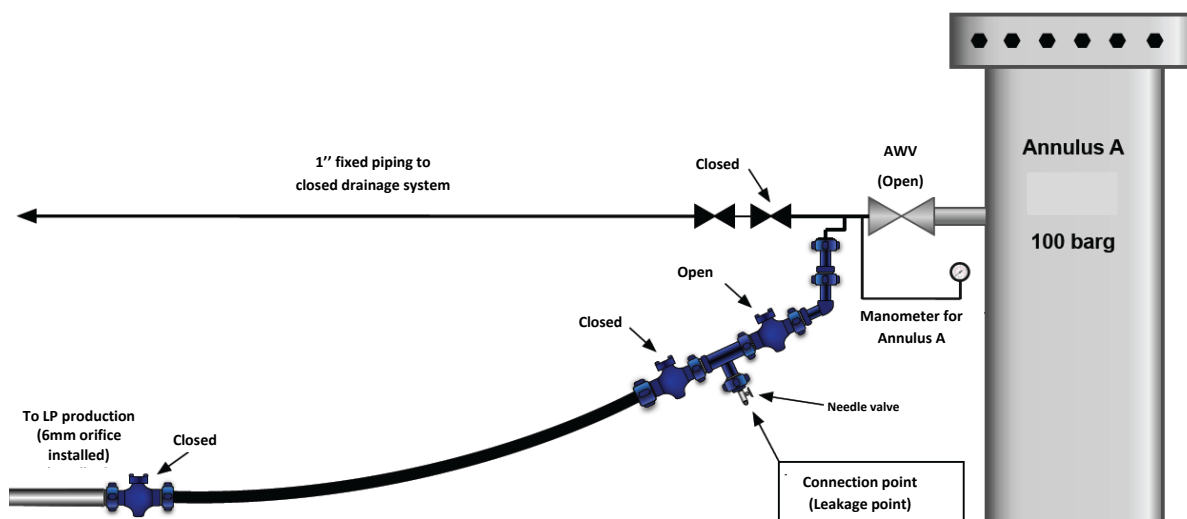


### Incident description: Gas leak 2013

The incident occurred in connection with testing of the gas lift valve on a well. The annulus contains large volumes of gas, and in order to reduce the need for flaring most of this gas was going to be produced. During the night shift a temporary chocksan line was installed for this purpose, ref. the figure below. During leak testing a leak was discovered in the manifold for connection of the leak metering system (LMS). The manifold was thus disassembled, and a needle valve was installed. This temporary system was leak tested at 280 bar, and the annulus wing valve (AWV) was then opened such that the chocksan line was pressurised.

Disassembly of the needle valve and installation of manifold for connecting the LMS was to be carried out by the subsequent day shift. An area technician and a LMS operator went to the well to begin this work. The area technician moved the AWV wheel to ensure that the valve was closed. He concluded that the valve was closed, even though it was actually in open position (according to internal procedures the valve should have been labeled if it had been closed). The manometer showing the pressure on the segment that was about to be opened, was not checked. Verification that the segment was depressurised was performed by partially opening the needle valve. At first a little grease/oil emerged from the needle valve. The valve was then further opened to about 2/3 opening. This led to a gas leak, as a barrier against the annulus (closed AWV) had not been established. The leak rate was 0,8 – 1 kg/s. The area technician had his hand on the needle valve and started closing the valve when the gas began to flow. It took approximately 5-7 seconds until the valve was closed. Estimated gas leakage to atmosphere is 5-7 kg.



## Causes

### Direct cause:

Needle valve was opened to verify that the system was depressurised without conducting required verification steps.

### Root causes:

- The task was considered a normal routine operation.
- Isolation plan was not established and verified.
- Leak test was not performed.
- Verification of valve position was not performed.
- It was assumed that the AWW was closed, despite missing labeling/locking.
- Chicksan line lacked a barrier against the needle valve.
- Checkout of Work Permit (WP) in the field was not executed. The WP for depressurising, drainage and closing of valve was signed, even though this task had not been performed.

## Learning points and recommendations

- Ensure that Norwegian Oil and Gas Association recommendations<sup>1</sup> are implemented in governing documents, along with measures to ensure that these are actually being followed. This includes active use of valve and blinding list along with verification of isolations.
- Introduce more robust technical solutions to ensure a proper isolation standard on process equipment.
- Improve routine for handover between day and night shifts.
- Introduce measures to improve training and competence and checkout of personnel suited for area responsibility.

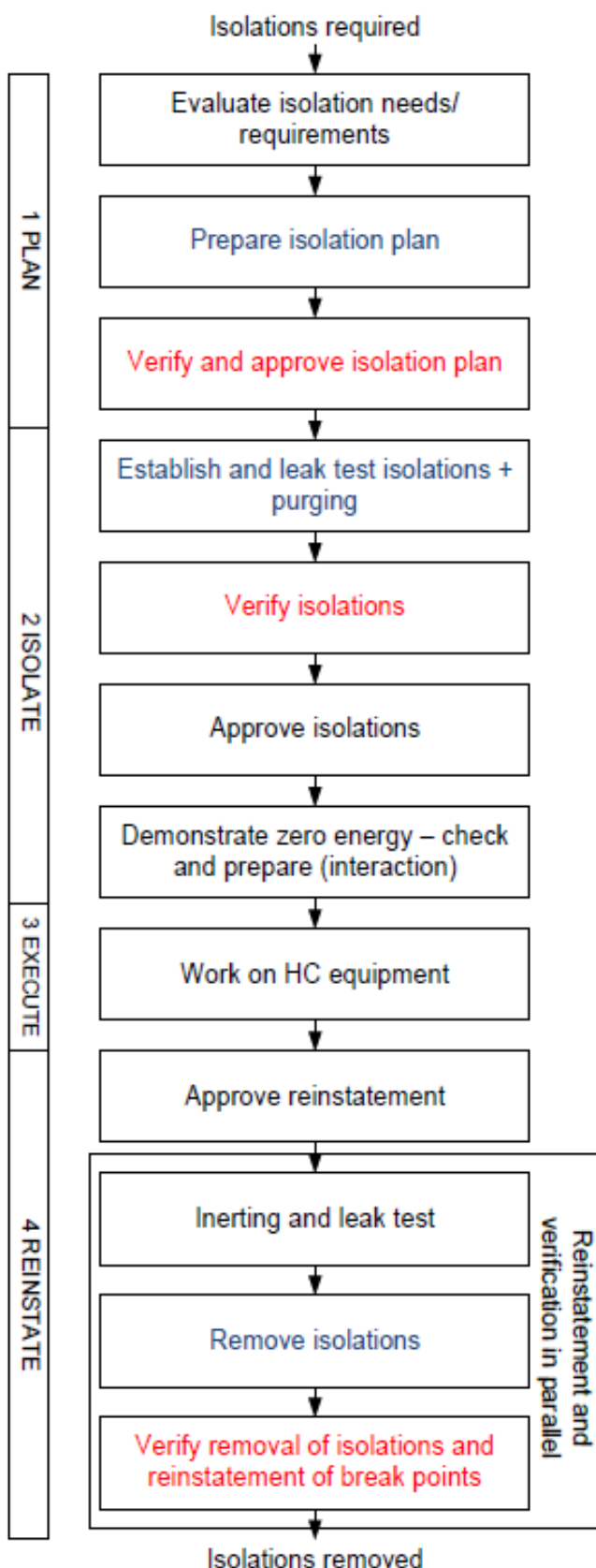
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<sup>1</sup> See the following document: "Best practice for isolation when working on hydrocarbon equipment: planning, isolation and reinstatement".

Description:

Blue and red text indicate roles which are to function as independent barriers.

**Status for steps in best practice document**



Description:

- 1 Was executed, functioning as intended
- 2 Was executed, but failed
- 3 Was not executed
- 4 Uncertain whether executed

Status during the incident:

- 2 The task was considered a routine task outside the scope of the best practice document.
- 3 Not executed
- 3 Not executed
- 2 Failure in isolation (AWV was open)
- 3 Not leak tested and drained
- 3 Not executed
- 3 Not executed
- 3 No checkout of WP in the field
- 4 Executed
- Gas leak 0,8 - 1 kg/s, 5-7 seconds