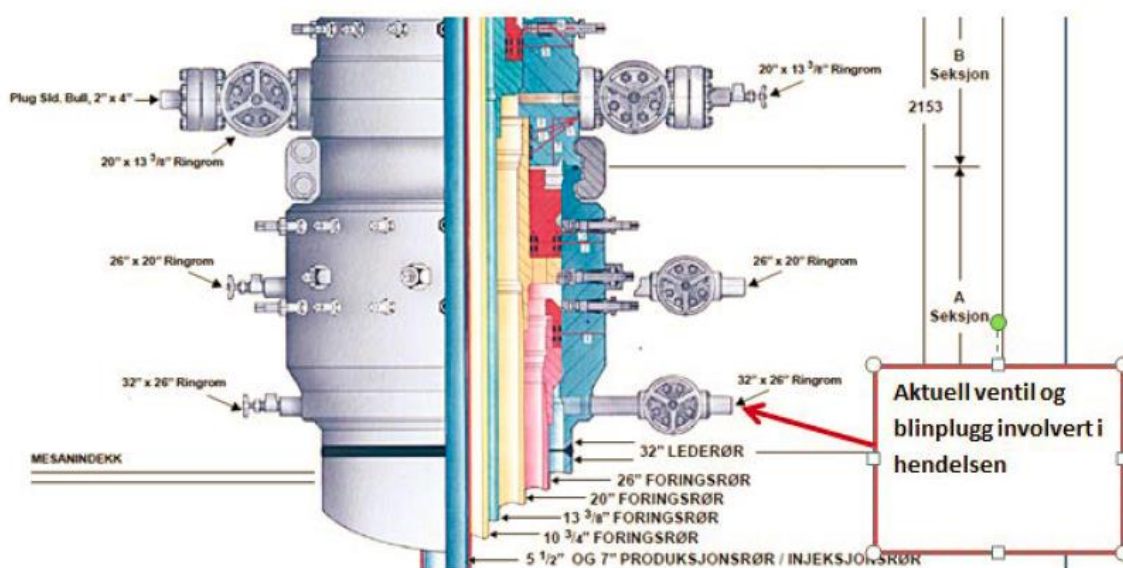


Incident description: gas leak 2016

A blind plug was removed during the installation of wireless pressure transmitters for annulus monitoring, which led to a leak. The annulus valve upstream from the blind plug was in the open position when the plug was removed (see illustration). This valve should have been closed. It was re-labelled as closed, but this proved to be incorrect. Hydrocarbon gas was present in the annulus. This is not normal, and was not known to those doing the work. The incident led to a hydrocarbon leak of 1.9kg/s for 20 seconds, with a total gas volume of about 3.87kg.

An isolation plan had been prepared and verified. However, the verification had failed to pick up that the annulus valve lacked an isolation plan. The person in charge of the area established the isolation single-handedly, without verification by a third party. This person was not present when the blind plug was removed.



Causes

Direct cause

- A blind plug was removed on a pressurised system.

Underlying causes

- The annulus valve was in the fully open position.
- The annulus contained hydrocarbon gas, probably as a result of seepage from the formation.
- The annulus valve was not tested and depressurised downstream from the valve before the blind plug was removed.
- The isolation plan was established in the field without verification/buddy check.
- The person in charge of the area established the barriers and closed valves in the annulus, while at the same time helping the specialist doing the job by closing some of the valves to speed up the work. The specialist doing the job did not identify whether the valve on the relevant annulus was closed when he was preoccupied with closing other valves. It emerged from interviews that the work was felt to be stressful (pressure of time), with many activities to be done.
- The person in charge was absent when the HC system was split and the equipment uninstalled.
- The maintenance procedure for ensuring that the annulus was filled with fluid was not followed.

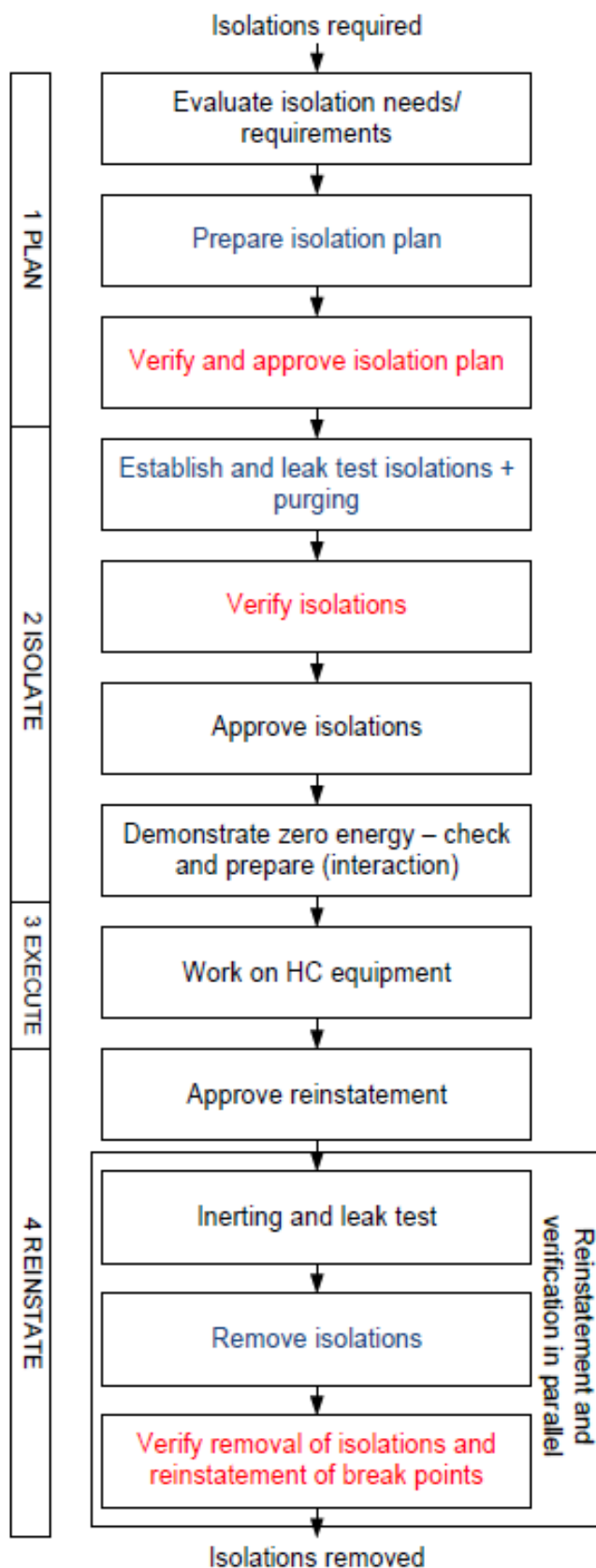
Lessons and recommendations

- Prepare a local job description to ensure uniform understanding of its content, how pressure in the annulus is bled down and how barriers are tested and secured in accordance with the requirements.
- Improve communication on personnel changes in offshore projects so that decisions taken on land which could be negative for the level of activity expected of offshore personnel are picked up by the offshore management.
- Changes related to the level of activity in projects and a high level of parallel activities in the same area must be covered by the operation plan and picked up in operation meetings.
- Ensure compliance with procedures for approved physical barriers, preparation of the isolation plan and establishing, verifying and approving isolations.
- Change the design – blind plugs without bleed-off provision must be avoided on the wellhead.

Key:
 Blue and red texts indicate roles intended to function as independent barriers

Key:
 1 Carried out, functioned as intended
 2 Carried out, but failed
 3 Not carried out
 - Not known whether carried out

Status for stages in best practice document



Status during the incident:

- 1 Carried out.
 - 2 Carried out, but annulus valve not included in isolation plan.
 - 2 Carried out, but failure to include the annulus valve in the isolation plan not noticed.
 - 3 Annulus valve not tested or depressurised downstream from the valve before removing the blind plug.
 - 3 Not carried out.
 - Not known whether carried out.
 - 3 Not carried out. HC system split without the person in charge of the area being present.
- ☁ Gas leak 1.9kg/s. 3.87kg.