Description of incident: Gas leak 2014

A compressor was started up after a turnaround of the plant. During service of a partitioning valve, a bleed plug was opened but had not been closed again. The plant was reset and leak tested. The segment with the open bleed plug was also leak tested, but the partitioning valve was not in use during this test.

During start-up of the plant, gas was leaking through the open bleed plug. The gas leak declined quickly as it was only leaking while the valve was moving, not when in closed or open position. The maximum leak rate was estimated to 1,07 kg/s and total amount was estimated to 5,5 kg.

Causes

Direct cause:

The bleed plug was in an incorrect position (open) during start-up of the plant.

Root causes:

- The segment with the open bleed plug was leak tested, but the partitioning valve was not in use during the test. The leakage point was not detected as the leak occurred while the valve was moving, not when in closed or open position.
- Opening of the bleed plug was not highlighted in the isolation plan.

Leaning points and recommendations:

- Consider to implement a complete verification of the start-up of a plant after a revision shutdown.
- Establish a practice for operating valves during leak testing to reveal open bleed plugs etc.
- Ensure that Norwegian Oil and Gas Association recommendations[1] regarding best practice during work on HC containing equipment is implemented in the governing documentation, ensure that necessary measures are in place and make sure that these are adhered to. This includes use of a list of break sections which shall be a dynamic document which specifies at any given time which points (both flanges and plugs) have been broken.

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[1] See the following document: "Best practice for isolatioun when working on hydrocarbon equipment: planning, isolation and reinstatement"

Description:
Blue and red text indicates roles that are to function as independent barriers.

Description:
1 Was executed, functioning as intended
2 Was executed, but failed
3 Was not executed
– Uncertain whether executed

Status for steps in the best practice document

Status during the incident:

Isolations required

	Step	Status
1 PLAN	Evaluate isolation needs/requirements	1
	Prepare isolation plan	1
	Verify and approve isolation plan	1
2 ISOLATE	Establish and leak test isolations + purging	1
	Verify isolations	1
	Approve isolations	1
	Demonstrate zero energy – check and prepare (interaction)	1
3 EXECUTE	Work on HC equipment	1
	Approve reinstatement	1
4 REINSTATE	Inerting and leak test	2
	Remove isolations	2
	Verify removal of isolations and reinstatement of break points	2

Reinstatement and verification in parallel

Isolations removed

Gas leak 1,07 kg/s. 5,5 kg.