WELLMASTER
WELL PERFORMANCE ANALYTICS

Introduksjon til gassløftbrønner for risikoanalytikere

ESRA seminar, September 3, 2014, Stavanger

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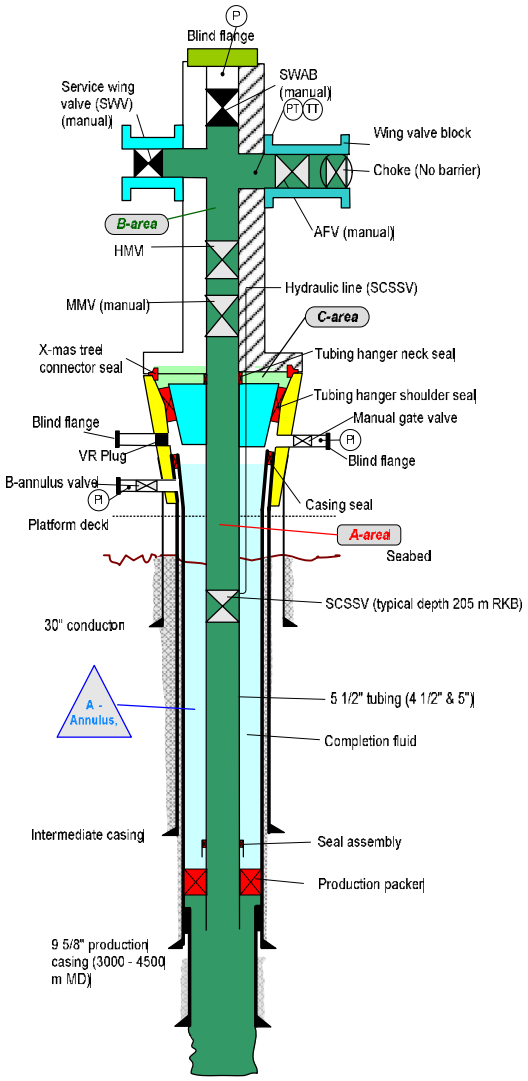
ExproSoft

No gas lift



Indicated depths, sizes, and volumes are based on 2-4X

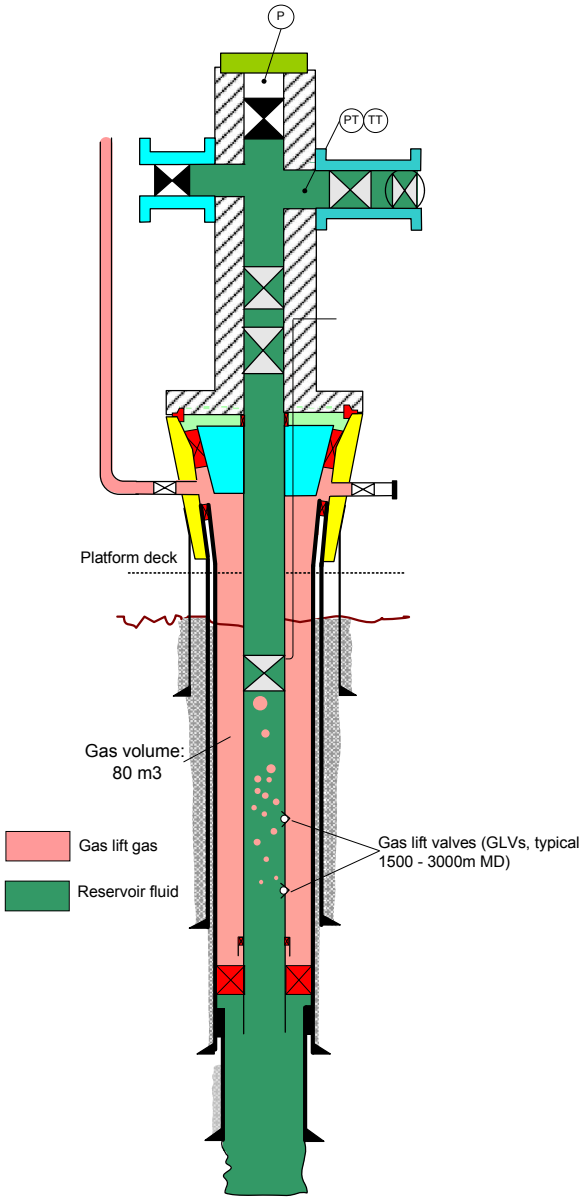
Reservoir fluid

Completion fluid (brine)

Normally open valve

Normally closed valve

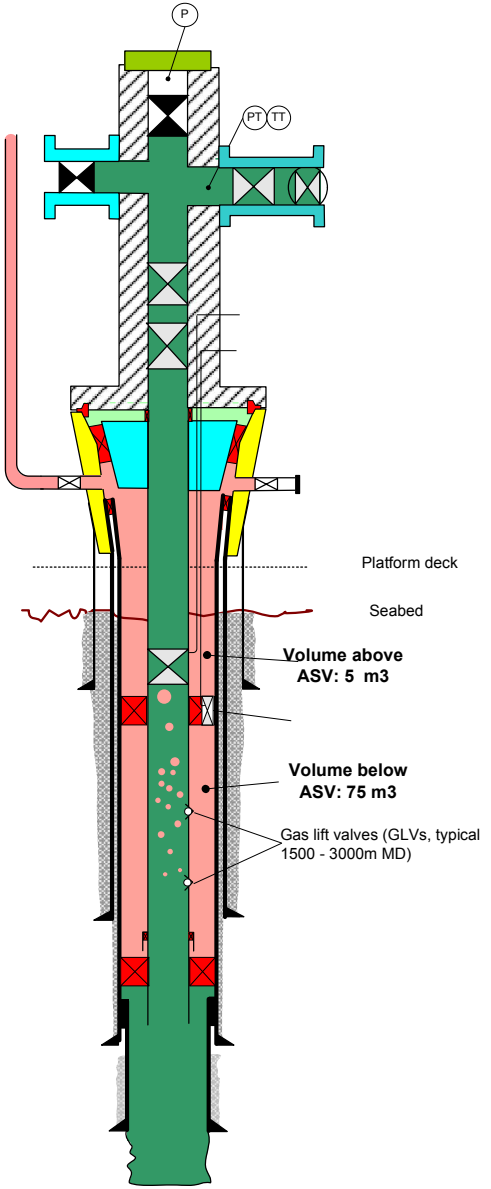
Gas lifted well, without ASV



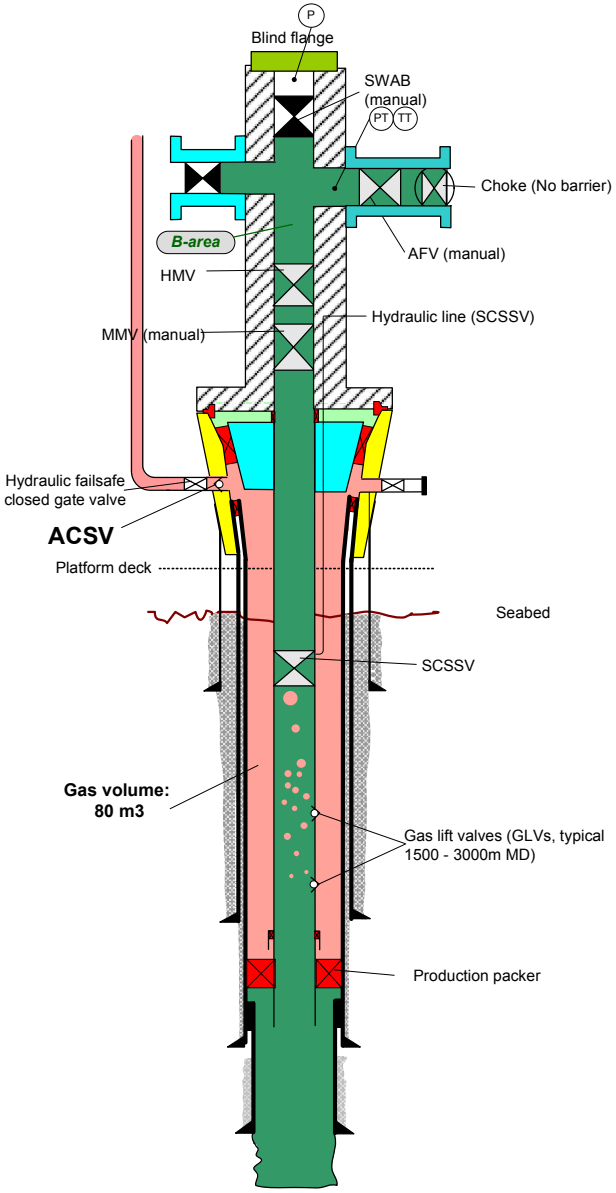
Gas lift gas

Reservoir fluid

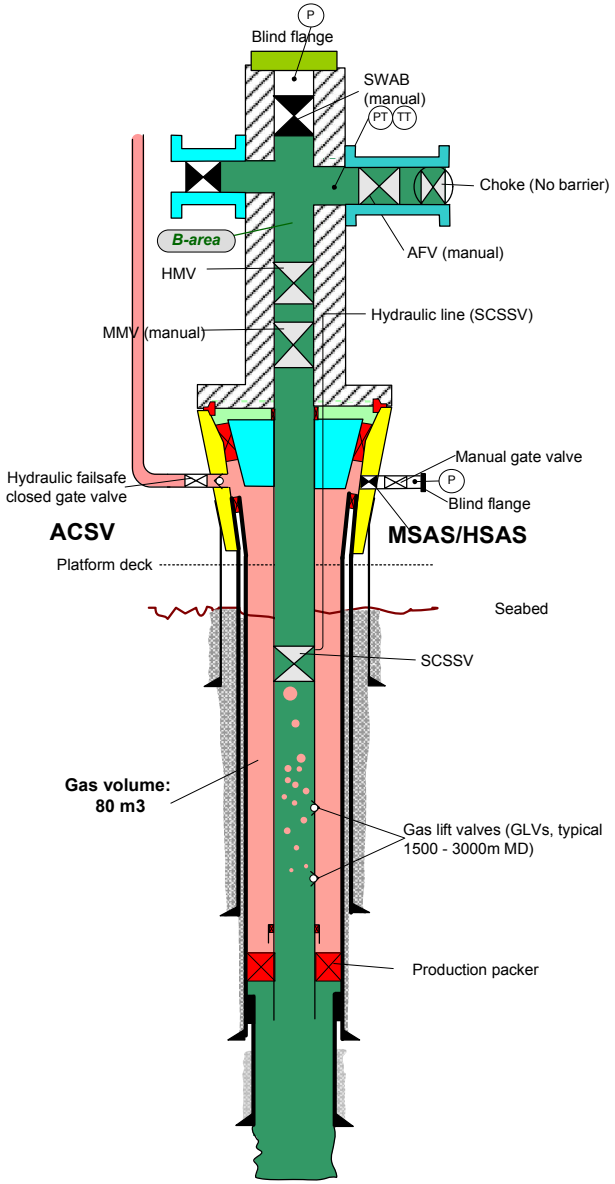
Gas lifted well, with ASV



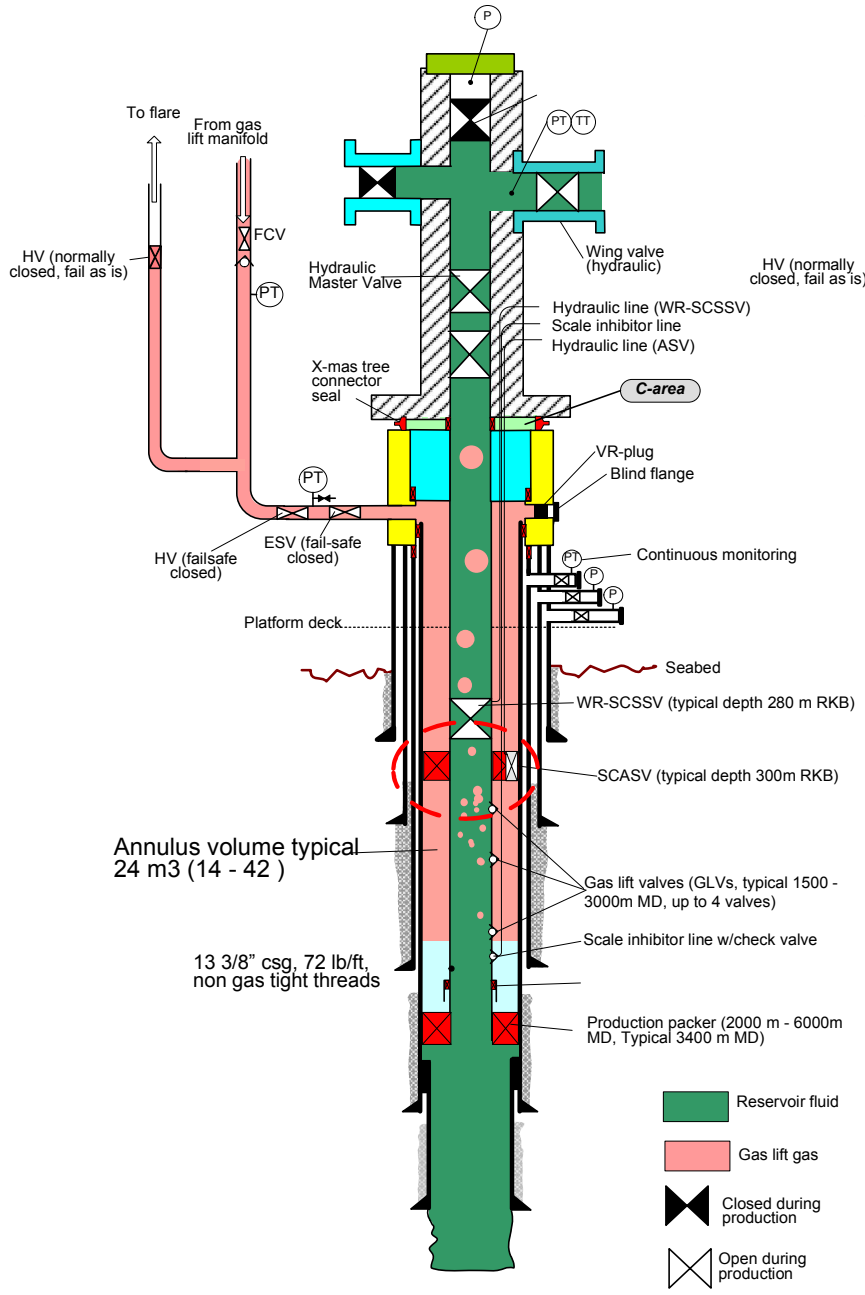
Gas lifted well, No ASV with ASCV



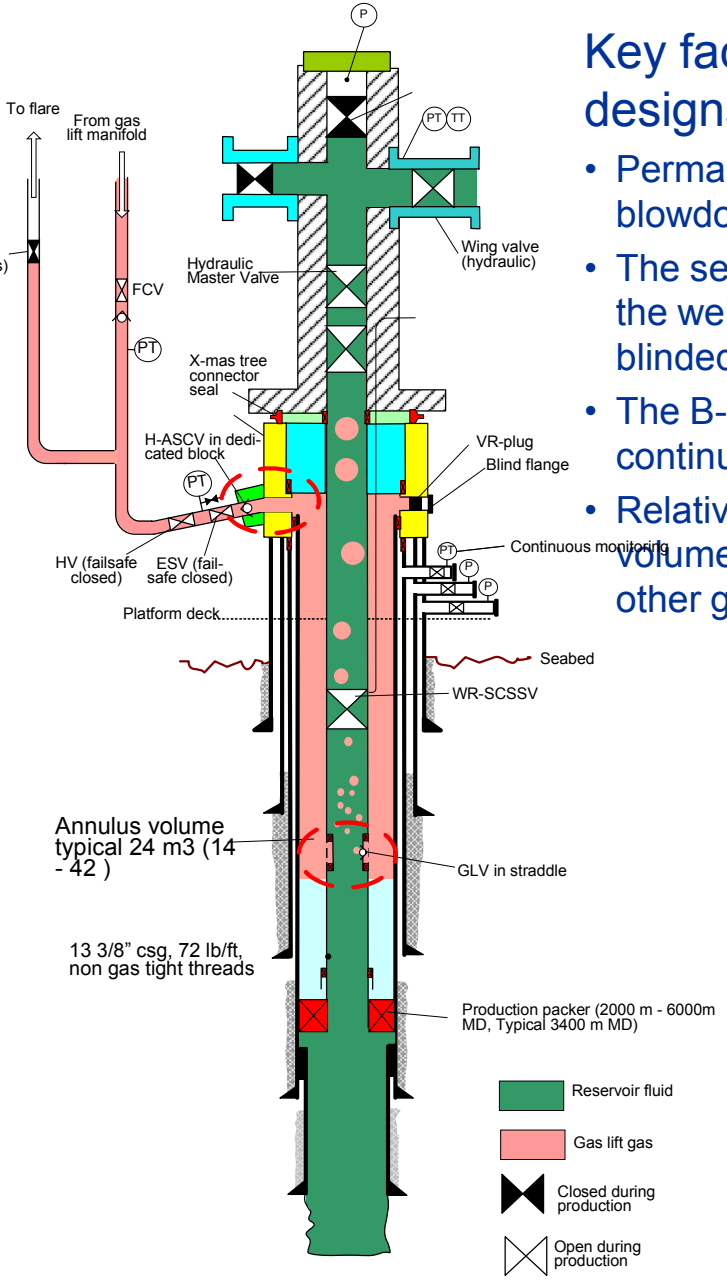
Gas lifted well, No ASV with ASCV and MSAS/HSAS



Base case: Conventional gas lift with ASV, 1 - 4 GLVs

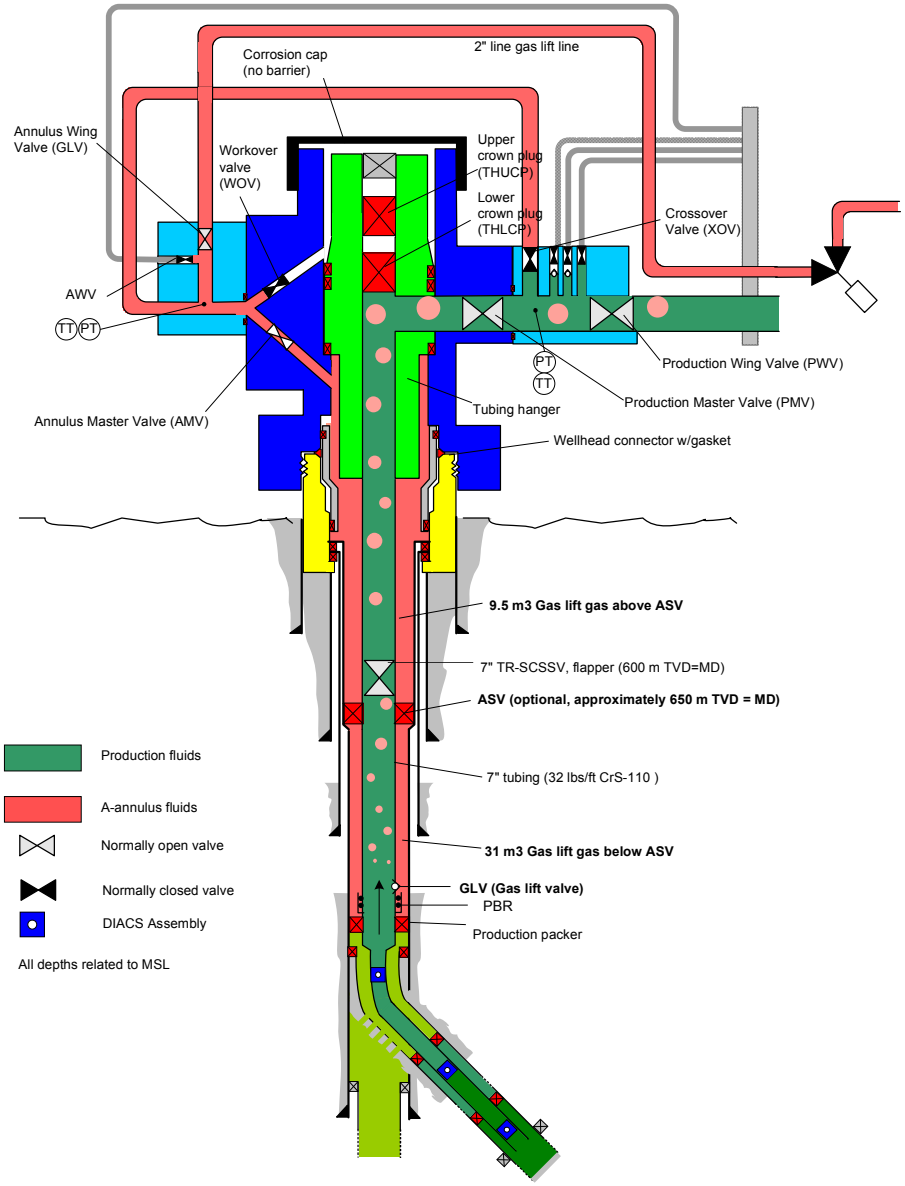


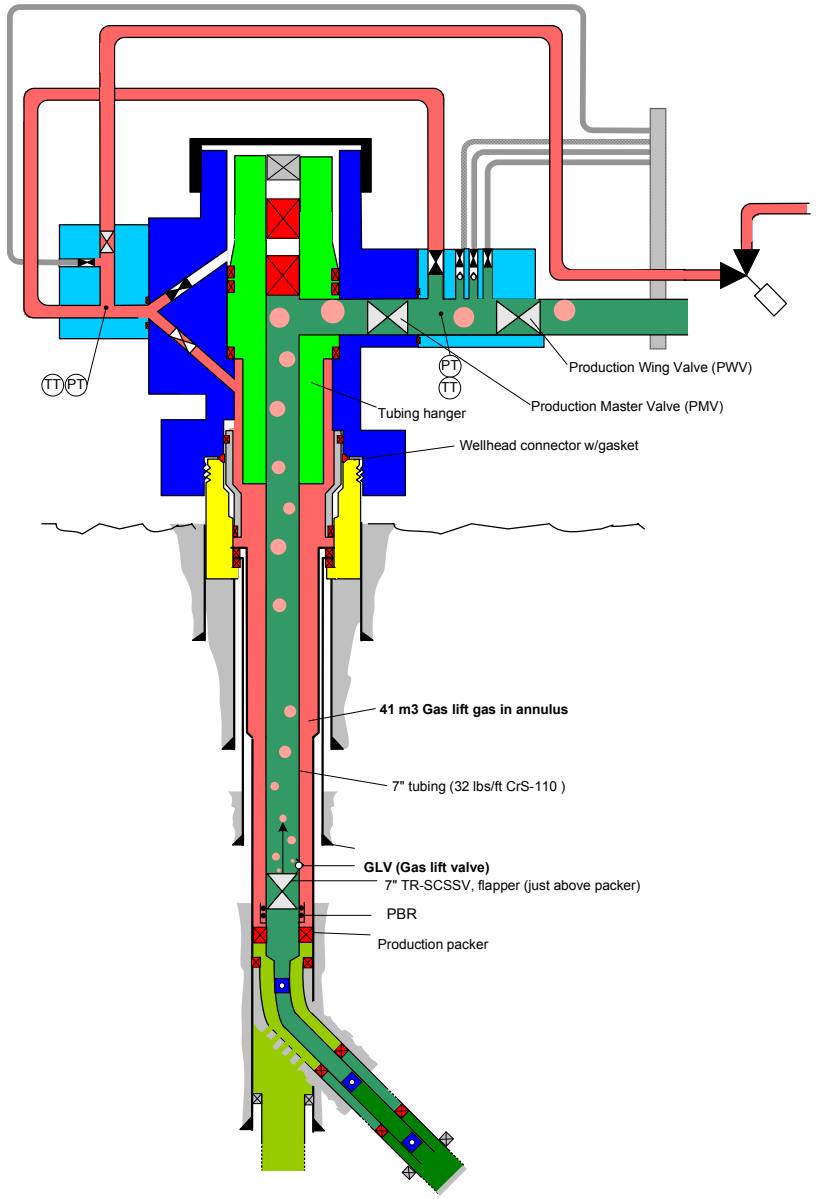
Retrofit, with GLV in straddle and H-ASCV in wellhead



Key factors, both designs:

- Permanent annulus blowdown system
- The second outlet from the wellhead will be blinded off
- The B-annulus will be continuously monitored
- Relatively small annulus volumes compared to other gas lifted wells





- Base Case: Gas lifted subsea production wells with ASV and shallow set TR-SCSSV

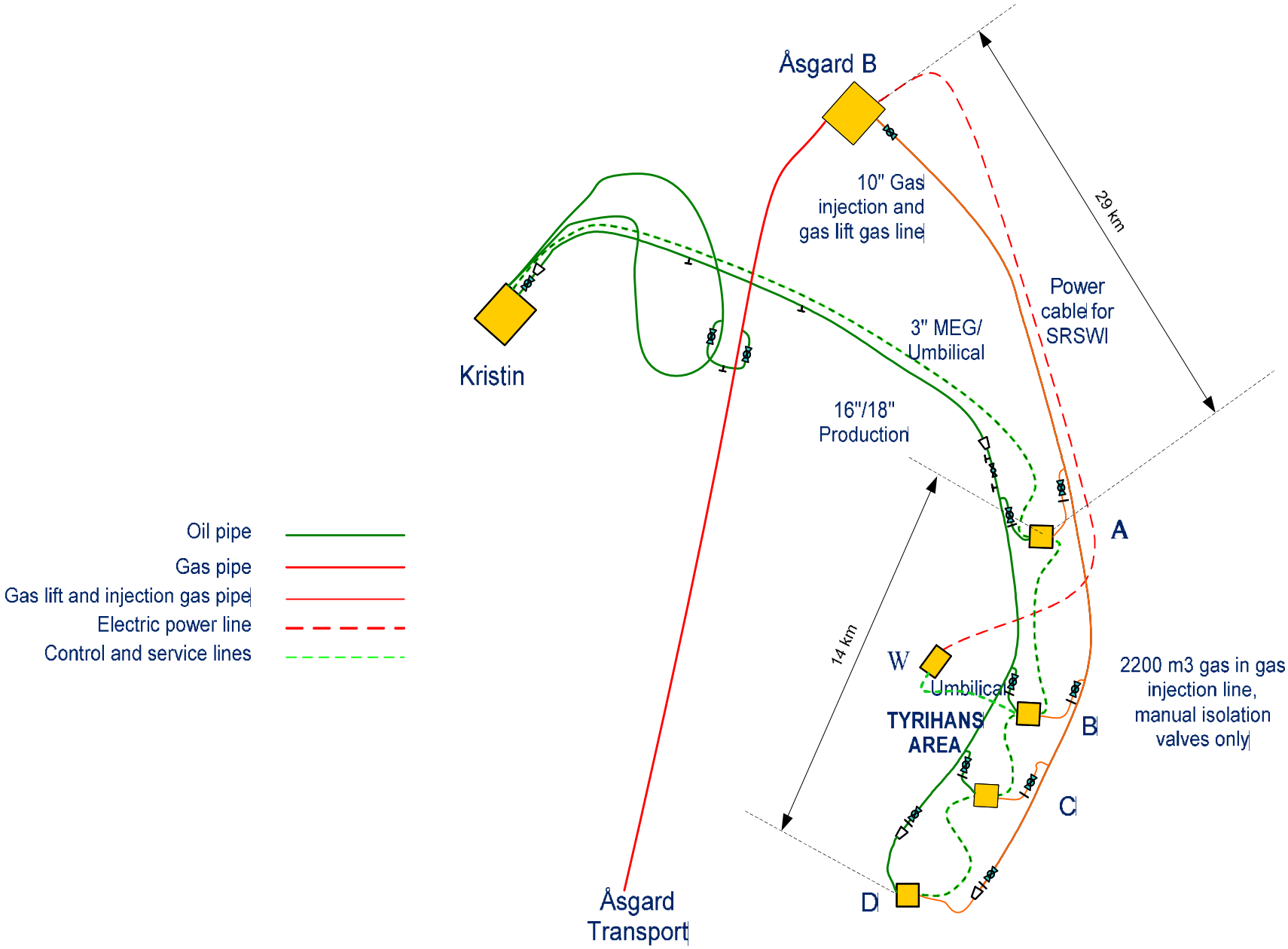
- Case III: Gas lifted subsea production wells with no ASV and deep set TR-SCSSV

Annulus gas volumes

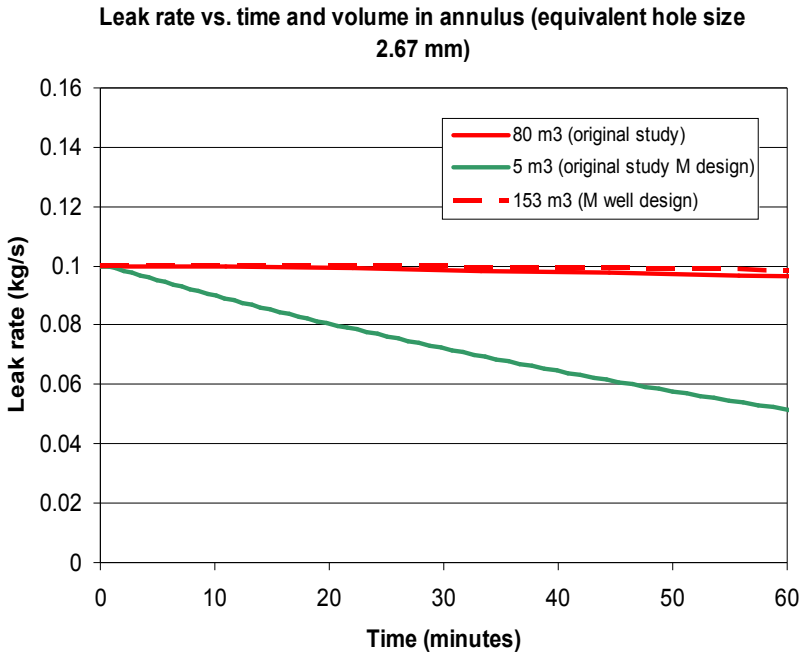
Field	Typical volumes of gas lift gas (m3)			Inlet gas pressure (bar)	Platform or subsea
	Above ASV	Below ASV	Total		
Ekofisk typical	4,3	72,0	76,3	125	Platform
Ekofisk M	4,2	153,0	157,2	125	Platform
Statoil Retrofit	2,5	24,0	26,5	130	Platform
Brage	13,0	104,0	117,0	130	Platform
Skinfaks/Rimfaks	9,5	31,0	40,5	245	Subsea
Norne	2,6	33,4	36,0	200	Subsea
Tyrihans	2,8	44,0	46,8	310	Subsea
Fossekall	3,0	26,0	29,0	295	Subsea
Dompap	3,0	29,0	32,0	295	Subsea
Hyme	2,5	20,5	23,0	200	Subsea
Havis	2,3	8,2	10,5	186	Subsea
Skrugard	2,3	5,0	7,3	150	Subsea
Maria	10,0	95,0	105,0	330	Subsea
Ivar Aasen	6,6	26,6	33,2	150	Platform

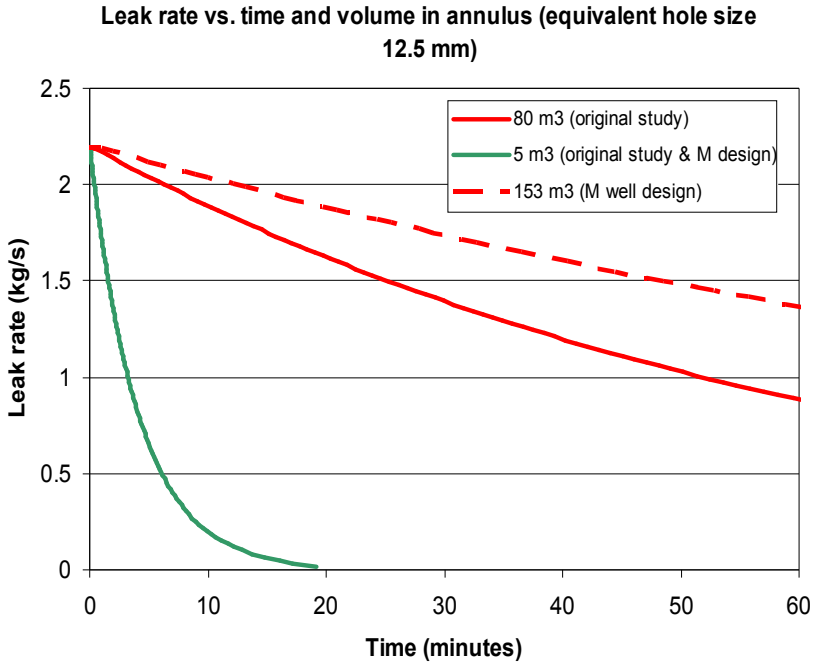
- Note that other, not well related, volumes of gas can be much higher
  - Export risers
  - Gas lift flowlines subsea
  - Gas injection flowlines subsea

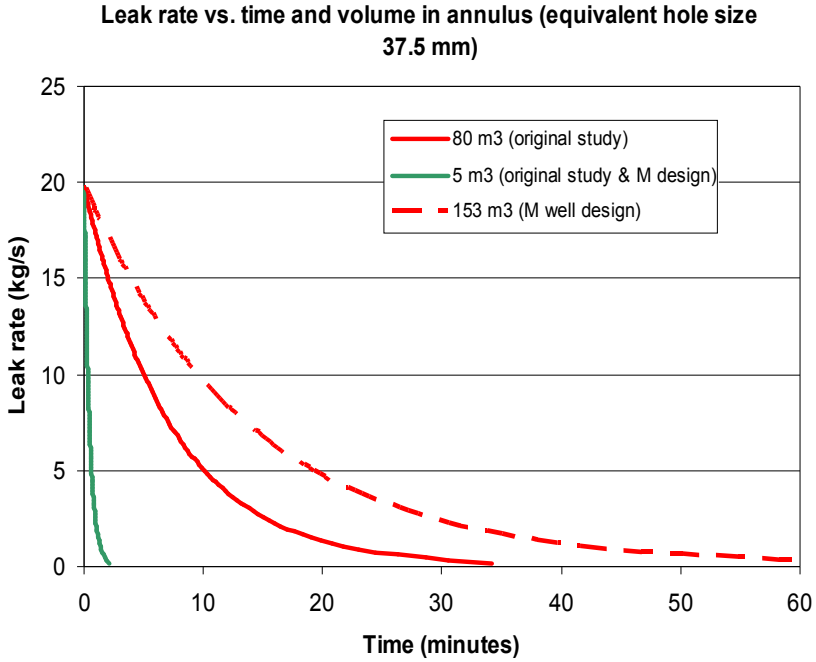
Tyrihans area field Sketch



Typical time dependant leak rates associated to typical failures, example from platform completed wells







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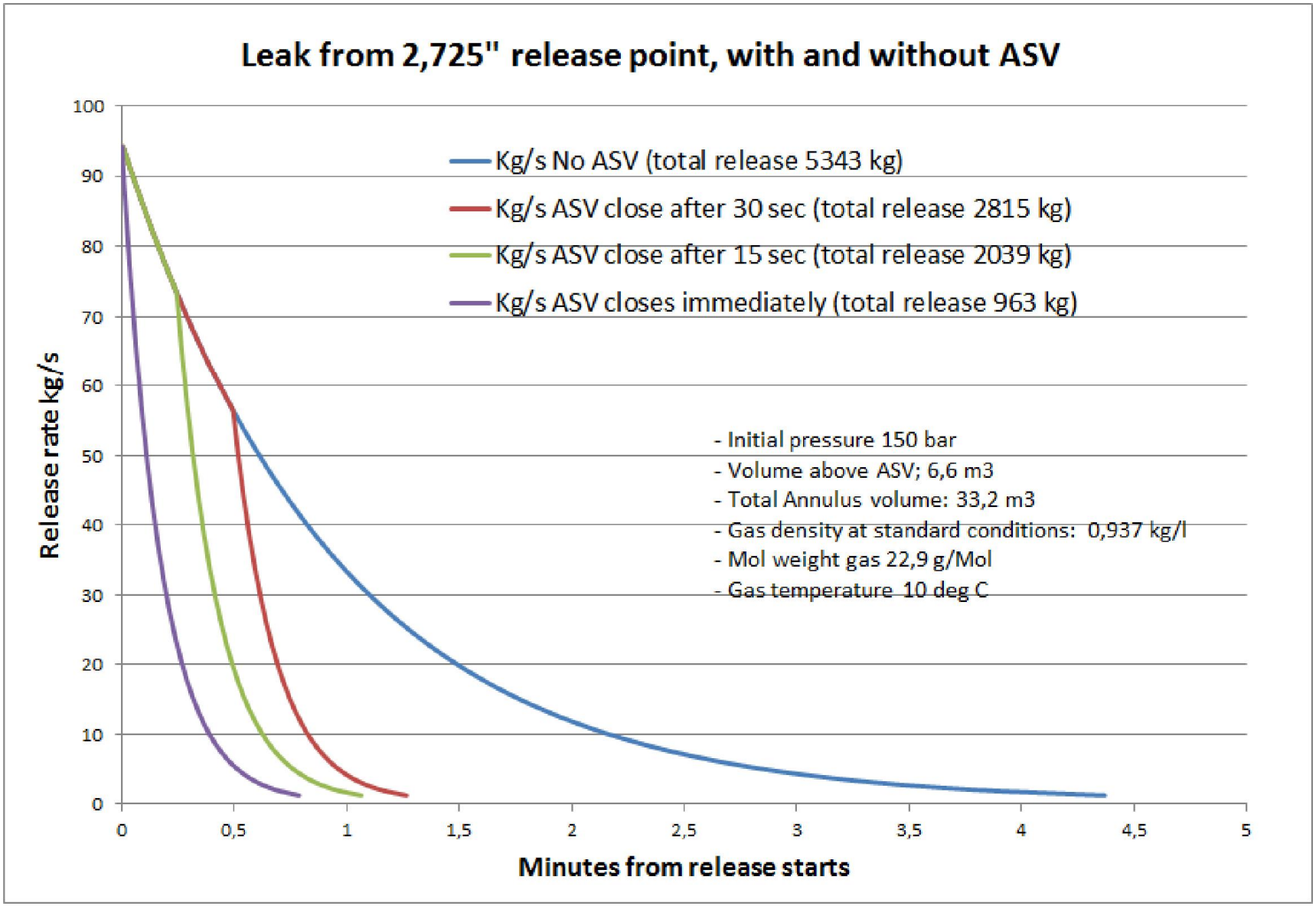
ASV closing time



Key elements in risk analyses

- Annulus volumes - above and below ASV
- Annulus pressures
- Annulus barriers wellhead, gas inlet side
- Annulus barriers wellhead, monitoring side
- ASV or not in the well
- ASV closing time
- Surface leak rates and associated probabilities
- Gas lift valve reliability (scale affected)
- No. of GLVs
- Water depth for subsea completions
- ASV related workover risk
- DHSV below GLVs or not
- Blowout risk through annulus