

”SHARING TO BE BETTER”

”SHARING TO BE SAFER”

“Sharing to be better”

Under the direction of OLF, a joint industry task force of Operator and Drilling Contractor personnel has been formed to recommend ways to reduce the number and potential severity of well control events on the NCS.

One team recommendation was communicating actual well control incidents that have recently occurred on the NCS so lessons are shared and understood.

This is the sixth in a series of case histories. The incident highlights the importance of understanding the risk related to conducting work on old wells, work over and P&A; with respect to their original design. Further, it is important to ensure that well control preparedness and relevant drills are understood and practiced.

Please take some time at your next safety meeting to review this case history and discuss the questions raised at the end of the presentation.

It is hoped that sharing of incidents is helpful and any feedback is welcome.

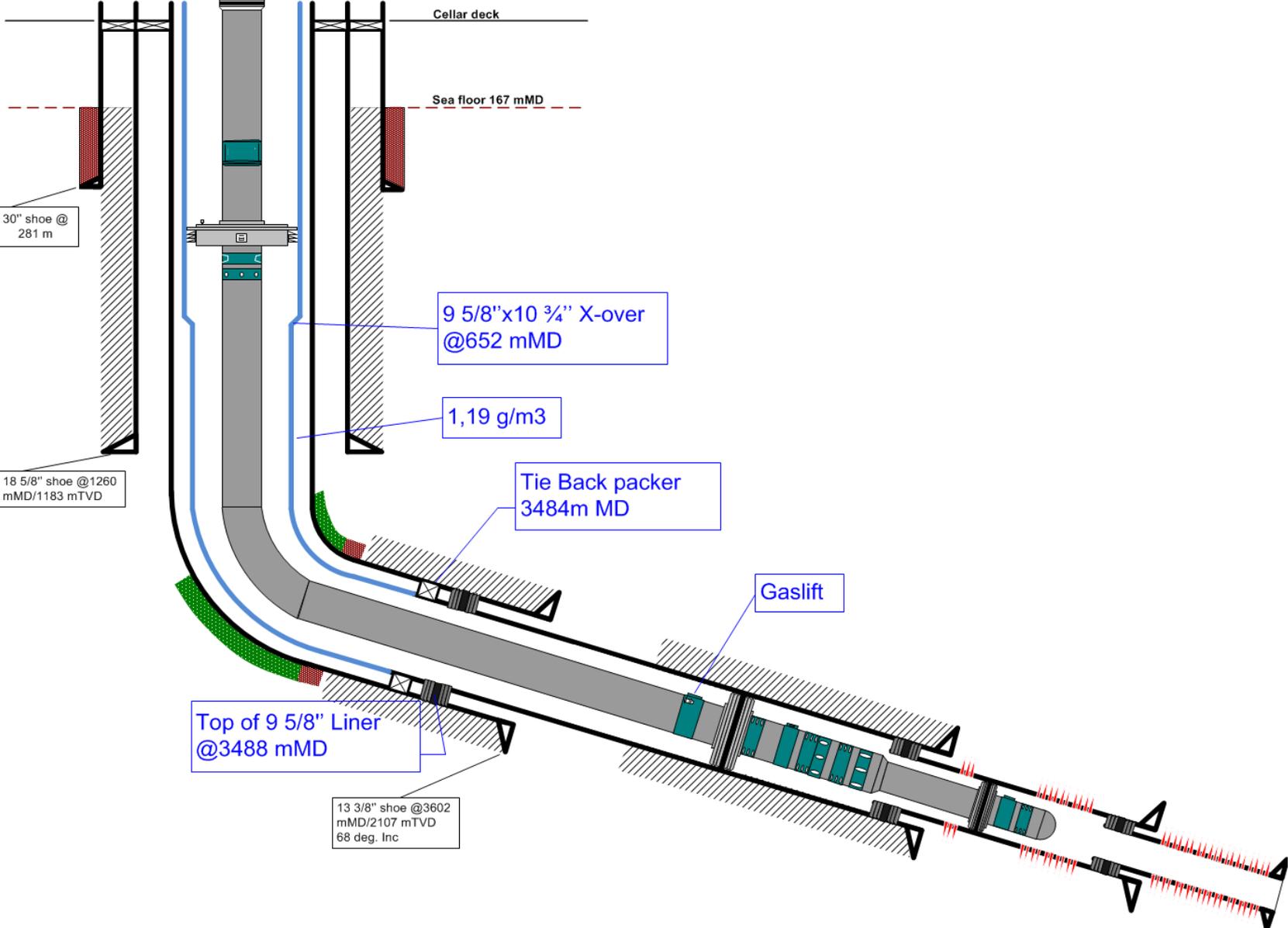
Offshore Platform Well Control Incident

After Action Review Summary

Incident Summary

During pulling of old 9 5/8 x 10 3/4 " tie-back string from a oil producer with gas lift a well control incident occurred involving release of gas to rig floor and mustering of personnel.

Well in production



Sequence of operations

Hand over of well from operations to drilling:

Pressure on B-annulus approximately 40 bar.

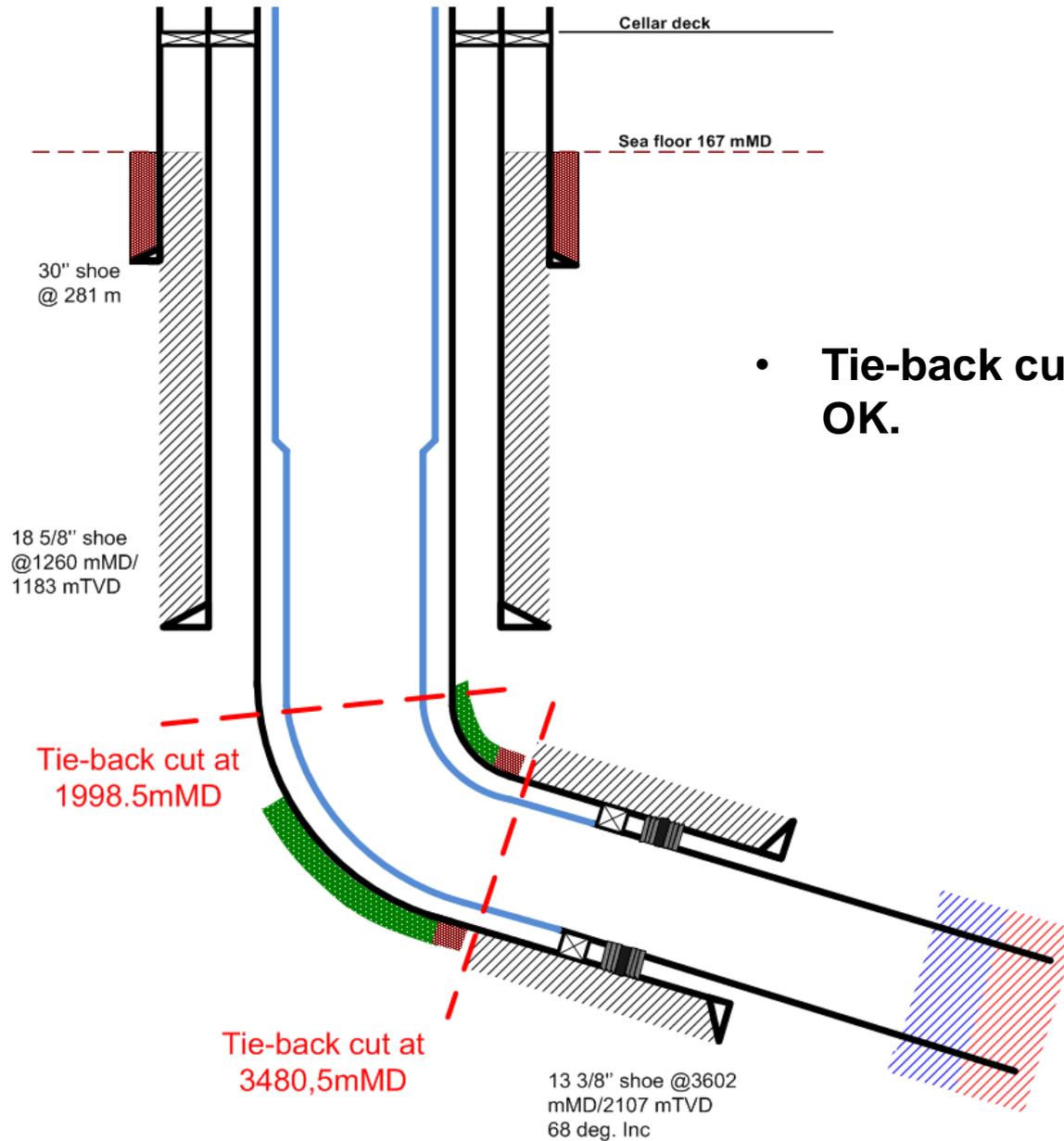
Worked a few days to bleed off gas from B-annulus.

Filled up B-annulus with base oil.

Rigged up BOP.

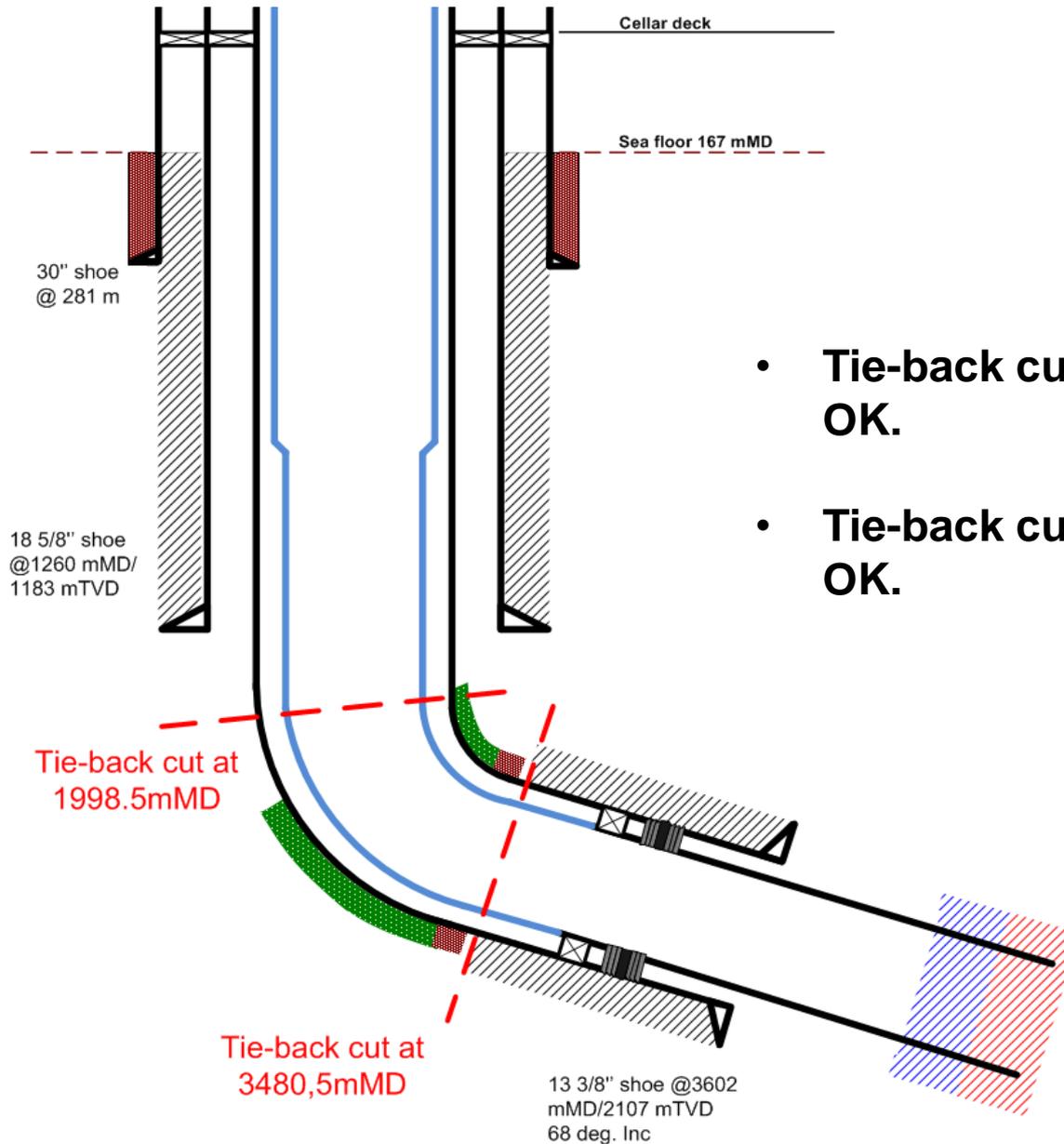
Pulled completion and established cement barriers against reservoir.

Cutting tie-back



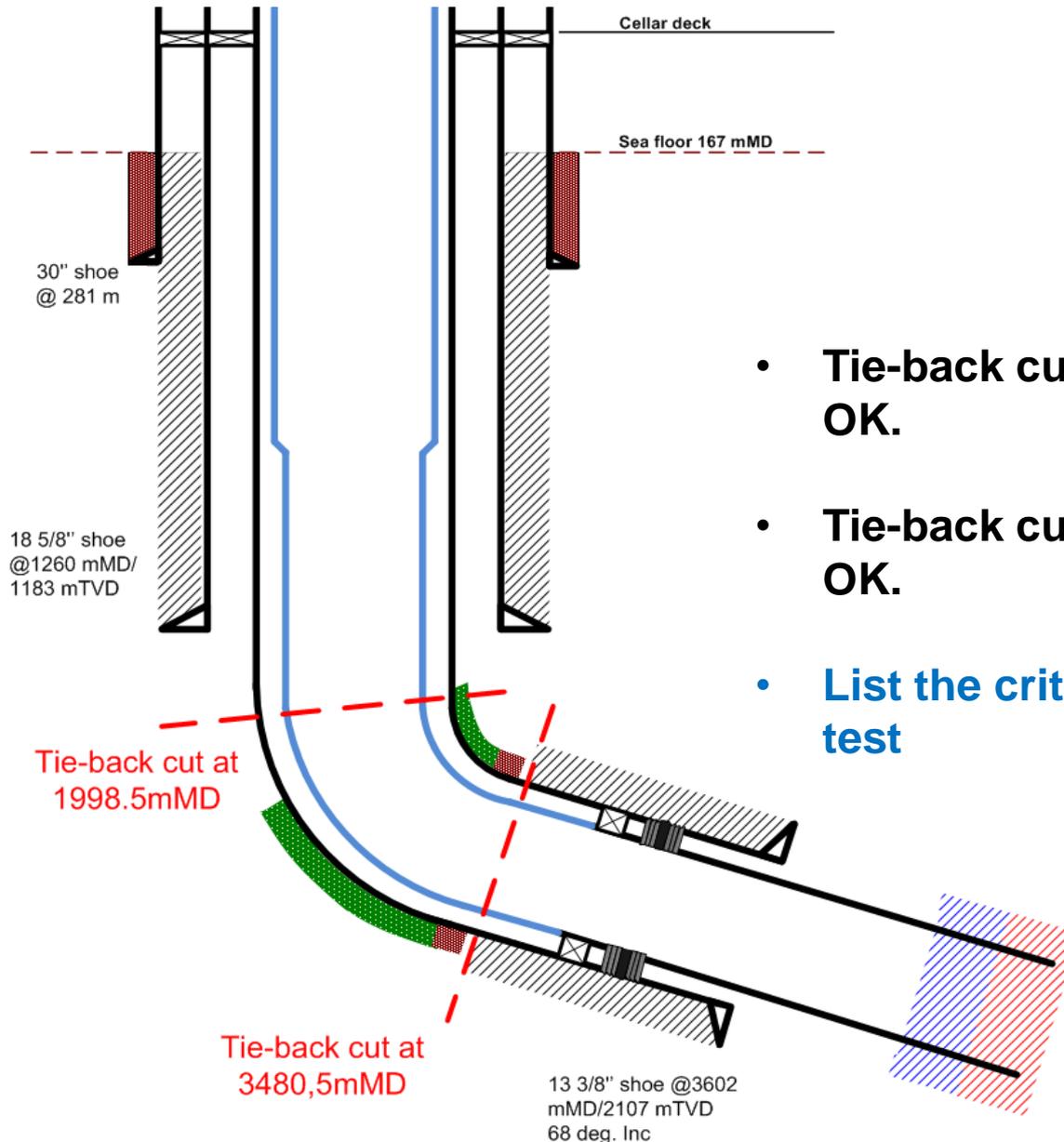
- **Tie-back cut @ 3480,5m – Inflow test OK.**

Cutting tie-back



- **Tie-back cut @ 3480,5m – Inflow test OK.**
- **Tie-back cut @ 1998,0m – Inflow test OK.**

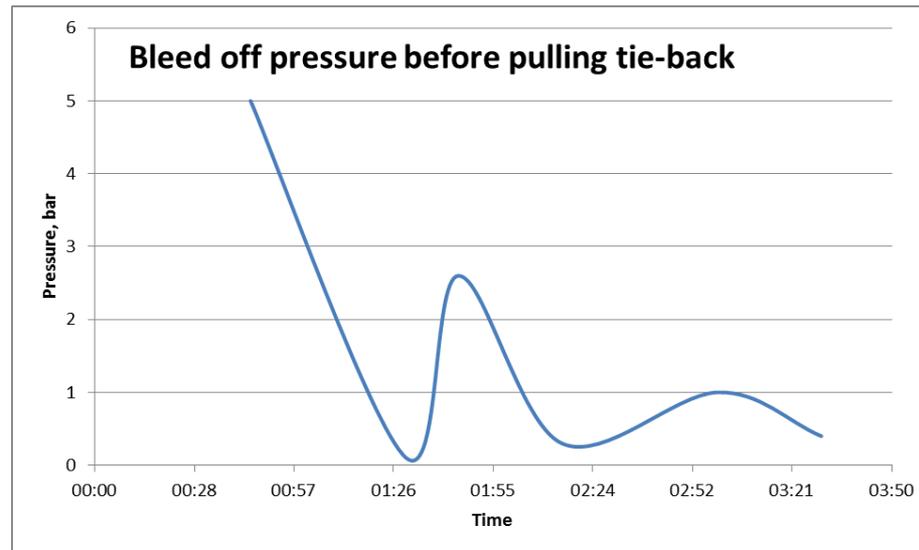
Cutting tie-back



- Tie-back cut @ 3480,5m – Inflow test OK.
- Tie-back cut @ 1998,0m – Inflow test OK.
- List the critical issues with an inflow test

Preparation to pull tie-back

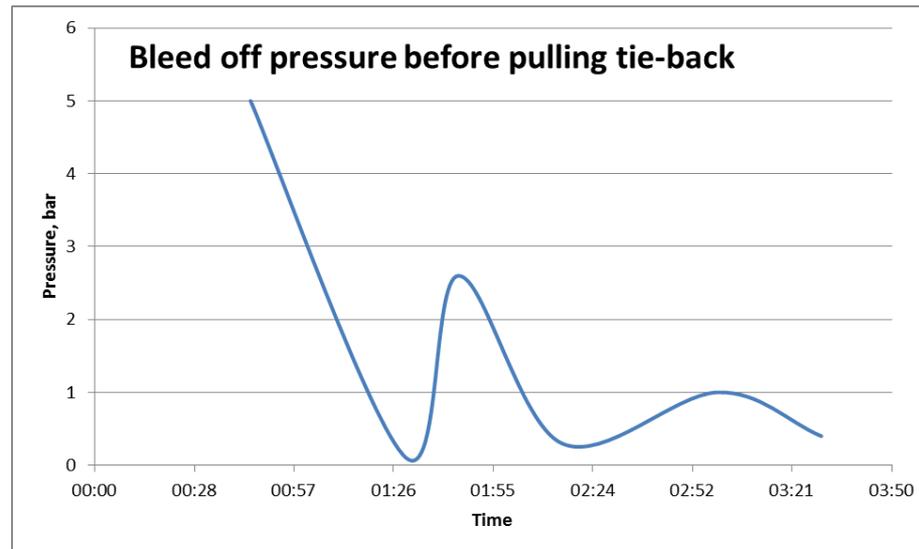
- **Prior to pulling tie-back, 5 bar was observed on B-annulus.**
- **Bled off pressure to 0 bar in steps as on graph.**
- **Flow checked well for 10 minutes – OK.**



Preparation to pull tie-back

- Prior to pulling tie-back, 5 bar was observed on B-annulus.
- Bled off pressure to 0 bar in steps as on graph.
- Flow checked well for 10 minutes – OK.

Is a 10 mins flow check adequate in this situation?



Pulling tie-back

Next operation: Going down with spear to pull tie-back.

			
PACK OFF TOOL FOR 10 3/4" CSG	▼		6,500	2,250	1,55	1,55	Rubber cup
SPEAR	▼		8,250	2,750	1,32	2,87	8" spear
STOP SUB	▼	SUB	8,000	3,500	0,94	3,81	
BUMPER SUB	▼	SUB	8,000	2,250	2,16	5,97	Slick

What precautions would you do before pulling tie-back?

How would you be lined up to handle an influx?

Pulling tie-back

Next operation: Going down with spear to pull tie-back.

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What precautions would you do before pulling tie-back?

How would you be lined up to handle an influx?

Pulling with up to 346 tons without succeeding.

Switching to stronger pipe.

Pulling tie-back

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What precautions would you do before pulling tie-back?

How would you be lined up to handle an influx?

Pulling with up to 346 tons without succeeding.

Switching to stronger pipe.

What else should be considered at this point?

Pulling tie-back continue

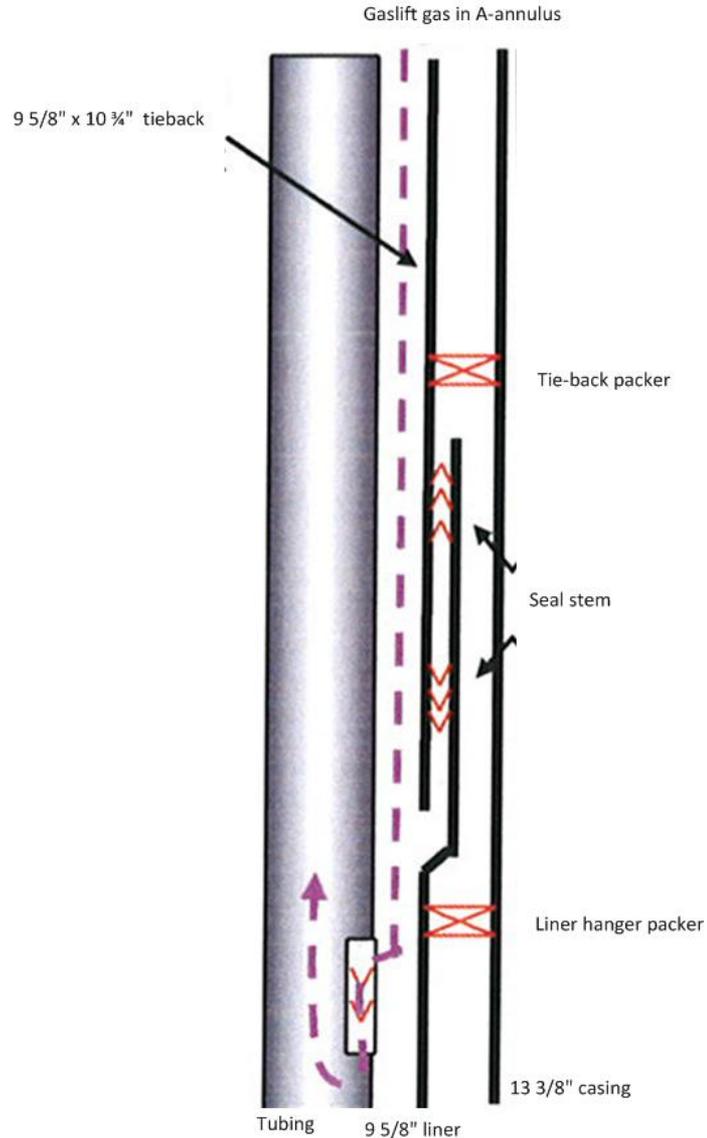
- Pulled up in steps to 392 ton.
- The tie-back came free with 392 tons. The weight dropped to 160 tons.
- **Gas alarm**, after the tie-back was free.
- Approximately 2 m³ of mud and gas came out over the bell nipple top and out on the trip tank deck before the well was shut in.
- Piping to trip tank was not able to take the flow from the gas kick. The trip tank had approximately 2,5 m³ gain Total gained approximately 4,5 m³.
- Closed BOP annular and observed the pressure.
- The pressure increased on the drill pipe side to 21 bar, and on the casing side to 19 bar.
- Due to alarm all personnel were sent to life boats.

Discuss

- **What happened?**

- **What happened?**
- **Could something have been done differently?**

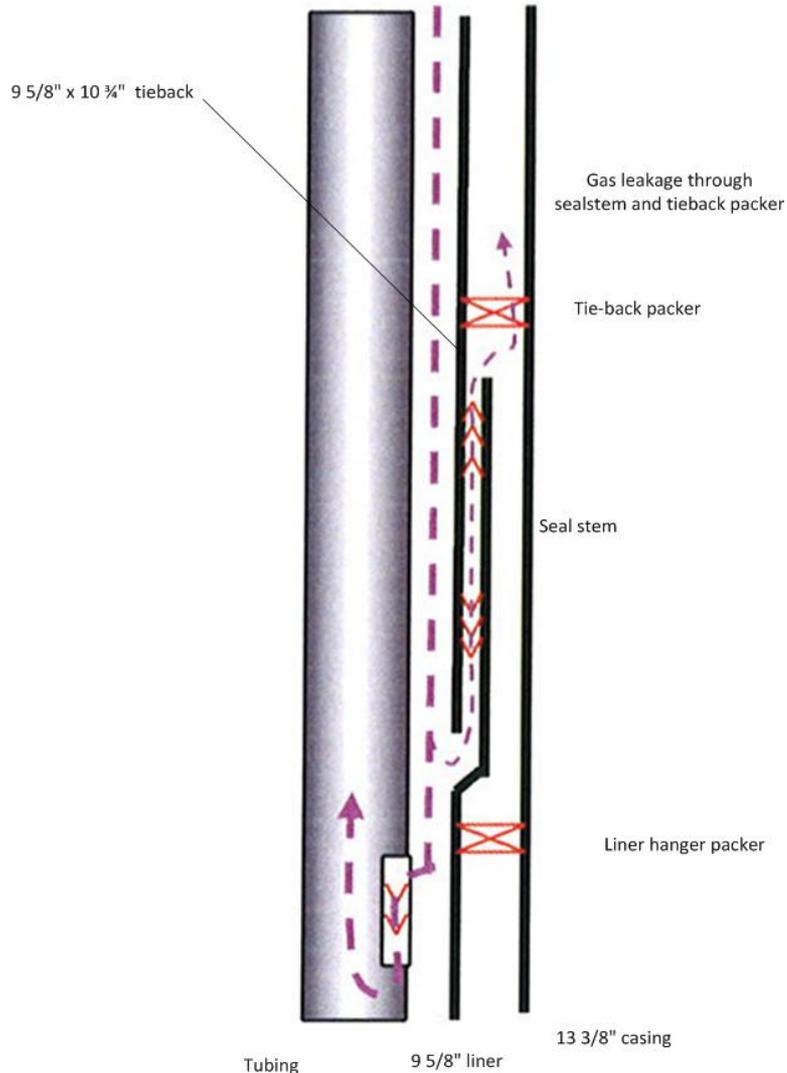
Root cause



- **Small volume between seal stem and tie-back packer.**
- **Difficult to know what's being tested under installation.**
- **Tie-back packer can fail without noticing under installation**

Root cause continue

Gaslift gas in A-annulus



- **Gas leakage through seal stem and packer**
- **When gas is entering in annulus B this will make the mud unstable and the precipitation of barite may start.**
- **This barite will end in dunes around pipe and couplings.**
- **This could be a collection point for gas which will be released when the casing is pulled.**

Points to consider

- **Could this situation been handled differently?**

Points to consider

- **Could this situation been handled differently?**
- **Who could have prevented this situation from developing into a well control incident? How?**

Learnings/ Recommendations

- **The gas combined with the precipitation of barite should have been better defined.**
- **Close annular while stripping casing/tie-back**
- **Consider use of casing ram**
- **Consider to cut tie-back at 100-200m first and pull out the upper part so that there is an interval with drill pipe in the well while pulling rest of casing (same risk will be there for the first part)**
- **Understanding risk of initial well design**
- **Construction phase; Consider to run tie-back in brine instead of mud.**

Be aware that gas can be trapped in pockets in settled mud when pulling old casing.

What type of well control drill did you perform with your crew last time you performed a work over operation?

Link to “Share to be better”:

- <http://www.olf.no/en/Activities/HSE-and-operation/Major-accident-risk/Well-control-incidents1/>