Depressurization and degassing of pressure core samples in storage chambers (UT GoM² 2017)

Summary

This protocol is for the depressurization/degassing (DD) of samples contained in storage chambers for accurate gas hydrate quantification.

Preparation

Check the storage chamber (SC) is secure in the degassing location and is correctly labelled.

Use the log sheet to record the sample (hole-core-section), SC #, manifold color, date, ambient P.

120 cm Storage Chamber (SC) used for degassing.

Bleed system and connect SC to manifold

Ensure valves to the sample SC and gas chamber (GC) are closed. Open all other manifold valves and turn on the water pump. Using this water pressure, bleed the system through into the bubbling chamber (BC) until water runs clear and no gas is evident. Close Bubble Chamber Ball Valve (BCBV).

Check that the Gas Chamber is empty (open bottom and top valves to release pressure or water).

Bleed and connect sample hose from manifold to top of SC.

Pressurize system and open SC to manifold

Log event for manifold being used ("start sample ID-SC#") and set up display.

Close all valves except bypass (needle) valve, HP pump, and SC valve.

Read SC gauge. Turn on water pump and pressurize system to the same pressure as SC.

Check that pressure on the Keller transducer is the same as being read by the manual gauges on the manifold and the HP pump.

Ensure pressure is stable (pump should stop) and open the valve on the SC.

Increase or decrease the pressure to the agreed start pressure. To decrease, close bypass valve and HP valve. Crack metering valve and then bubble chamber valve.

Isolate the manifold from the HP line (close HP valve)

Bleed the bubble chamber of air (use a syringe to remove the last bit) and ensure that the water level is at the upper overflow level. Make sure the cylinder is free to move.

pressure transducer display screen

THE SYSTEM IS NOW READY FOR DEPRESSURIZATION/DEGASSING

Begin depressurization (above hydrate stability)

Note the start pressure and time.

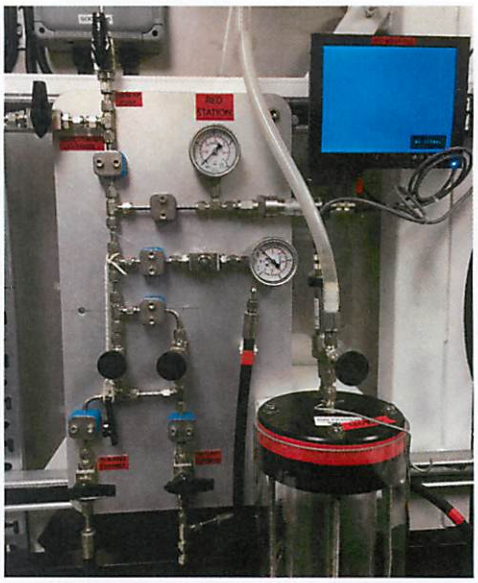
Open the BCBV and slowly open the metering valve until the pressure begins to drop. Keep a hand on the BCBV.

When water flows through the metering valve it makes a 'hissing' sound.

Observe the water rising in the bubble chamber and close the BCBV when the pressure has dropped to the next sampling point or more than 100 ml of liquid has been expelled.

Note the end pressure. Remove liquid in syringe, record the amount of liquid expelled and repeat the process after filling in the log sheet.

Continue as above until gas starts to be expelled.



pressure control manifold

Continue depressurization (around gas hydrate stability) in bubble chamber

Record the time and start pressure on log sheet.

Open the BCBV and then slowly open the metering valve until the pressure begins to drop and/or gas is released.

Close the BCBV before gas escapes from the bottom of the measuring cylinder or water flows over the top!!

Record final pressure.

Measure gas volume & record. Sample as per plan.

Release gas through exhaust manifold and use syringe to remove last gas from bubble chamber.

Measure liquid volume and record.

Monitor pressure rebound and start next stage as per plan.

If there is a lot of gas estimated to be in the system (>30 l) then the gas chamber can be used (see below).

bubble chambers

Depressurization in gas chamber (large gas vols only)

Ensure that the gas chamber top and bottom valves are closed and the pressure reads 1 bar.

Record start manifold pressure, chamber pressure, time.

Open the Gas Chamber Ball Valve GCBV and then slowly open the metering valve until the pressure begins to drop and/or gas is released into chamber.

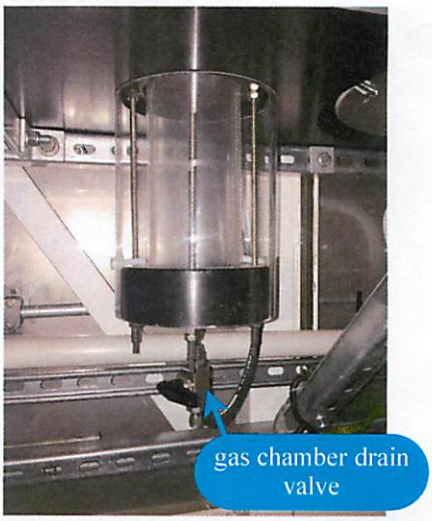
Allow gas and liquid to fill chamber. Standard pressure increments in the gas chamber are 2 to 5 bar.
DO NOT EXCEED 5 bar.

Close the GCBV and record the end manifold pressure, end chamber pressure, and ambient temperature.

Drain the liquid from the gas chamber; measure and record the volume.

Release the remaining gas in the chamber through the exhaust manifold using the needle valve on top of the GC. Copper tube samples can be taken in line.

Alternate gas chamber and bubble chamber. Note that a full gas chamber at 5 bar is ~ 16 litres gas compared with 2 litres in the bubble chamber.



Finishing degassing

At ~3 bar, use bubble chamber only.

Open bypass valve as well as metering valve. Metering valve does not allow flow at very low pressure. Use BCBV to control flow.

When all the gas has apparently been expelled, leave the system open for 1 hr to collect any remaining gas.

End process

After the final reading is recorded, close all valves and disconnect the sample SC from the manifold.

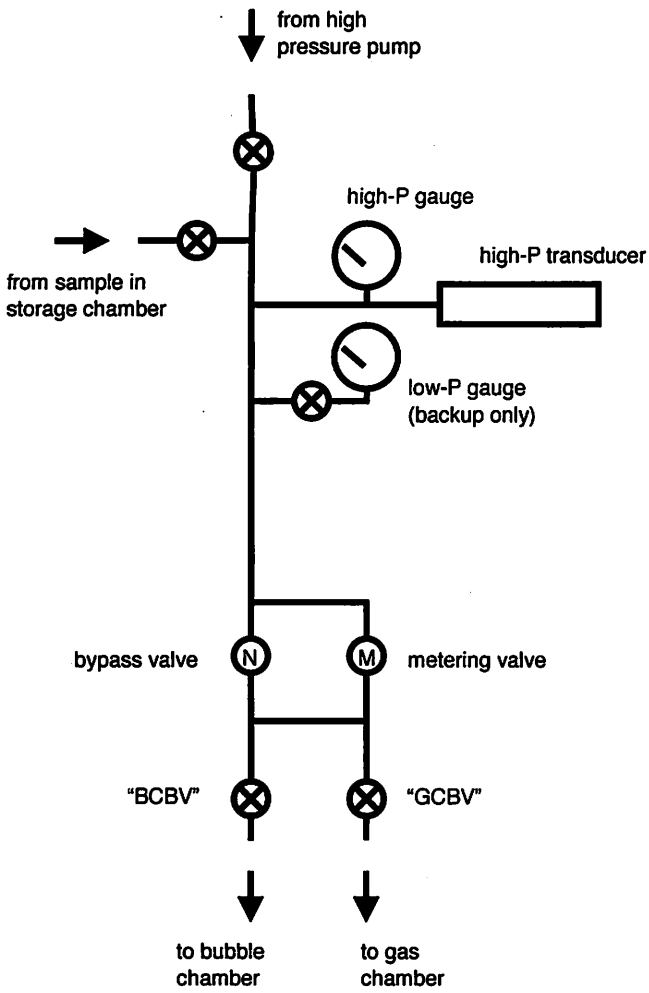
Stop the automatic pressure transducer data recording.

Cap the ports to prevent leakage.

Carefully remove sample from storage chamber, curate sample, and clean chamber.

Flush all lines in manifold ready for next sample.

Manifold diagram



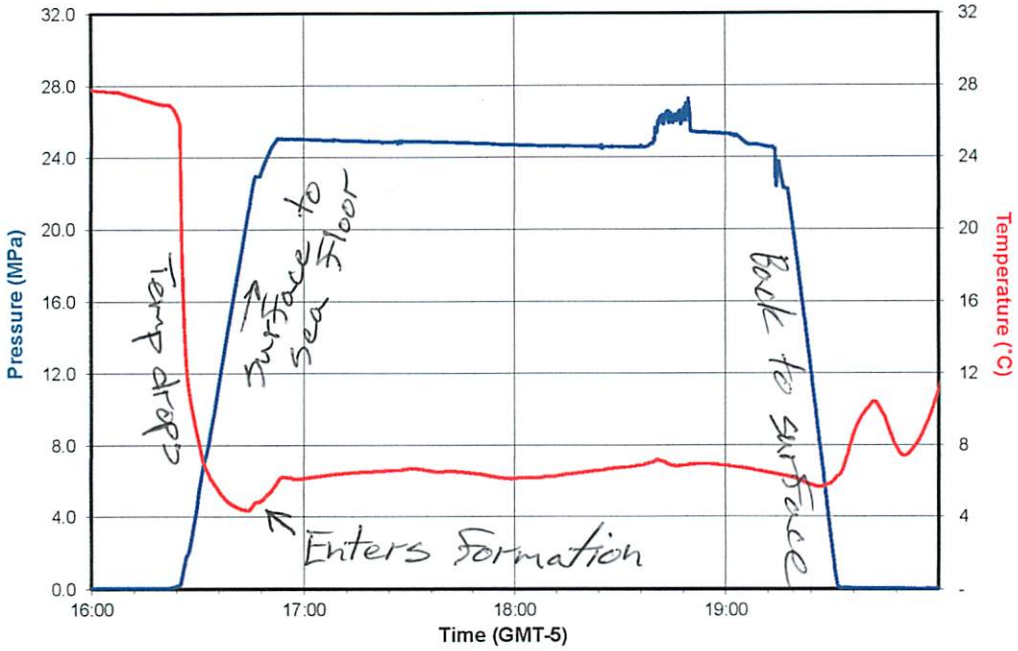
ROP - Rate of Penetration
- want low RPM so you don't disturb core
- Formation & Weight on bit, Pump rate dependent

RPM - dependent on formation type

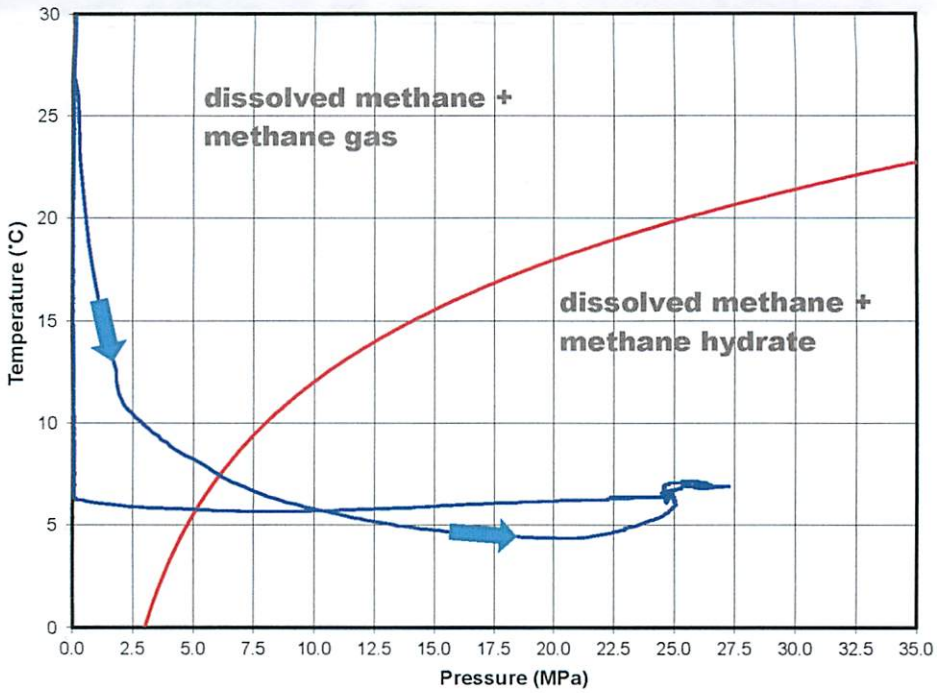
Torque - Force you see a bit is trying cut - amperage on motor top drive
As torque goes up, RPM goes down

- Standpipe Presswre - mud manifold pressure up standpipe to Kelly hose Feeding Top Drive
- Flow - how much fluid going into drill string, coring needs low flow rate
- L

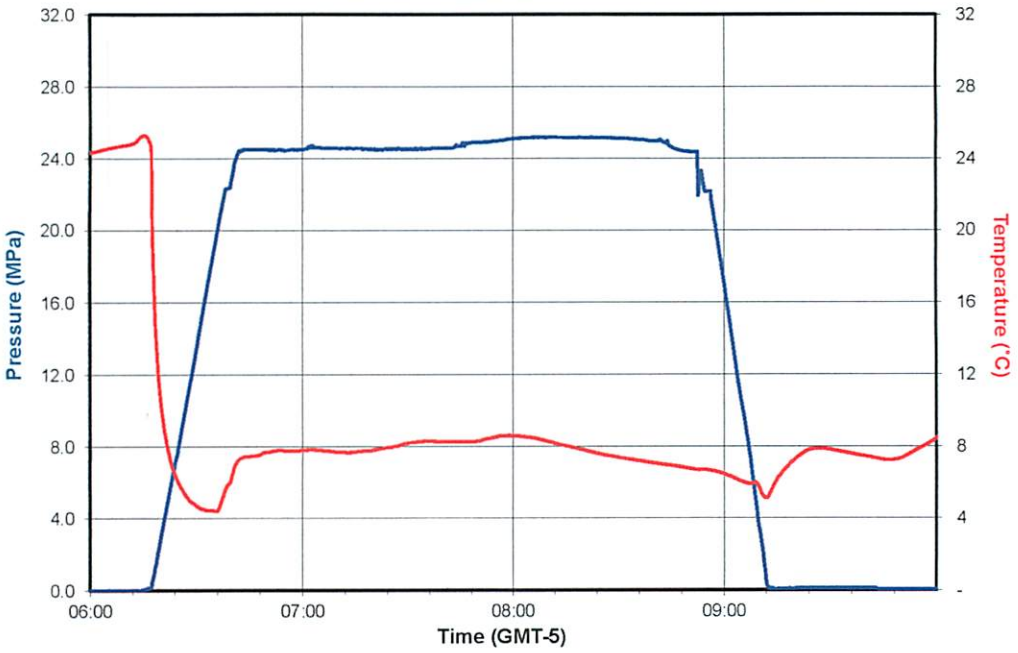
UT-GOM2-1-H002-2CS Rabbit PT record 12 May 2017



UT-GOM2-1-H002-2CS Rabbit P vs T



UT-GOM2-1-H002-1CS Rabbit PT record 12 May 2017



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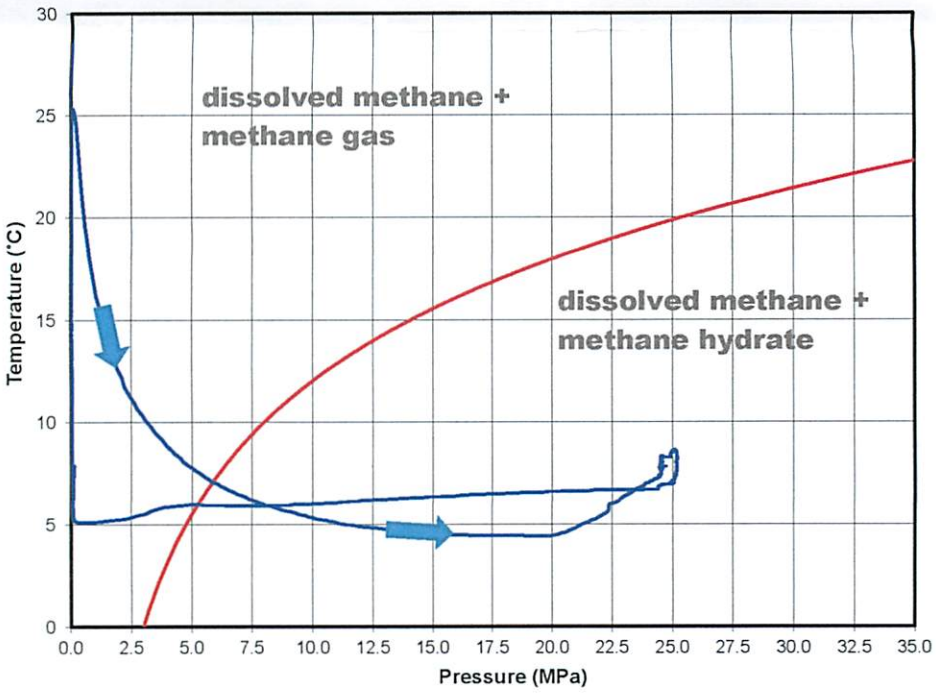

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✓Find ¼ NPT Female to 6mm Swagelok tube

-Need 6mm Swagelok nuts & Ferrules

✓Get hydrostatic pump ready to ship back to UT after cruise

Now on hydrostatic pump

~~Fly gauge back w/ me~~

-✓Send address & ship date to Jac for Intermoor items

-✓Send Niko shipping address for office & when to ship

-✓Order hydrated lime mortar & review Geotek training plan.

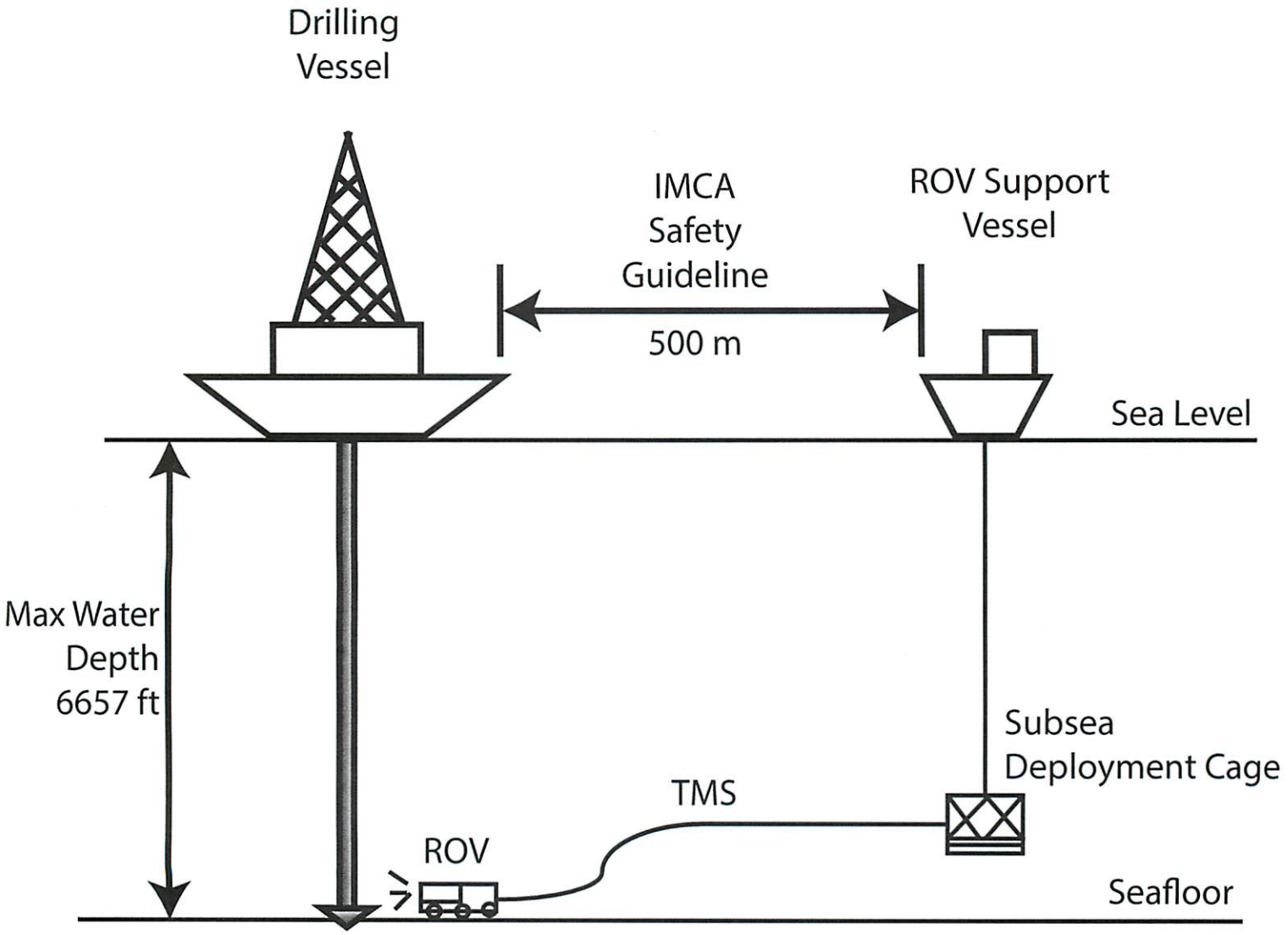
Syringe ~~5:30~~

Next, Degassing ~~9:30~~, ~~10:30~~, Syrine

~~Copper tube~~ ~~11:00~~

Take Copper tube on last run

Hole cleaning worked 3FB Pressurized, 9:57



To Josh

Keep on Smiling