

**From:** Chris Dykes

**Sent:** 27 October 2017 15:03

Robin,

Many thanks for inviting us to comment on CSL's request to revoke Rough undertakings. We comment as follows:-

You are probably aware that as CSL's independent well examiner, Chris Dykes International Limited (CDIL), have been involved with the well examination of CSL's gas storage well inventory since we were appointed in February 2015.

Following our initial Well Examination Annual Well Integrity Review conducted at CSL's Hedon offices on 11<sup>th</sup> – 12<sup>th</sup> February 2015 we highlighted the following major concern:-

*The well examiner noted that the operational values for A Annulus MAASP in the Centrica Storage Ltd Rough Field Maximum Allowable Annulus Shut in Pressure (MAASP) Review dated 12/8/2014 were significantly lower (quoted as ranging from 450psi – 3000psi) than the Maximum Closed in Well Head Pressure (CIWHP) achieved with the offshore gas compressors (3450psi).*

*If there were to be a catastrophic failure of the tubing below the SSSV in one of these wells the A annulus would be rapidly exposed to a pressure in excess of the MAASP. **This poses the risk of overpressure of the production casing, subsequent failure and potential loss of the well and platform.***

*Established industry practice is to equip wells with production casing that can contain well bore fluids in the event of completion failure. This provides two mechanical containment barriers in the well in the event of tubing failure.*

*This is generally not an issue with conventional wells where CIWHP declines (in line with reservoir pressure) over the life of the well as do corresponding MAASP values. However in the case of Rough Gas Storage wells the CIWHP does not decline as it is a factor of reservoir NRVs and the operational limits of the offshore compressor and injection pipework so production casing pressure derating becomes more of an issue.*

***The well examiner would recommend that a risk review is undertaken to demonstrate that this current mode of operation is indeed ALARP and if so what constraints on future operability may need to be imposed by following subsequent production casing integrity derating.***

As a result of our review and intervention CSL decided to limit the maximum operating pressure from 3500psi to 3000psi while it conducted physical tests to establish whether it could safely operate wells at the higher pressure. This subsequent extensive test programme identified several well integrity failures which highlighted that CSL could not safely return the wells to injection and storage operations.

We concurred with this decision and agreed that the only viable option for reducing the risk associated with further well operations to an acceptable level (as low as reasonably practicable – ALARP) is to cease further gas injection operations and move towards timely full well abandonment.

CDIL would expect to be fully involved in:-

- 1) the decision process throughout any proposed production and abandonment operations until full abandonment in accordance with the requirements of The Offshore Installations (Offshore Safety Directive) (Safety Case etc) Regulations 2015 - SCR 2015 SI 398.

- 2) continuing to monitor CSL's management of each of their well's integrity and their arrangements to demonstrate that all their remaining well operations are planned and undertaken to reduce risks to personnel and the environment to ALARP.

We would also expect that any future strategic UK strategic gas storage facility wells would involve similar involvement of independent well examination throughout their full life cycle from initial design through to final abandonment.

If you wish to discuss anything further please contact the undersigned as below.

Thanks and regards

Chris Dykes  
Technical Director  
Web Page:[www.cdint.co.uk](http://www.cdint.co.uk)