

Unloading Completion Fluids Via a Well Test Package at 14 bbl/min

ASIA PACIFIC

CHALLENGE

- » Unload completion fluid from the wellbore at 10 bbl/m (14,400 bbl/d) or higher.

SOLUTIONS

- » Design and engineer a system utilizing conventional and readily available equipment.
- » Modify, certify and mobilize equipment in a timely manner
- » Install equipment offshore around the existing well test package

RESULTS

- » Performance of the system exceeded all expectations
- » Maintained increased unload rate throughout second season wells
- » Saved approximately 100 minutes of rig time for each well

OVERVIEW

Following a successful first season of wells on Prelude using a conventional unload and clean up approach, Shell Australia recognized that an increase in the completion fluid unload rate could improve the mobility of completion fluids, perforating debris, and other solids along the horizontal hole sections ultimately improving the performance of the wells once producing to the FLNG vessel.

CHALLENGES

Shell Australia desired an engineered solution to increase completion fluid unload rate without introducing any significant additional costs. The parameters for the design included:

- » Minimum Unload Rate of 10 bbl/min (14,400 bbl/day)
- » Conform with all local, industry, operator, and service provider standards and regulations
- » Approved by independent authority
- » Utilise existing well test package onboard (designed for 4 bbl/min liquid flow rate)
- » Fit in existing well test area
- » Provide recovery method for completion fluids to tanks where possible for reuse on subsequent wells
- » Maintain burner configuration for optimised burn of condensate rates between 2 and 4 bbl/min

SOLUTIONS

Halliburton engineered a bespoke solution, utilising a hydraulic choke, modified knock out pot and high pressure manifold. The unload system was tied back into the well test liquid handling system, so that existing pumping and storage equipment could be used. The utilisation of equipment in this manner is unconventional, and a detailed engineering study was performed by Halliburton to verify its suitability. A robust safety system was developed and installed to protect the low pressure equipment against numerous hazards, most notably early gas production.



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HAZOP and HAZID studies were then performed on the system by Shell Australia and Halliburton and the system was approved by the independent validator with support from both companies.

RESULTS

The performance of the system exceeded all expectations, and a steady 14 bbl/m (20,160 bbl/d) unload rate throughout the four wells in the second season was achieved, with peaks of 16 bbl/m (23,040 bbl/d). Improved solids mobility was evident during the clean ups, as the produced quantity of debris was noticeably increased compared to the first season wells. A marked improvement in completion fluid recovery and retention was also achieved.

The benefit of this high rate unload was that gas-to-surface was achieved extremely quickly, saving around 100 minutes of rig time each well. The long term advantage of this engineered solution was that the well was cleaned as effectively as possible and was left in a state which allows optimum well productivity.

