Inflatable Bridge Plug Conveyed from a Capillary Tube Unit Enables Rigless Workover Operations in Western Australia

Challenge:
A leading operator required a safety barrier solution to enable workover operations in a water disposal well located in Western Australia. The application objective was to temporarily plug the well to enable safe inspection of a well head and tubing hanger as part of preparations required to commence a plug and abandonment (P&A) campaign. The challenges and requirements associated with the job were as follows:

- Rigless deployment
- Capillary tube conveyance with reduced tensile limitations
- Effective sealing/anchoring in 6.1” ID fiberglass-lined casing with low friction coefficient
- Mature well characteristics represented unknown borehole geometry
- Retrievability and equalization with a workover rig
- Full scale product qualification testing at the required expansion in fiber glass

Solution:
IPI supplied a 5-1/2” OD Retrievable Inflatable Bridge Plug (RIBP) mounted on a 3-1/2” OD tool chassis. The RIBP was conveyed to the required setting depth from a capillary tubing unit configured with a ¼” OD coiled tubing reel. This enabled rigless deployment of the RIBP utilizing a crane for rig up. Prior to job execution, product qualification testing activities included:

- Clamp validation testing at tension levels exceeding the capillary tube yield point
- Function test of the RIBP’s release disconnect, equalization, and retrieval mechanisms
- Anchoring tests inside fiberglass lined pipe against the maximum expected differential pressure throughout the job.

The RIBP’s inflation mechanism utilizes the same type of valve featured in IPI’s Inflatable Casing Packer product line. It features a check valve and a shut-in mechanism providing primary and backup sealing to effectively lock in inflation pressure within the bridge plug element to ensure that the RIBP would remain set in place throughout the duration of workover activities.

Results/Created Value:
The RIBP was successfully set and pressure tested inside the fiberglass lined casing. It sealed the well pressure during wellhead removal, allowing the operator to safely carry out inspection and measurement activities. After approximately five months, a workover rig was brought in and the RIBP was retrieved on joined tubing by latching onto its fishing neck and applying overpull. The bridge plug element retracted to its original run-in-hole diameter allowing trouble-free retrieval. The job was successfully executed in a safe and timely manner without any operational issues.

Rigless RIBP conveyance enabled the wellhead inspection to be carried out within the sufficient time frame to allow the operator to organize mobilization of all necessary equipment to location prior to the arrival of the workover rig. This benefit generated substantial savings in operational time as it mitigated nonproductive rig time that would have been otherwise spent waiting on last minute equipment call outs.