

Case Study: VR Big Bore Lubricator

Petroleum Technology Company successfully removed stuck valves from the VR profiles using high torque with the new VR Big Bore Lubricator. The BB Lubricator was developed to avoid a time consuming and costly intervention. The estimated savings are over £1 million.

Challenge

A North Sea operating company had five wells with 4" Injection Non Return Valves (INRV) within the VR profile with 4" 10 UNS Threads. The valves installed were no longer reliably holding the pressure and had to be replaced with new surface annulus safety valves.

The standard PTC VR Lubricator has a torque capability of 1500Nm (1106 lbf.ft.). The challenge for PTC was to design a VR Lubricator with enhanced torque capabilities to break out the stuck INRV's.

Solution

PTC Big Bore VR Lubricator (BB Lubricator) was developed with the capability of providing torque up to 3750NM (2765 lbf.ft.). The BB Lubricator has a stroke length of 962mm, with an operating length of 723mm. Low torque can be applied from back of the lubricator using a standard ratchet wrench. For torque requirements above 1000Nm (737 lbf.ft.) a hydraulic torque wrench is required.

Result

The BB Lubricator package was deployed with the plan to remove five INRVs over two weeks of operations (12-hour shifts). A single PTC field service engineer was able to safely operate the tool in the confined well bay. Once permits were in place the average operation time for the removal of each INRV's was half a shift (6 hours). The break out torque values were 3270Nm - 3633Nm.



Key Information

- Region: UK North Sea
- Well Type: Oil producer
- Well head type: Vetco

Case Benefits

Avoidance of cumbersome, risky and costly milling operations. The BB Lubricator was able to operate and complete the job in a confined well bay in an efficient, safe and controlled manner. Estimated savings over £1 million.

Key Capabilities

- Barrier qualified VR Lubricator
- High torque capability (up to 3750Nm/2766 lbs.ft.)
- Compact size with long reach capabilities
- Can be operated with live annuli

Typical Applications

- VR profile intervention operations
- Remove stuck plugs, check valves using high torque bracket

The alternative to the PTC intervention involved; setting a deep set plug, bleeding down all tubing and annulus pressure before milling the seized INRV's. The HSE, logistics and risks involved in the milling operation made it extremely cost prohibitive. The BB Lubricator based solution was efficient and cost effective, completing the work in 4 shifts.

Figure 1 shows the Torque Adapter, locked onto the Lubricator body; it provides a cradle and back-up function for the Torque Wrench.

Figure 2 shows the BB Lubricator during the site integration test at the PTC UK yard before initial deployment. The stack up length from the Gate Valve face to the back of the Lubricator was 1048.2mm (41.27"). For the deployment, the use of the spacer spool was required due to the length of the INRVs. Once the tool was fully retracted, the INRV was housed within the spacer allowing for the gate valve to be shut.

Figure 3 shows BB Lubricator during rig up without the Torque Adapter installed. The tool can be operated without the Torque Adapter/Wrench up to 1000Nm (737 lbf.ft). For example if the tool was being used to set a plug or valve the Torque Adapter/Wrench would not be needed.

Figure 4 shows the BB Lubricator installed within a confined environment where standard lubricators would struggle to operate. The Compact design of the BB Lubricator tool, Torque Adapter and Torque Wrench enables operations even in crowded environments.

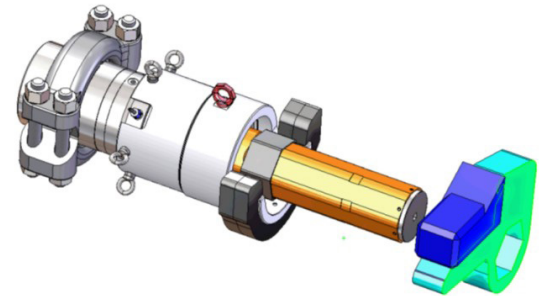


Figure 1| Torque adapter and wrench on lubricator body



Figure 2| BB Lubricator during SIT with torque adapter

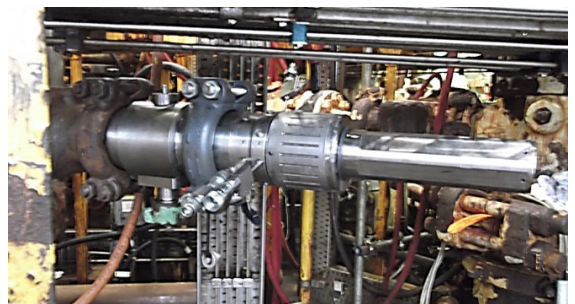


Figure 3| BB Lubricator without the torque adapter

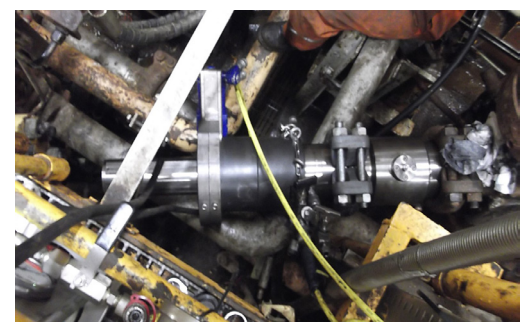


Figure 4| BB Lubricator during operation

