

Successful stuck plug remediation restores well to normal production

Customized milling and retrieval equipment allows operator to restore production in new well.

CHALLENGE

- Remove stuck plug from hanger of new oil well to return it to normal production

SOLUTION

- Used detailed drawings of tubing hanger bore and plug to engineer job-specific milling and retrieval tools
- Milled over the plug with gate-valve drilling unit to create access
- Installed retrieval sleeve equipped with J-slot tool to recover broken brass pin
- Milled through plug to captured plug inside mill with internal snap latch in retrieval sleeve

RESULT

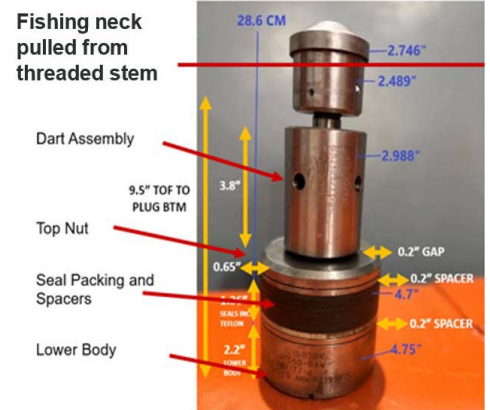
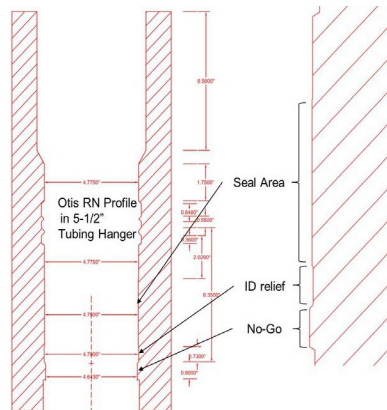
- Successful recovery of stuck plug and returned well to normal production

Overview

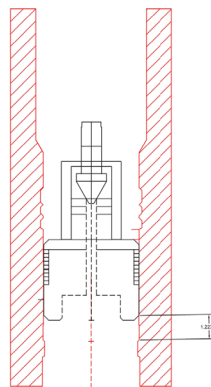
An onshore operator in the Middle East engaged Halliburton Boots & Coots® to perform a mill and retrieval operation for a plug stuck in the hanger of a new oil well. The objective was to restore the well to normal production.

Challenges

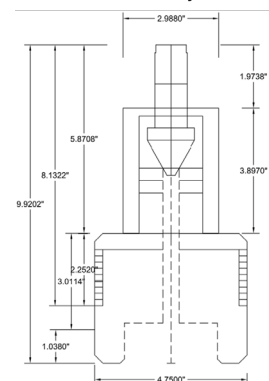
An attempt to jar the plug loose with coiled tubing (CT) with ±26k lbs was unsuccessful and resulted in parting the fishing neck. The mill operation faced several challenges: a sheared brass pin on top of the plug from previous retrieval efforts, a plug with no fishing neck for recovery, a seal stack that included metal rings with a potential to spin during the mill, and unknown pressure under the plug. In addition, there were concerns that the milled plug might drop below the tubing hanger into the production tubing.



Option 2



No-Go Plug Assembly



Solution

To address the issue of the broken 0.5 in. brass pin, the team created AutoCad® drawings of the tubing hanger bore and plug to design and manufacture job-specific mills and retrieval equipment. The custom equipment consisted of 120 mm extended annular cutters with an internal snap latch and a modified short catch overshot with a finger grab, retrieval sleeve, and J-slot tool.

To recover the broken 0.5 in. brass pin from the production tree, we implemented a detailed plan that incorporates specialized equipment. We began by using a 120 mm extended annular cutter to mill 3 inches deep over the stuck plug. Next, we deployed the extended retrieval tool to access the production tree and recover the broken brass pin. Using the extended annular cutter method, the Boots & Coots® 15 ksi Hydraulic BPV unit with a custom-designed overshot with finger grab and J-slot tool would be used to remove the top dart assembly and install the retrieval sleeve. This provided a predetermined fish neck. Finally, we installed an internal latch in the 120 mm extended annular cutter, which allowed us to mill the remaining 0.5 in. plug while the coupon would be captured inside the annular cutter.

Results

The stuck plug was successfully recovered. This allowed the well to be restored to normal production and the customer was pleased to resume operations.

Boots & Coots created a systematic plan for stuck plug remediation. At first, they recovered a piece of broken brass pin from the plug with a mechanical grab and milled 1 in but progress was halted due to spinning seals and high torque. The team then used a jetting tool to remove debris from the tubing hanger bore and recovered large pieces of seal and metal shavings. They then milled with a new 120 mm extended annular cutter for an additional $\frac{7}{8}$ in. (total of $1\frac{7}{8}$ in.). When the metal ring was encountered, spinning prevented further milling and the team used a



Original plug (right) and after milling and retrieval (left)

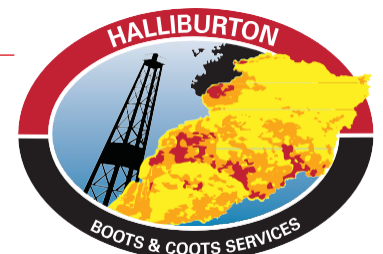
jetting tool to remove debris. They successfully milled through the lower metal ring and part of the plug body with a new 120 mm cutter. Despite the usage of a 15-ksi BPV lubricator with an overshot at 3,000 lbf force, the plug remained stuck, though measurements show it had moved. Finally, they backed off the dart assembly and recovered the assembly and seat. Once recovery was made, they used a dry rod and J-slot tool to install the retrieval sleeve and milled through the plug with an annual cutter. The team pulled the mill from the tree and confirmed successful recovery of the plug.

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