Drilling Disconnect
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Drilling Disconnect

- Introduction
- Description
- Operation
- Technical Specs
- Lab Test Results
- Field Test Plan
- Summary
Drilling Disconnect Introduction

- Provides effective drill string **release mechanism** to mitigate drilling issues.
- Can be used in **drilling or fishing** BHA for emergency release.
- Acts **passively** in the string until intentionally activated.
Drilling Disconnect Description

- Upper Sub, NC-50 Box (4-1/2 API IF)
- Funnel Housing, internal thread
- Threaded Dogs, 3 dogs total, retractable
- Ramp Mandrel, 3 ramps total, one on each dog
- Lower Mandrel, housing 3 dogs
- Lower Sub, NC-50 Pin (4-1/2 API IF)
Disconnect Operation

- Drop a ball
- **Compression** 45,000 lbf weight
- **Pressure** 1,200 psi
- Apply **Tension**
- **Confirm** Disconnect
  - Hook Load
  - Pressure Drop
Reconnect Operation

- **Lower** the upper half of the tool onto the lower half while circulating at very **low pump rate**
- **Create pressure** on the ball to reconnect
- **Extrude** the ball into the ball catcher below the tool
- **Screw** the upper half of the tool to the lower half
- **Pick up** to verify connection is made
- **Tighten the connection**

Following this sequence the Drilling Disconnect can be disconnected and reconnected downhole multiple times.
Screw-in to Reconnect

This is a contingency reconnect procedure if normal reconnect procedure fails, i.e., loss of pressure on the ball.

- Lower drill string while circulation at low pump rate until some weight loss
- Start right hand rotation slowly until torque builds up
- Pick up drill string to confirm reconnect
Drilling Disconnect Technical Data

- 6.50” OD
- 2.60” Upper Section ID, and 1.50” Lower Section ID
- NC50 (4-1/2 API IF) Box and Pin Connection
- Tool length 8.45’
- Designed to meet or exceed mechanical strength requirements of 4-1/2” 16.6# S-135 drill pipe.
- 595 kip Tensile Rating
- 38,000 ft-lbf Torsion Yield
- 5,000 psi Internal Pressure Rating
- 350 F
## Drilling Disconnect Lab Test Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
<th>Criteria of Success</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Test under Max Torque</td>
<td>Manually Activate under 38,000 ft-lbf Make-Up in Grease</td>
<td>Full disconnect</td>
<td>✓</td>
</tr>
<tr>
<td>Functional Test under Make-Up Torque</td>
<td>Manually Activate under 22,500 ft-lbf Make-Up in Mud</td>
<td>Full disconnect</td>
<td>✓</td>
</tr>
<tr>
<td>Functional Test under Make-Up Torque and with pressure</td>
<td>Disconnect Reconnect</td>
<td>Full disconnect and full re-connect</td>
<td>✓</td>
</tr>
<tr>
<td>Static Pressure</td>
<td>Static Pressure 5,000 psi</td>
<td>No disconnect</td>
<td>✓</td>
</tr>
<tr>
<td>Rated Tension Test</td>
<td>595 kip Tension Pull</td>
<td>No disconnect, and no permanent deformation</td>
<td>✓</td>
</tr>
<tr>
<td>Jar Bed Test</td>
<td>Full Jar with 6-1/2” impact tool</td>
<td>Full 400 kips impact load</td>
<td>✓</td>
</tr>
<tr>
<td>Rig Test</td>
<td>Vertical Well 500’</td>
<td>Operate in water</td>
<td>✓</td>
</tr>
<tr>
<td>Rig Test</td>
<td>Deviated Well 1,800’</td>
<td>Operate in mud</td>
<td>✓</td>
</tr>
</tbody>
</table>
Field Test Plan

5 Prototype tools are ready for field trials
Drilling Disconnect potentially offers benefits to drilling and fishing operations.

The concept of Drilling Disconnect has been proven in lab tests.

Ready for field trials.

Other sizes are planned.