



## Case study: Tornar® BOP Cleaner

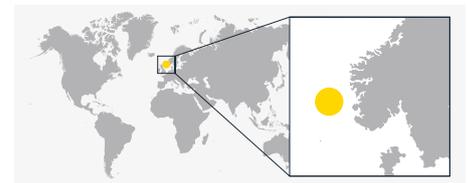
# Statoil, Troll Y-14 extensive milling operation done by Stena Don.

### Effective Sub Sea BOP Cleaning for Stena Don

The Archer Tornar™ BOP Cleaner String is specially designed to clean BOP rams and annular cavities. Any steel or particles inside a cavity can damage or break down any BOP. The main purpose is to clean and collect debris without damaging the BOP. The Archer Tornar™ BOP Cleaner creates a rotating column of drilling fluid called a Tornado. When the closed pressure circulation passes any cavity it creates a lower pressure inside the cavity and pulls debris into the rotating column of drilling fluid. Any debris pulled into the tornado will circulate past cavities without leaving debris inside.

### Challenge

Statoil was planning a standard P&A of existing well and reuse slot for new well construction. During this operation, necessary annulus barriers were not obtained. This resulted in extensive milling operations to get the required depth for obtaining annulus barrier. Due to the anticipated large amount of steel debris, Stena Don semi-submersible drilling rig requested a clean-up of the BOP systems. Running the Archer Tornar™ BOP Cleaner, they were able to remove large amounts of swarf from BOP Cavities. The Swarf removed was shavings and chippings of metal from milling operations. Utilizing the Tornar™ BOP Cleaner was essential to eliminate damage and downtime on BOP stack.



**Region:** North Sea  
**Customer:** Statoil  
**Field:** Troll Y14  
**Rig:** Stena Don  
**Well type:** Oil & Gas

### Case benefits

- Effective well cleaning
- Reduced BOP maintenance
- Reduce BOP swarf that could cause failures

### Key capabilities

The Tornar™ BOP Cleaner string removes wellbore debris from blow-out preventer (BOP) cavities rapidly and reliably. Its combination of Tornar™ flow ports and large outside diameter (OD) create a powerful cyclone effect that clears potentially hazardous debris from ram and annular cavities – without damaging the BOP.

- Tornar™ flow ports
- Can be easily configured to suit any BOP requirements
- Drillpipe connection
- One piece mandrel
- Non rotating stabilizer and magnet.
- Large one side magnet area

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### Solution

Designed to remove debris from the BOP rapidly and reliably, the Tornar™ BOP Cleaner string combines Tornar flow ports with a large OD to create a powerful cyclone of drilling fluid. When the cyclone passes any BOP cavity, the differential pressure engulfs any accumulated debris and retains it in the drilling fluid. Reducing problems that lead to equipment failures and downtime. By running the Archer Tornar™ BOP Cleaner they were able to remove large amounts of swarf from the BOP Cavities. The swarf removed were shavings and chippings of metal from the milling operations. Utilizing the Tornar™ BOP Cleaner was essential to eliminate damage and downtime on the BOP stack.

### Operation

During milling operation Tornar™ BOP cleaner was used several times. On the first run after milling Seal-stem, PBR and packer 141 kg of metal was cleaned off the magnets. On the second run 92 kg of metal was cleaned off the magnets. On the third run 12 kg of metal was cleaned off the magnets. Operations continued by milling ZXP packer, followed by BOP cleaning recovering 130 kg of metal from magnets. The last operation was cutting and pulling 10 ¾" liner, followed by BOP cleaning. Two BOP Cleaning runs were performed with 16 kg and 17 kg of metal recovered. A positive BOP function and pressure test was performed, proving a job well done with Tornar™. After suitable barriers were obtained, operations continued with setting whipstock and milling the window. Two new BOP cleaning runs was performed after milling, recovering 112 kg in first run and 22 kg in second run.

### Result

The Tornar™ BOP Cleaner operation resulted in total a of 542 kg metal recovered from BOP and Riser and positive function and pressure tests of the BOP. Due to the positive result of BOP test, operations continued without pulling the BOP for maintenance, thus saving on rig downtime.



**Tornar® Sub**



**17.45" BOP Magnet**

