MudCube: A modern, safer and lower cost solution for primary solids control
**History since Giant 2012**

**Cubility in brief**
- Founded in 2005 in Sandnes, Norway
- Developed and introduced the MudCube, a step-change technology for solids control and mud treatment
- Statoil a key technology development partner
- First commercial MudCube sale in 2012
- Global uptake of MudCube technology from a number of international & national customers
- Owned by Triton funds

**The MudCube**

**Projects as per Jan 2018**
- Maersk Giant (Jack-up - NCS)
- Askepott, Statoil (Jack-up - NCS)
- Askeladden, Statoil (Jack-up - NCS)
- Chevron, onshore US
- Maersk Gallant (Jack-up - NCS)
- Scarabeo 5 (Semi-sub – NCS)
- Statoil Peregrino A (Jacket - Brazil)
- Noble Lloyd Noble (Jack-up – UK)
- Mariner Jacket PDQ, Statoil – UK
- Saudi Aramco, Sino 7 - onshore
- Maersk Resolve (Jack-up – UK)
- Shell Sarawak, (Tender rig – Malaysia)
- BOS Solution, onshore US / Canada
- Sichuan / CNPC, onshore China
- Petrobras, onshore Brazil
- Johan Sverdrup PDQ, (Jacket – Statoil NCS)
- EQT, onshore US
- Murphy, onshore Canada
- Shell, onshore Canada
- BOMCO, onshore China
- Naga 8, HESS, (Jack-up – Malaysia)

- **Total of 150 wells drilled with MudCubes as pr 2018**
- **Total of approx 120 MudCubes sold as pr 2018**

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**Operational and HSE benefits**
- Reduced drilling waste volumes
- Reduced consumption of drilling fluid
- Improved drilling efficiency
- Improved ECD performance
- Greatly reduced oil vapor & oil mist
- Reduced filter-cost
- Reduced noise levels
- Eliminated vibration
- Reduced loading on deck

**Cubility footprint and service capabilities**

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SAFE HMS-konferanse “Fullt forsvarlig” 12-13 Juni 2019, Sandnes
Traditional solids control equipment

High Mud Losses

- At least 1 bbl of mud lost for every 1 bbl of rock drilled

HSE Exposure

- Mud mist

Labour Intensive

- Washing plugged screens
- Wet cuttings as waste
- Noise & Vibration
- Up to 24 screen panels
The MudCube uses a combination of high air flow pulled through a rotating screen (filter belt) in combination with micro vibration to filter-belt in order separate drill cuttings from drilling fluid. The fully enclosed MudCube incorporates its own ventilation system, significantly improving HSE in the solids control area.
MudCube – Operational details

- Air separator
- Mud inlet section
- Mud inlet
- Mud outlet
- Micro vibrators
- Air exhaust
-secondary filter inside
- Junction box
- Filterbelt motor
- Particle filters
- Filterbelt
- Scraper belt
- Local operator panel
- Cuttings sample outlet
MudCube reduces exposure to vapour & gases

Feedback from Maersk Giant roughneck

Harmful vapor/mist extracted
Working environment

- Vapor and oil mist are eliminated in the shaker room due to the enclosed system and airflow through the MudCube.
- The noise from the MudCube system is significantly lower than from the previous conventional shaker system.
  - Noise level tested to maximum 74 dBA in the upper shaker house by Lloyd’s Register ODS.
  - No restriction on maximum working time or required hearing protection.
- The structural vibration from previous system is eliminated.
- The MudCube system is the only solids control system which today meets the given regulations with regards to the working environment on the NCS.

"I went to get a coffee and brought it back to the MudCube lounge because this is the nicest place to be" - Roughneck.

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**Shaker room on Maersk Giant**

**Measurement of oil mist and vapours during operations**

- **Oil mist measurements, mg/m³**
  - Accept criteria NCS: 0.6 mg/m³
  - Average measurement Maersk Giant: 0.087 mg/m³

- **Oil vapour measurements, mg/m³**
  - Accept criteria NCS: 30 mg/m³
  - Average measurement Maersk Giant: 13.65 mg/m³

**Tester:** Intertek
**Date:** 5-6th Jan 13
**Flowrate:** 3 500 ltr/min
**Mud:** Versatec OBM
**Flow-line temp:** 60 deg. C
**Locations:** 14 samples from the shaker room
Remote operation and automation

The MudCube can be controlled and operated remotely due to camera, sensors and control system.

Cameras installed inside the MudCube, allowing for visual monitoring process without moving away from control room.

Operator panel connected via Ethernet to PLC for visualizing and controlling / monitoring of the process.

MudCube allows for remote operation.
KCAD MudCube Operations

- Installed on Askeladden and Askepott

Challenging drilling - new operations
- Good learning curve for all parties moving towards more and more effective operation
- Continue operational improvement

Cubility/KCAD initiatives:
- Improved MudCube operational performance
- Reduce service points
- Operational excellence
Askepott – user experience

Control room
Askepott – user experience

MudCube on Askepott
Askepott – user experience

Exhaust from MudCube/Shaker room
Askepott – user experience

Mud sampling point

Cleaning of filterbelts (air nozzle and flushing)
Thank you!