

Hydraulic Intervention

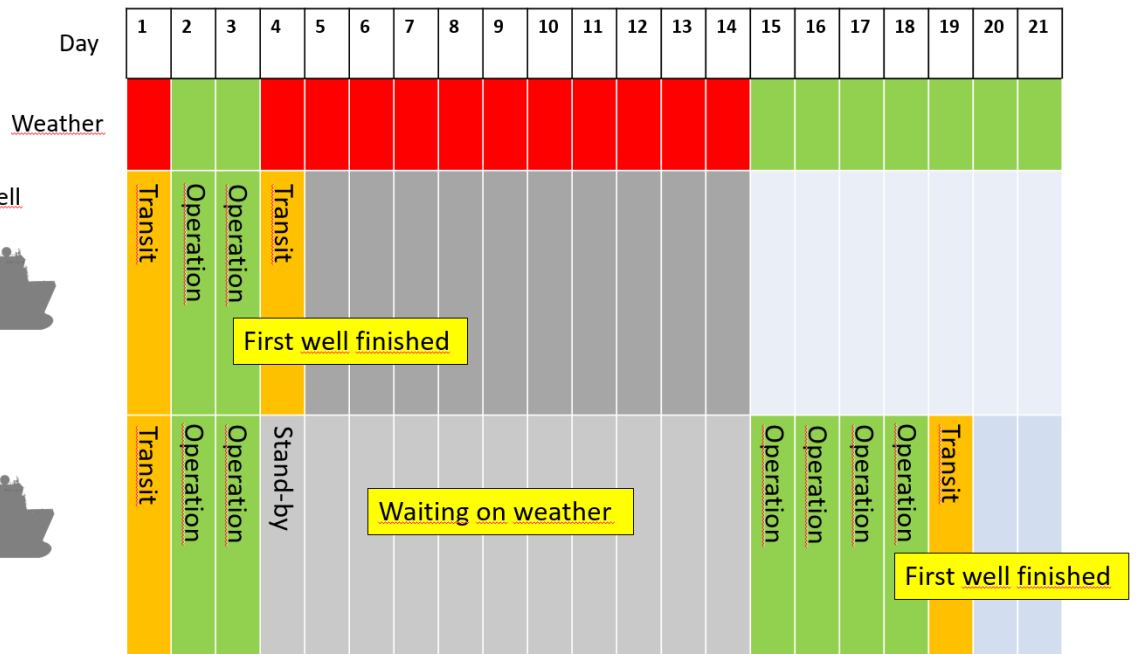
Solution to pump any fluid through
VXT and HXT
5-15k system



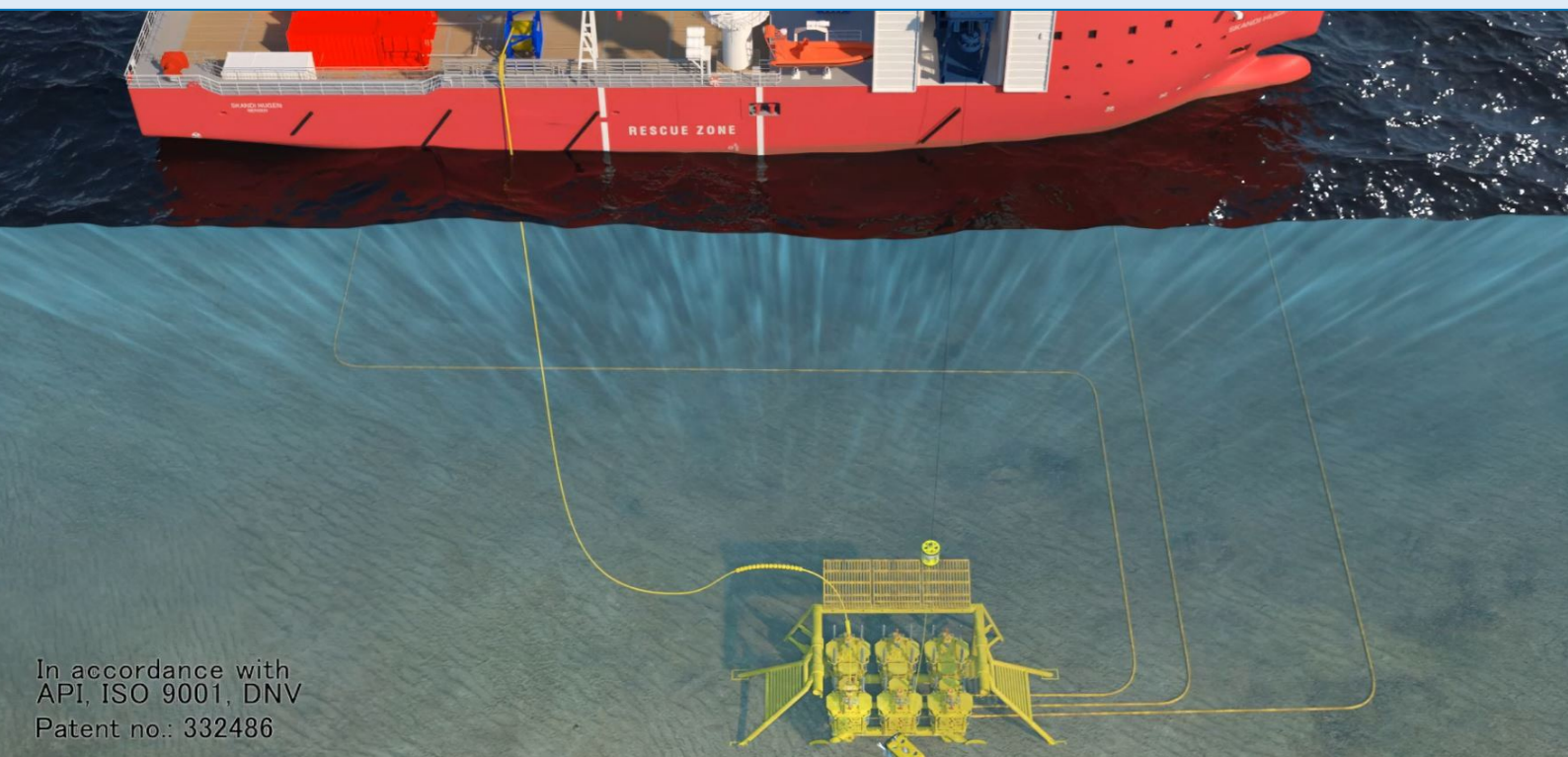
48 Hrs per well



142 Hrs



Introduction



In accordance with
API, ISO 9001, DNV
Patent no.: 332486

Habu subsea was founded in 2011 by inventor Torfinn Borsheim. The company's green and flexible subsea production solutions are manufactured and assembled at one of the Habu Groups production facilities in Dubai.

The Habu group owns workshop facility in Saudi Arabia where HABU HPU systems and WH panels are being manufactured.

Facts about Habu Holding AS

- Established: 2007
- Turn-over (Consolidated): NOK 1097 million (2020)
- Solidity: Equity Capital NOK 637 million (2020)
- Group employees: Approx. 500
- CEO: Mr. Eimund Sletten

Owners

Habu Holding AS is a private investment company focusing on numerous sectors, with strong emphasis on innovation and early-stage entrepreneurship. We also have a diverse portfolio of real estate investments.

Our team has extensive operational experience from the various industry sectors and knows what it takes to succeed. We create value by partnering with entrepreneurial managers to build substantial and sustainable companies.

Our head office is in Tananger (Stavanger), Norway. Through our group members we have additional offices in Dubai, Saudi, France, Hungary, England, Scotland, Sweden, USA and the Netherlands.

Description of system

- The Subsea Tree Cap (SSTC) system is installed on a vertical or a horizontal XMT.
- Doing hydraulic Intervention from Top of the XT means you have to remove the tree cap, causing high risk to damage the poppet valves and main connector seal ring.
- We shall not have any subsea safety module at seabed, that can cause damage to XT in case if drift scenario if EQD or jumper is leaking or not working.
- The cost could be huge if this happens and could occur each time the TC is either removed or installed.
- Habu Subsea AS patented solution is using a modified Tree Cap with a top valve installed with a quick connect system, protecting and simplifying the hydraulic intervention.
- When the well is producing the Top Valve and the Swab valve (PSV) are acting as 2 independent barriers.
- By closing the Production Wing Valve, you can open the PSV and the Top valve and start hydraulic pumping from the top of the XT. When finish pumping the PSV and the Top Valve will be closed and establish 2 independent barriers. The main barriers are control from control room(PMV,DHSV).
- The system allows the client go direct from intervention (Injection) to production by opening the PWV.
- If an emergency, the Habu Subsea AS system allows dis-connect from the modified TC and the equipment can be removed and pulled to surface and allowing the hatches on the trawl over to be closed.
- API approved and DNV Certified

Habu Subsea VS Platform System

HABU SUBSEA:

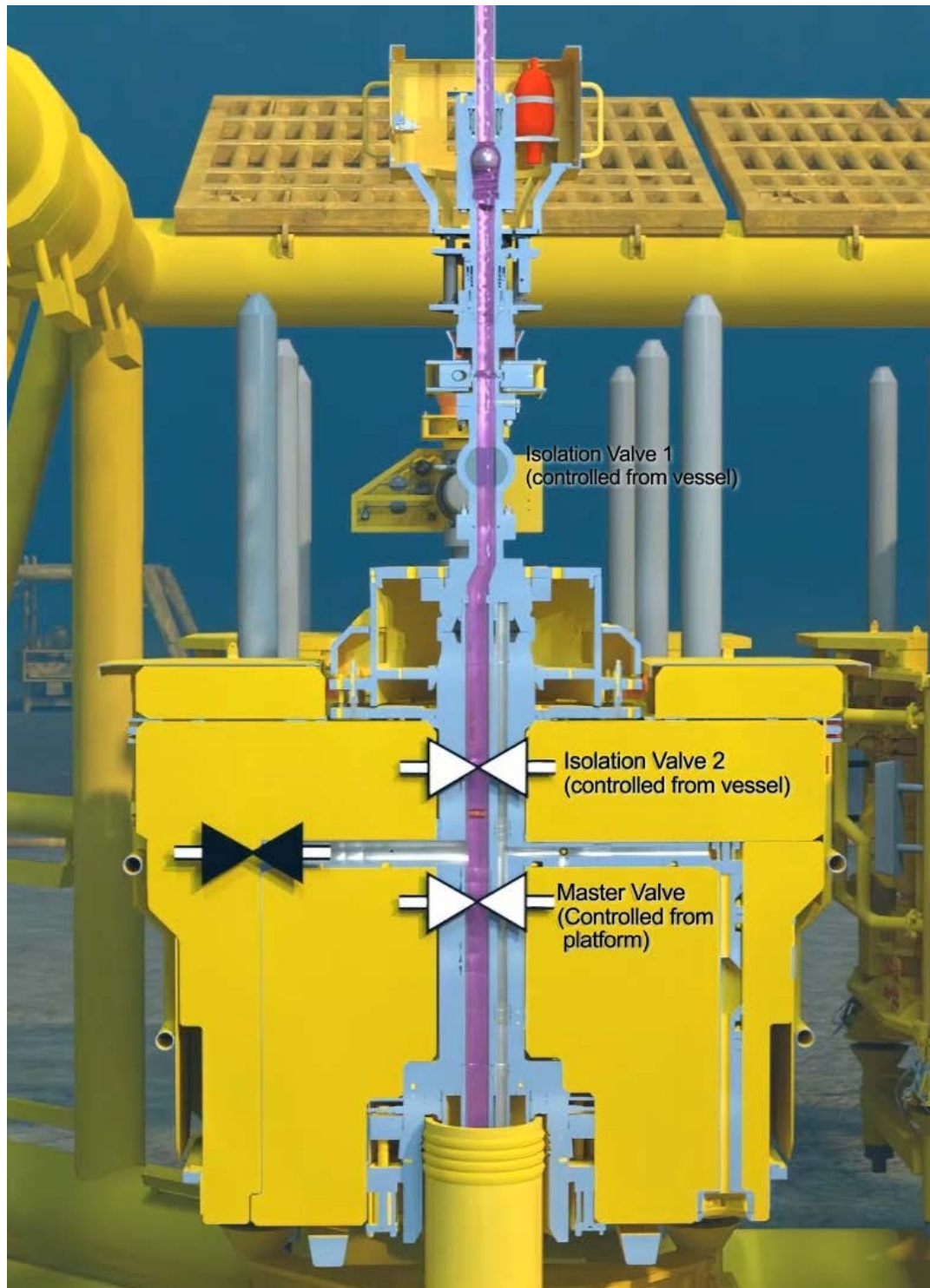
- On trip installation from vessel
- HS system can go direct from intervention to production while jumping to the next well on the template
- Enable jumping from well to well on a template
Possible savings is 5 days on a 2 well campaign
- HS system can pump acid through the XT due to equipment has Inconel material class
- No need for IWOCS
- If an emergency, the HS system allows dis-connect from the modified TC with EQD and equipment will float up due to Buoyancy facility on the hose

PLATFORM SYSTEMS

- Mobilize an extra vessel to carry fluids in addition to vessel to load equipment on platform and open/close valves on template manifold
- Causing extra handling time
- Need to use gas lift line (service line) filled with acid. This can cause loss of production in other wells as gas lift is no longer available
- Need to flush service line to each XT after operation
- Need for extra space on platform to place equipment
- Need for extra POB on platform

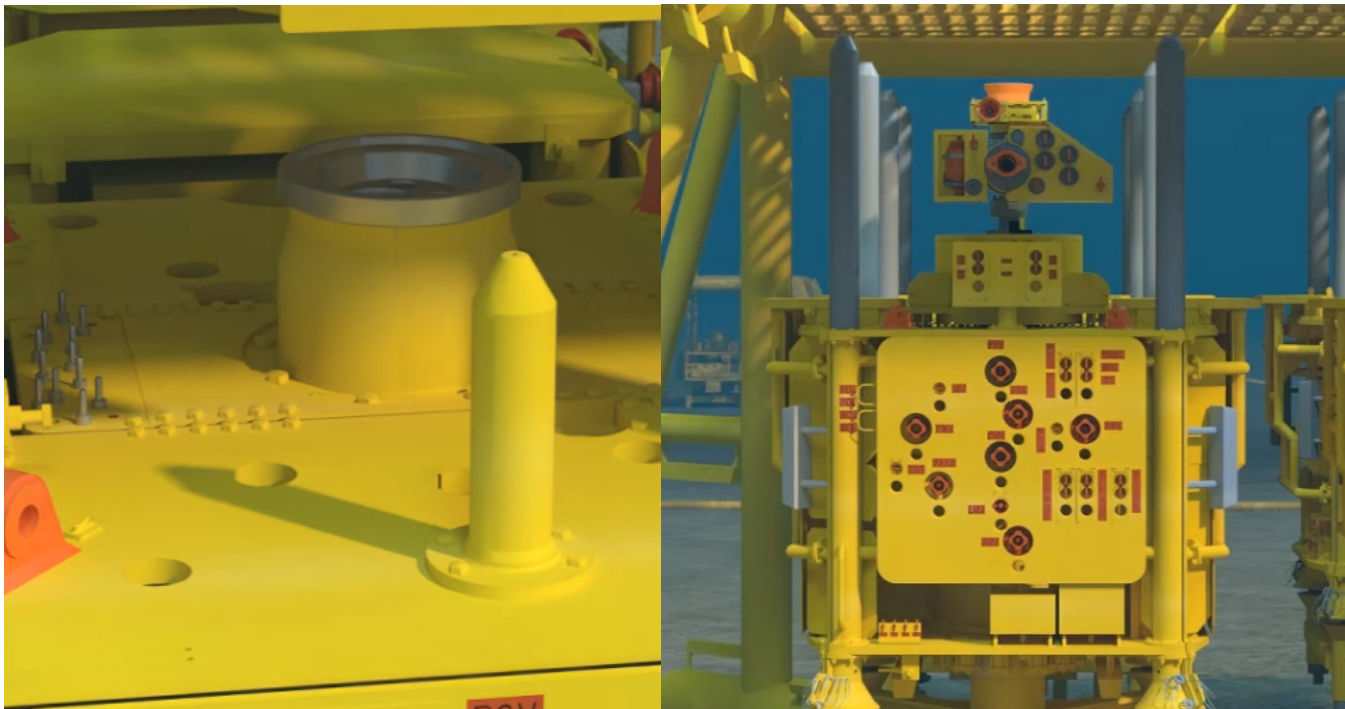


Barriers



Main Barrier in XT – controlled from platform
2x FSC – controlled from Vessel
EQD Drift off scenario (DP2 or DP3)

Safety



Doing fluid intervention traditionally means removing the tree cap. This operation is always high risk as the poppet valves and main connector seal ring can be damaged. If damaged the costs can be astronomical.

Every time the tree cap is removed or installed is a risk for serious damage.

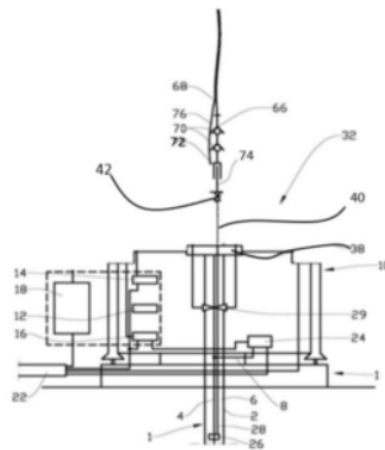
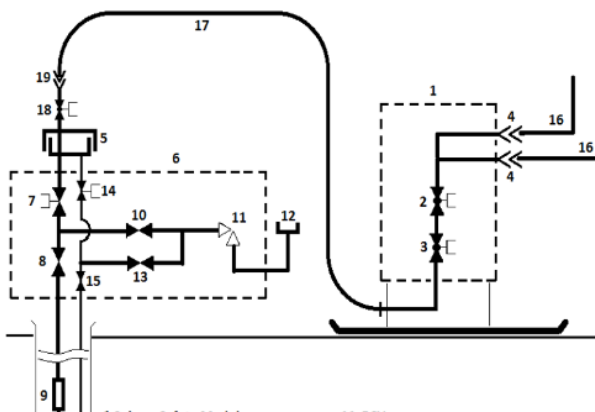
By using Habu Subsea the Tree cap is replaced with a new type hydraulic tree cap with full access. Eliminating the need for removing and testing the tree cap. Habu Subsea AS tree cap protects the XT poppet valves and connectors permanently from damages.

Summary

- Conventional DP2 vessel – Habu Subsea AS, Each Well
 - 48 Hrs Operation
 - Wells can be online after first treatment
- Choke System
 - 142 Hrs Operation
 - De-oiling & Shutdown all subsea wells
 - Purchase of Choke insert
- Pumping from Platform
 - 108Hrs Operation
 - Service line in use and can't be online before all wells are treated

Habu Subsea AS, using example from Siem Pride timeline showed:

- Reduced operational time with 1,5 day each well (pumping from Platform)
- Reduced risk of acid expose of lines and well heads over longer time
- Maintained pressure support to other wells (gas lift)
- Reduced risk of lost production due to no gas lift during Hydraulic intervention
- Lowered cost on chemicals needed
- Lowered Co2 emission due to lower burn time on PSV
- For 2 wells; Saved 23 136 Kg Co2 for environment & Financial cost (NOK 532 128)



3K-15K system (3000psi-15000psi).



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(12) **United States Patent**
Borsheim

(10) **Patent No.:** **US 9,062,515 B2**
(45) **Date of Patent:** **Jun. 23, 2015**

(54) **METHOD AND DEVICE FOR SUPPLY OF LIQUIDS FOR KILL AND SCALE TO A SUBSEA WELL**

(56) **References Cited**

U.S. PATENT DOCUMENTS

(75) Inventor: **Torfinn Borsheim**, Sandnes (NO)

3,552,419 A * 1/1971 Weston, Jr. 137/236.1
3,894,560 A * 7/1975 Baugh 137/606

(73) Assignee: **Subsea Solutions AS**, Sandnes (NO)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

FOREIGN PATENT DOCUMENTS

WO 2005/047646 A1 5/2005

OTHER PUBLICATIONS

International Search Report for parent application PCT/NO2012/050093, having a mailing date of Jul. 13, 2012.

(Continued)

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E21B 37/06 (2006.01)

E21B 33/035 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **E21B 37/06** (2013.01); **E21B 33/0355** (2013.01); **E21B 34/04** (2013.01); **E21B 41/04** (2013.01); **E21B 41/08** (2013.01)

(58) **Field of Classification Search**

CPC **E21B 33/0355**; **E21B 37/06**; **E21B 34/04**; **E21B 41/04**; **E21B 41/08**

USPC 166/75.13, 351, 344, 368

See application file for complete search history.

(57) **ABSTRACT**

A method and apparatus are for supplying liquids for scale treatment and killing to a subsea well, where the subsea well is provided with a tree which has a swab valve and a coupling for a tree cap. The method comprises: arranging an upgrading module on the tree after the tree cap has been removed, the upgrading module comprises an electric control unit and a tree cap which via an intermediate conduit is coupled to a top valve at the upper portion of the upgrading module, coupling a coupling column comprising at least two column valves and a quick-releasable coupling to the top valve, the coupling column communicates with a vessel via a hose connection; coupling the control unit to the vessel via a signal wire running within or close to the hose connection, thereafter the tree and the upgrading module is controlled via the signal wire; opening the swab valve, the top valve and column valves; and pumping liquid from the vessel via the hose connection, coupling column and upgrading module down into the subsea well.

11 Claims, 4 Drawing Sheets

