



Det norske oljeselskap - Our first diving operation

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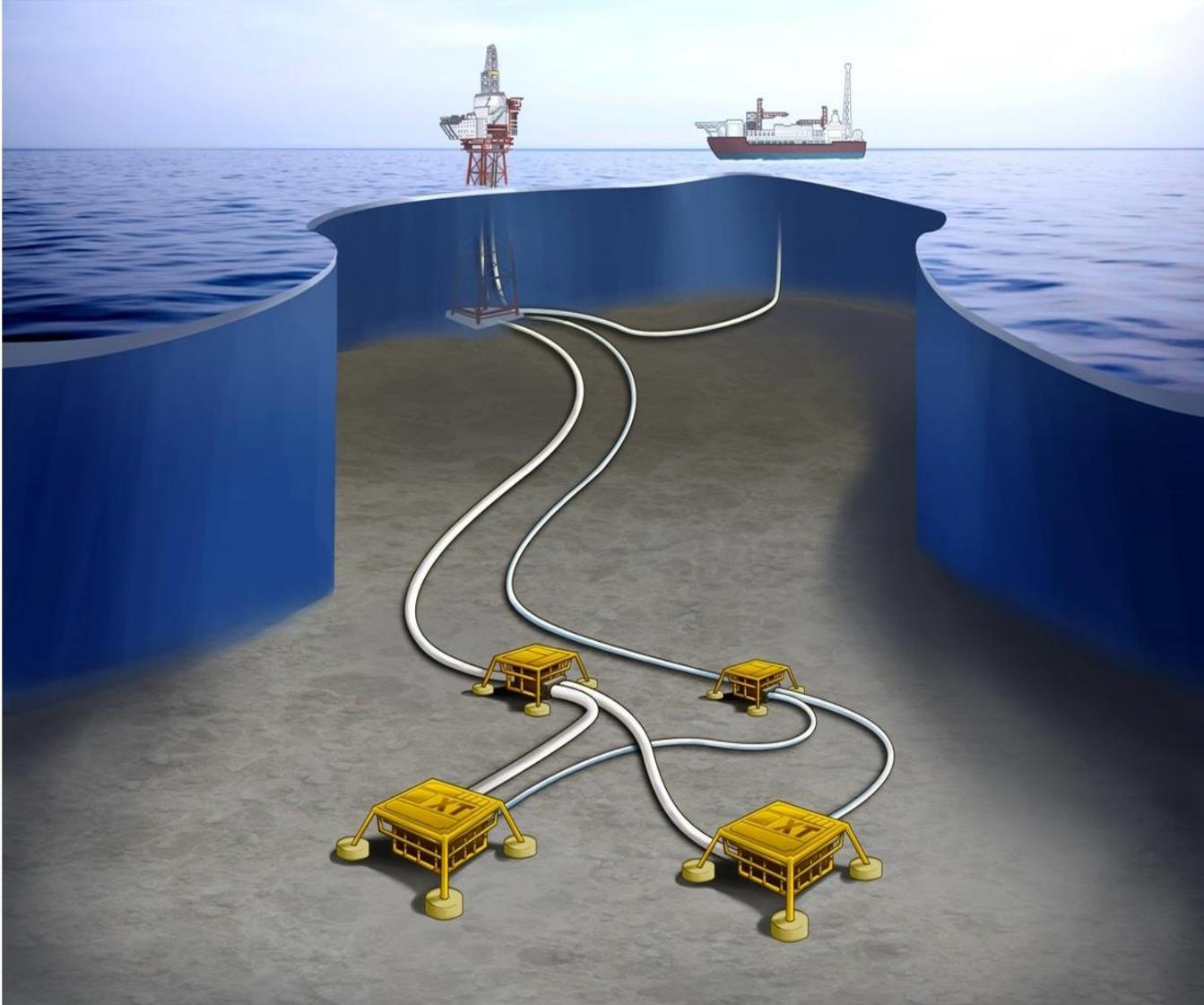
Diving Operations – our starting point

- Det norske started out with a somewhat reluctant attitude with regards to diving.
- The company had no experience with offshore construction activities, but a significant of experience from exploration drilling. In connection with the exploration activities a management system for operational activities had been established.

Jette Diving Operations

- It was decided that the Jette field should be developed as a fast track project.
- The development solution that was chosen was to tie in the production line from Jette to the existing riser at Jotun B, which made diving the only option.
- Jette was the first development project for Det norske. Some uncertainty within the company and the project arose regarding how to manage the diving operation.

The Jette field



Facts

Situated in the North Sea, block 25/7 & 25/8, 185 km west of Haugesund, 6 km south of the Jotun field.

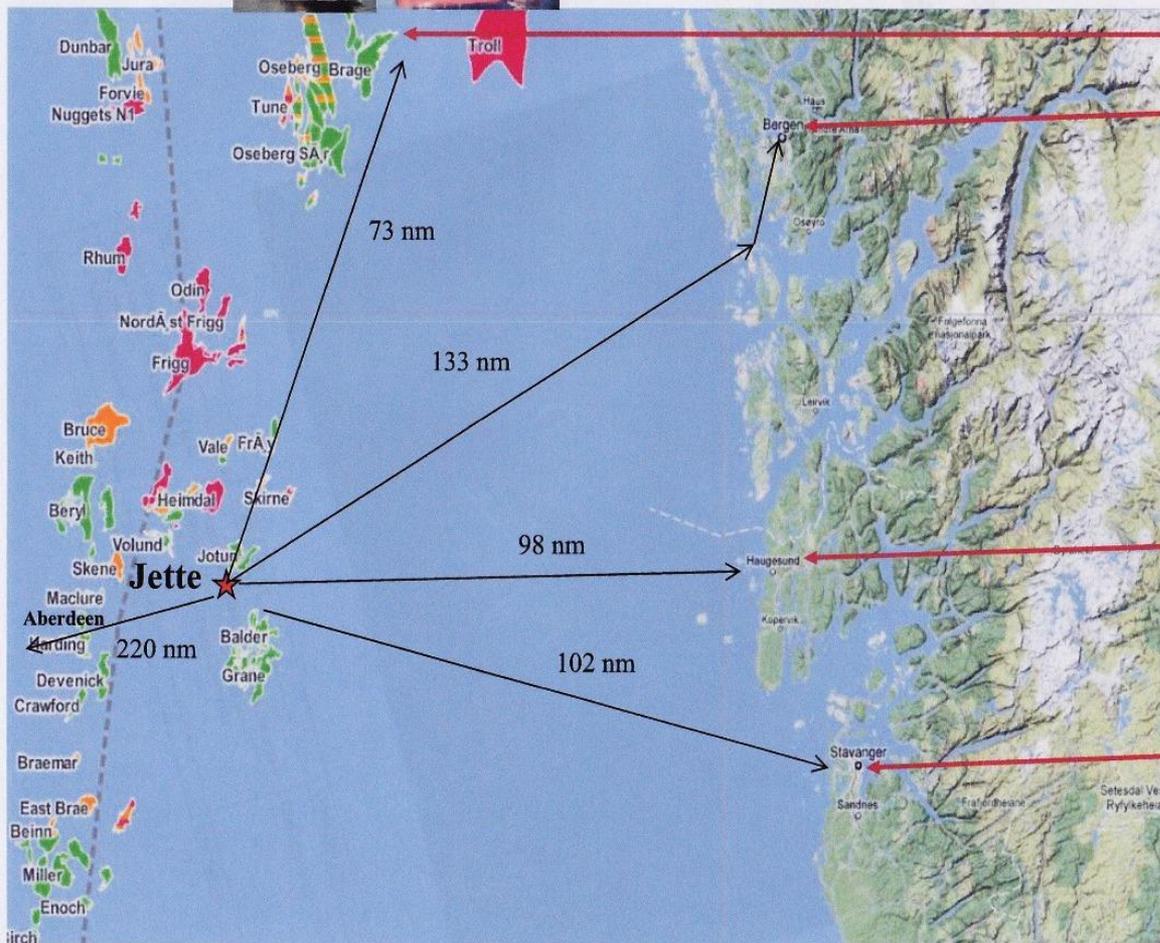
Depth: 126-128 m.

Two production wells & subsea facility tied back to ExxonMobil platform Jotun B.

6 km long 8" flexible pipeline & control umbilical with integrated gaslift. ₄



JETTE - Field Distances



Havila Troll & Stril Herkules (RRRV)
Located at the Oseberg/Troll Field

NUI AS (Hyperbaric Reception Facility),
Bergen

Redningselskapet,
"R/S Bregen Kreds", Haugesund

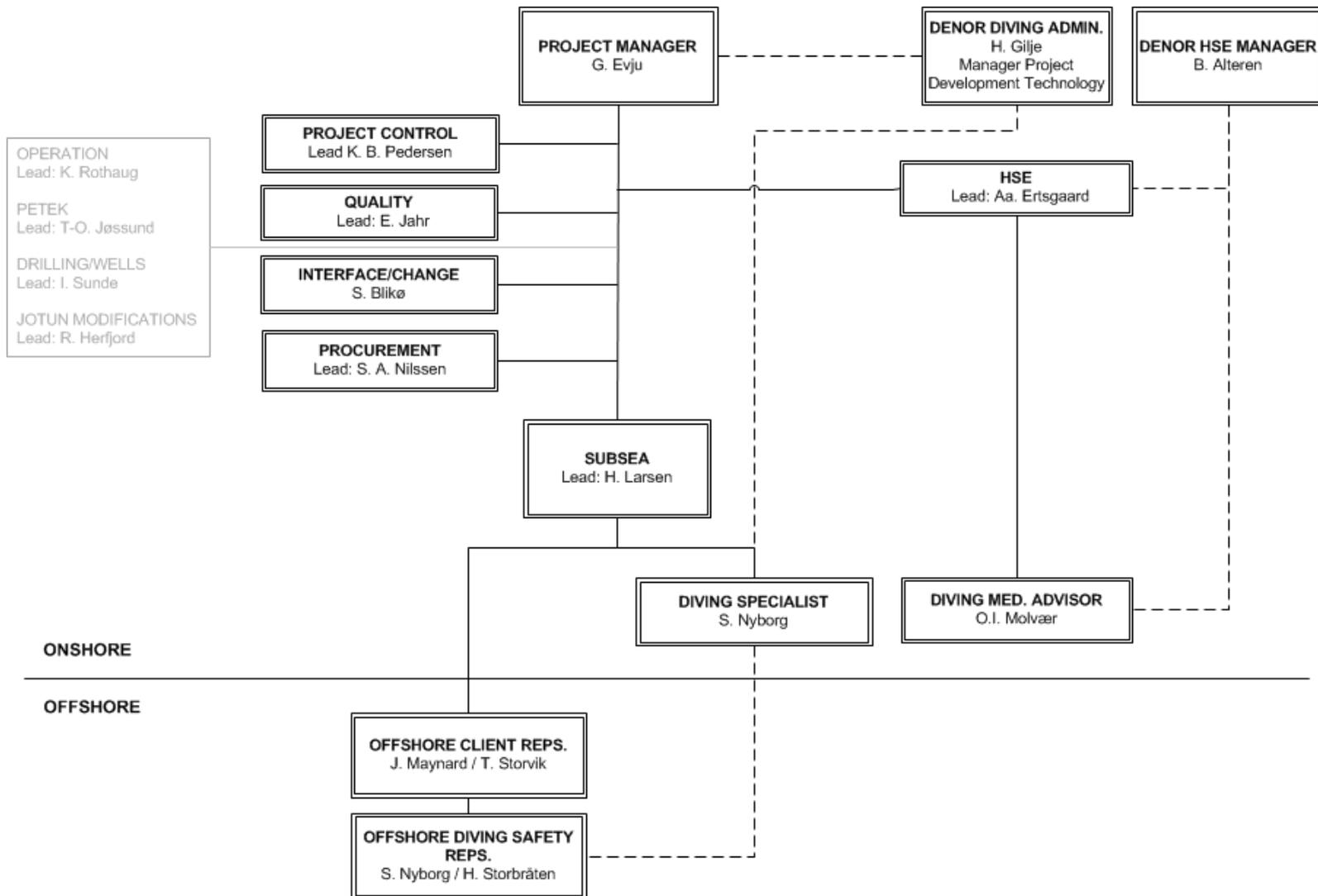
LSP (Subsea 7 Base, Dusavik,
Stavanger)

Diving Management in Det norske

- In December 2011 a Diving Advisor and a Diving Medical Advisor were engaged.
- Together with the Jette project team and the line organization a managing procedure for diving activity in Det norske was established.
- The document describes how diving activities should be managed in the company, as well as organising the activity within the project structure.
 - The document also anchors itself and the diving activities to the company by establishing the role of Diving Administrator.
 - This was done to give diving activities a longer perspective in the company than that of the Jette project, in case the company should need diving intervention/activities in the future.

Jette Organisation Chart – Diving Operations

JT02-DN-Q-KA-0001-304 rev. A, 2013-01-04



Initial Planning Stage

- It was important for the company to establish contacts in the diving industry, and the subsea operators in Norsk Olje og Gass is one of the arenas in which the company's diving advisor participates.
- With these basic elements in place the work began to prepare our application to the PSA for consent for diving operations at Jette.

AOC Planning & Preparations

- Det norske benefited from experience with applying for consent to conduct exploration drilling when preparing the application for consent (AfC) to dive
- We selected to use the same emergency preparedness planning system that was already established for drilling activities. In this structure OFFB (Operators Association for Emergency Preparedness) is used as 2nd line emergency response.
- Collection of seabed samples for the relevant areas was started.

Application for consent

- Jotun operator - Exxon Mobil:
 - Since parts of the subsea operations was within Jotun's 500 meter zone, an extensive cooperation with ExxonMobil to establish a bridging document and for their approval of the operation was required.

- Contractor - Subsea 7
 - Successful cooperation with the selected contractor, Subsea7, who provided the necessary documentation and information according to the established schedule for the application for consent.
 - Cooperation with other operators using Subsea 7 for joint verification activities and experience transfer. This team effort was very constructive

- The application for consent to dive was submitted to the Petroleum Safety Authority (PSA) in June 2012 for diving planned for November.

- Consent to dive was received from the PSA in September 2012.

Changes in schedule

- The diving operation was re-scheduled to January 2013 due to an extended drilling operation.
- With the new schedule, the planned vessel “DSV Seven Pelican” had planned dry dock maintenance in this period, and “DSV Seven Havila” was assigned instead.
- “DSV Seven Havila” is a new generation purpose built diving vessel with improved operational criteria for Norwegian waters.

Re-planning & Verification

- An updated application for consent was submitted to the PSA in October 2012, incl. new schedule and vessel change.
- Verification activities and necessary revision of documentation and procedures was carried out.
- ConocoPhillips had used “DSV Seven Havila” during autumn 2012 as the only operator in the Norwegian Sector. They shared their experiences with Det norske, which was valuable in our verification of the vessel.

Preparedness

- One table top exercise and one full day emergency preparedness exercise was carried out onshore. The scenario was a helicopter crash onto the vessel whilst diving was in progress.
- Another table top exercise with the same scenario was carried out on-board during sailing.
- The exercises gave the organisation valuable insight and understanding of the emergency preparedness structure. It also ensured that the emergency response organisation for the Jette diving operation was better prepared.
- An updated consent to dive was received from the PSA in January 2013.

DSV Seven Havila



Type:
Diving

Classification:
1A1 ICE-C SF COMF-V(3)
HELDK-SH DSV-SURFACE
and SAT E0 DYNPOS-
AUTRO NAUT-AW CLEAN
DESIGN DK(+)

The *Seven Havila* is one of the most advanced diving vessels in the world, featuring a 24-man twin bell saturation diving system rated to 400m and a heave compensated 250t crane.

- Length 120m x breadth 23.45m
- 24-man twin bell saturation diving system
- Heave compensated 250t crane
- Accommodation for 120 persons
- Ice Class hull, high transit speed
- Deck area 1,050m²

Jette Diving Operation

- The diving operation at Jette was standard «diving tie-in» work.
 - 7 flange connections to the flexible pipe at 128 msw, using Hydratight equipment.
 - 20 GRP covers installed, in 4 locations.
- The flexible pipe and GRP-covers were wet stored prior to the diving operation.
- The protection structures were installed after the diving activities were completed, which gave the divers easy access.

Jette Diving Operation

- Control umbilicals between the Subsea Distribution Unit (SDU) and Christmas Trees (XMT) had been installed by ROV in an earlier campaign. The divers had to repair and install one umbilical that the ROV had not succeeded to install. They also had to sort and gather the umbilicals after the ROV intervention.
- Acoustic research company 'Subacoustech' was sponsored by Norsk olje & gass to carry out noise measurements during the operation. The measurements were carried out in 4 bell runs (dives) imposing only minor inconveniences for the operation.

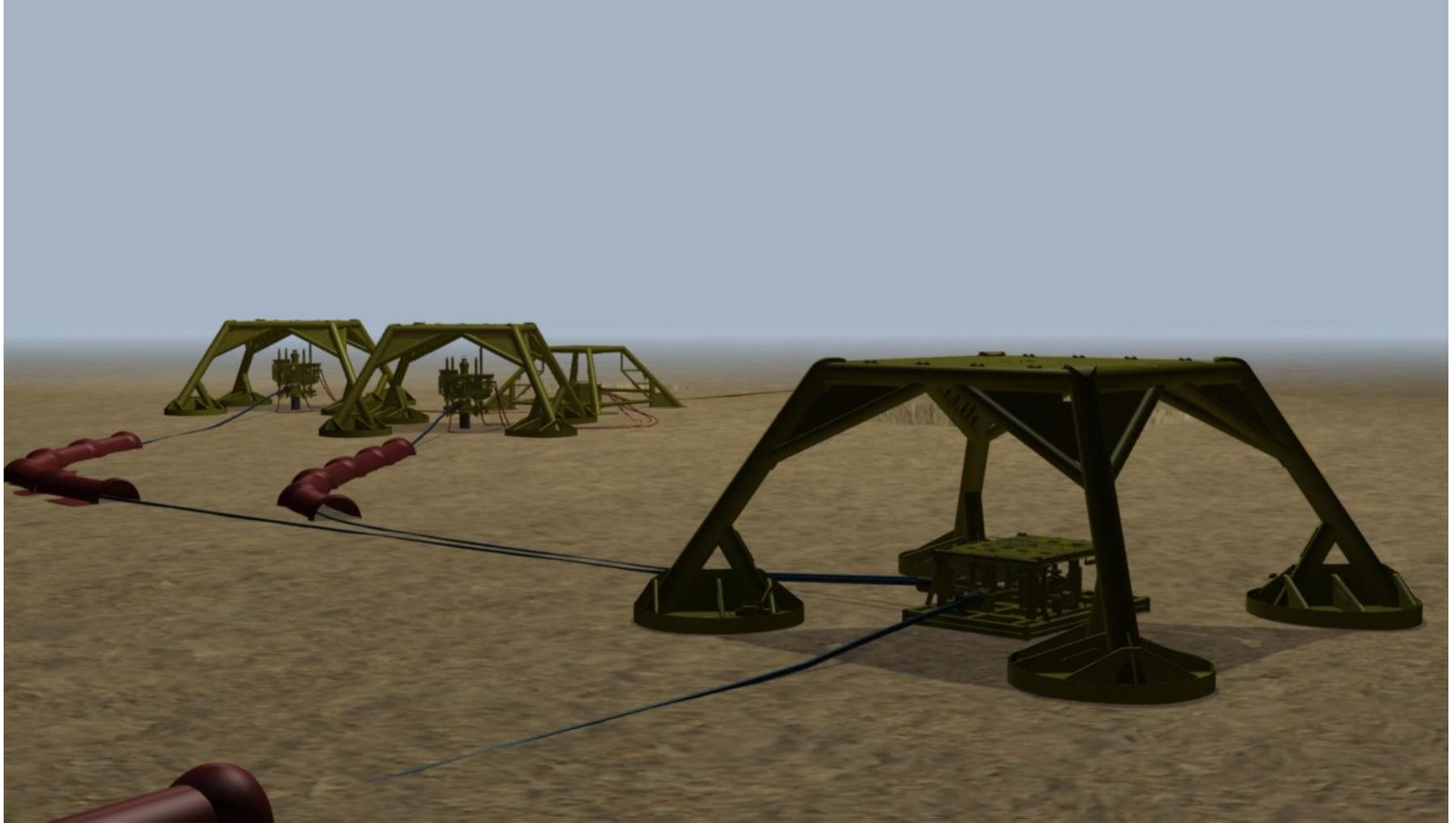
Diver at work using “Hydratight”



Jette Diving Operation - Summary

- The diving operation was completed safely and successfully in 12 days in January 2013, without any waiting on weather.
- DSV Seven Havila confirmed solid operational criteria throughout the operation. It even allowed for crew change by helicopter while using Dynamic Position (DP) of the vessel.
- The contractor, Subsea7, demonstrated an open and professional culture during the whole campaign and made it easy to be the responsible operator.

Jette field after installation



Conclusion

- The diving campaign on Jette was a success!
- In Det norske diving has been 'de-mystified'
- Det norske have changed its attitude about diving to the positive. We are now considering diving a safe and viable intervention method.

Thank You



DETNORSKE

NEST STØRST PÅ NORSK SOKKEL