Fabrication and Installation considerations for Subsea Hydrocarbon Storage

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April 2016
FABRICATION AND INSTALLATION CONSIDERATIONS FOR SUBSEA HYDROCARBON STORAGE

NSRI - Thursday 21 April 2016
AGENDA

- Company Overview
- Hydrocarbon Storage Tank
- Installation
- Hook Up and Commissioning
- Solan SOST Case Study
- Conclusions
COMPANY OVERVIEW:
WHO WE ARE NOW

• Established in 2003
• Leading subsea services provider
• North Sea geographical core and growing internationally
• Global fleet of five vessels
• Modern fleet of 18 advanced ROVs
COMPANY OVERVIEW:
WHAT WE DO

- Subsea installation, construction, inspection, repair and maintenance
- Our capabilities extend from ROV inspection to saturation diving and construction activities
- Leading subsea decommissioning contractor with an outstanding track record in safety and efficiency
HYDROCARBON STORAGE TANK

Design Considerations

Operational
- Production constraints & contingencies
- Production rate
- Frequency of offloading
- Single vs multiple tanks
- Service life & reusability
- Fishing friendly?

Fabrication & installation
- Ease of manufacture & transportation
- Installation
- Diver access/ROV interfaces
- Modular approach
- Decommissioning

Modular cells in the gravity base foundation

Subsea Storage Tank
LOGISTICS

Considerations

- Suitably sized port
- Port availability
- Cost constraints i.e. vessels & port fees
- Delivery to UK?
- Long term storage

Semi-submersible ship

Tug boat with barge
INSTALLATION
SEABED PREPARATION

Seabed surveying
- Geotechnical study
- Seabed core Sampling
- Seabed surveying

Creating a level seabed
- Debris clearance
- Suction dredging
- Mass flow excavation
- HP water jetting

Foundations
- Pile foundations
- Subsea mud mats
- Other methods include
  - Concrete mattress
  - Rock dump

Dredging machine
Pile driven into seabed
Olympic Ares

- DP2
- Crane capacity - 250Te
- Deck area - 1300m²
INSTALLATION
TANDEM CRANE OR SEMI-SUB

Tandem Crane

• DP2 vessel
• Tandem crane lift on Monohull vessel
• Tandem cranes up to 2,000Te

Heavy Lift Semi-Submersible

• DP3 vessel
• Tandem cranes up to 14,200Te
INSTALLATION SDS

Operations

- Load-out
- Shallow draught surface tow
- Ballasting & trimming
- Transit tow
- Positioning
- Set down
- Float-off
Post Tank Installation Tasks may include

- Removal & recovery of lifting points and lift rigging
- Installation of pipelines
- Installation of tie-in spools
- Installation of control umbilical
- Installation of offloading system
- Leak testing system – topside/DSV supported
- Commission system
- Concrete mattress protection to spools
- Periodic inspection tasks/ integrity testing

Bibby Topaz spool deployment

Olympic Ares Flexible Lay
The field consists of a SOST, an OLS, 2-off production wells and 2-off water injection wells and a production platform.
Tank Details

- Size - $45m \times 45m \times 25m$
- Weight - 9,500 T
- Capacity – 300,000 barrels
- Water depth – 137m

Bibby Offshore Scope

- Removal of installation aids
- Spool tie-ins & flexible pipeline installation
- Install tank level instrumentation
- Pressure-test and commissioning of tank
SOLAN SOST
FABRICATION/TRANSPORT

Method

- Fabrication in Dubai
- Transport to Lerwick via semi submersible
- Preparation work in Lerwick
- Floated in Lerwick and towed to Solan field
SOLAN SOST DEPLOYMENT & DECOMMISSIONING

Deployment of tank in field

Divers working on tank
CONCLUSIONS

• Key installation considerations
  • Size
    ▪ Multiple tanks vs single large tank
    ▪ Simplicity of fabrication, logistics & installation
  • Modular construction
  • Reusability
  • Decommissioning

• Opportunity for innovation
THANK YOU

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