



DNV Id. No.: SHIPLIFT
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DET NORSKE VERITAS

FINAL SHIP LIFT VERIFICATION REPORT ALL ELECTRIC SUB SEA OIL PRODUCTION AESOP

The undersigned Surveyor to this Society, at the request of Kockums Engineering, attended at Kockums shiplift on 4th and 12th of November 1999 for the purpose of witnessing the following tests

1. That the test was performed with the Docking module totally submerged. Water depth was 9 meters.
2. That the All electric sub sea oil production (AESOP) module could be properly positioned inside the Docking module by means of guiding in four steps as follows:
 - a) AESOP structure and Docking module structure.
 - b) Guide posts on Docking module and guide pipes/sleeves on AESOP.
 - c) Centrally placed spigot on upper MATE half and centrally placed bore in lower MATE
 - d) Guide pin on lower MATE and corresponding bore in upper MATE.
3. That the mechanical pipe connection between the AESOP module and the Docking module could be established. This was verified by pressurising the three bores through the MATE with 26 barg.
4. That the electrical connection (power at 11 kV and control) between the AESOP module and the Docking module could be established by operating the ELEX' hydraulic mechanism and performing the purging procedure (removing of seawater, then flushing with freshwater and finally filling with nitrogen gas at 1.0 bar).
5. That the separator air pressure could be held sufficiently stable at 1,9 barg. Controlling the air outlet valve.
6. That an emergency shutdown could be performed by operation of the REAct valve actuator. After re-establishing the actuator (charging the spring and opening of the valve) the process could be restarted.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.


7. That the control of the AESOP separation process could be performed from the land-based Master Control Station, the single interface being a 2 wire connection via a sub sea mateable connector.
8. That the sub sea process, when interrupting its communication with the MCS continued to operate. After a predefined time with no communication the sub sea system automatically shut down.

Conclusion:

The dockside equipment delivered to the AESOP module a mix of water and air as follows: 132 m³/h of water and 800 Sm³/h of air at 5 barg.

The mix of air and water supplied to the AESOP module was separated sufficiently (no visible water in the air return outlet) and the water level in the separator was held sufficiently stable by controlling the position of the modulating valve by means of the PROAct actuator. The sub sea pump was running with a fixed speed.

Malmö, SWEDEN 1999-12-15



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Senior Surveyor



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