

PROJECT SHEET

WHITE ROSE PROJECT GLORY HOLE EXCAVATION

BOSKALIS OFFSHORE:

SKILLS, RESOURCES, EXPERIENCE

Boskalis Offshore brings together the offshore skills, resources and experience of Royal Boskalis Westminster. The group's offshore capabilities include seabed rectification works for pipeline/cable and platform installation, construction of pipeline shore approaches and landfalls, offshore mineral mining, offshore supply and support services and decommissioning services. Boskalis provides clients with tailored, project-specific solutions for above dredge related offshore services, as illustrated by the following project summary.

WHITE ROSE PROJECT

The White Rose offshore oil field is the third major oil field in the Jeanne d'Arc Basin on the Grand Banks, some 350 kilometres east of St. John's, Newfoundland, Canada and within 50 kilometres from the Terra Nova and Hibernia fields. The South White Rose oil pool covers approximately 40 square kilometres and contains an estimated 200-250 million barrels of recoverable oil. The area is subject to frequent iceberg migration, which forms a serious hazard for offshore installations and has to be taken into account in the design of offshore oil and gas facilities. To protect the subsea wellheads and manifolds from iceberg scouring they are lowered into the seabed in so-called glory holes. Grab Excavation System

FEATURES

Client	Husky Oil Operations Ltd.
Location	Grand Banks, offshore Newfoundland, Canada
Period	2001 – 2003
Contractor	Boskalis Offshore bv



- A** Location map
- B** Grab Excavation System on board DPFV 'Seahorse' Inset: Excavated glory hole



There was no equipment readily available for the excavation of the White Rose glory holes in 120 metres of water depth. Soil investigation showed that very stiff clay, cobbles and boulders with sizes up to 1 metre, and hard pan layers were present. To face this water depth and these soil conditions, Boskalis Offshore proposed to excavate the holes with a large grab deployed from the DP Class 2 Fallpipe Vessel "Seahorse". This vessel is normally used for rock dumping, generally for the protection and stabilisation of offshore pipelines and ballasting of platforms. For this specific project a Grab Excavation System has been designed. By using two lifting points - one forward and one aft - the excavation system is able to transport the excavated material underwater just above the seabed from the excavation point to the dumping location nearby the glory hole, while the vessel keeps its position using its Dynamic Positioning system. During the various phases of the excavation cycle the grab is heave-compensated. For maintaining precise position and orientation of the clamshells, a ROV with four powerful thrusters is mounted on top of it.

Grab and ROV performance is continuously monitored and displayed during all phases of dredging operations, indicating winch load and speed settings, cable tensions and catenaries, real versus planned grab path, cylinder status. Excavation with such a grab system means that the slopes of the glory holes, that were approximately 10 metres deep, can be kept to their natural angle of repose, which results in minimum quantities to be excavated and minimum effects to the environment.

GLORY HOLE EXCAVATION

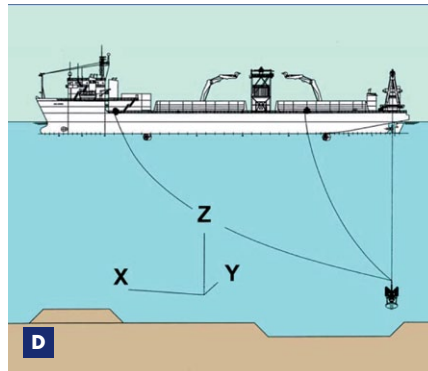
After commissioning and testing of the excavation system in the summer of 2002 and start of operations later that year, and after an interrupt of exceptionally heavy winter and spring seasons, the two glory holes were completed in July and August 2003, in six weeks and two weeks nett time respectively. For final levelling of the bottom of the glory holes, with tolerances as narrow as +/-5 cm, a rock bedding layer was installed. After all, the grab excavation system was on board of a fallpipe rock dumping vessel.

BREAKING NEW GROUND

Boskalis Offshore has introduced a new way of soil excavation, indeed after an innovative engineering effort. The system has proved its ability to construct glory holes very accurately and to cope with challenging soil and environmental conditions. The flexibility of the system ensures that similar seabed rectification works can be undertaken in a range of soil characteristics and in water depths up to 1,000 metres.



C



D



E



F

- C** 4—thruster ROV
- D** Grab and ROV
- E** Grab Excavation System
- F** Control displays for grab operations

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