

PROJECT SHEET

SHAH DENIZ 2

TRENCH DREDGING, PIPE PULLING, DIVING AND SURVEY WORKS

BOSKALIS' ENERGY SOLUTIONS

Boskalis is a leading global dredging and marine expert. With safety as our core value we provide innovative, sustainable and all-round solutions for our clients in the energy market. Realizing projects in remote locations with a heightened environmental focus is one of our specialties. Under brands such as Boskalis, Dockwise, Fairmount, VBMS and Smit we offer more services than any other company in our industry, making us your next one-stop solution provider. We support the development, construction, maintenance and decommissioning of oil and gas import and export facilities, fixed and floating exploration and drilling facilities, pipelines and cables and offshore wind farms.

SHAH DENIZ PHASE 2:

The BP Shah Deniz field is a High Pressure (HP) gas-condensate development located off the deep-water shelf in the Azerbaijan sector of the Caspian Sea, approximately 100 km south of Baku. The development of the Shah Deniz second stage consists of a subsea production system comprising subsea trees and manifolds located on the north, west and east flanks of the field development, and will be installed in water depths ranging from approximately 70 m in the north to approximately 540 m in the south east area of the field.

The Shah Deniz stage 2 development connects the Caspian Sea gas-condensate fields of Azerbaijan to Southern Europe via the Southern Gas Corridor.

Saipem Contracting Netherlands subcontracted to Boskalis Offshore Subsea Contracting the shore approach dredging and landfall scope of works, including but not limited to, 23 km trench dredging, 3 x shore pull, dry earth movement, construction of water extraction lagoon, buoyancy tank removal and pipe pull and pipe lay survey support works.



B

FEATURES

Company	British Petroleum [BP]
Contractor	Saipem Contracting Netherlands BV
Location	Azerbaijan, Baku
Period	Preparation Sept 2014 - Dec 2014 Execution Dec 2014 - Sept 2015
Vessels	Backhoe Maricavor, Hopper barge Frigg, Hopper barge Rind
Man hours	325,000 hrs



A

- A** Dredging of shore approach and near shore trenches, whilst commissioning of shore pull spread.
- B** Removal and transport of 477 buoyancy tanks from pipeline.
- C** Completion of shore pull operations.

SAFETY

Safety is first priority during the preparation and execution of the project. The Boskalis NINA (No Injuries No Accidents) was implemented using kick-off, follow-up and task specific sessions.

Extensive training and preparation ensured good safety behaviour amongst local and expat personnel. The project was carried out without incidents or accidents.



C



MOBILIZATION EQUIPMENT

Preparations for mobilization of the marine fleet consisting of 1 backhoe dredger and 2 split hopper barges began in September 2014. Time was the biggest challenge due to the winter closure (ice) of the main access route into the Caspian Sea. The vessels were modified and prepared for this 4 week towage/voyage, having the complete spread including local vessels on site late November 2014. For the Landfall works all equipment for trenching and pipe pull works were mobilized via 30 special road trucks during a 3 week journey arriving early 2015.

DREDGING, LANDFALL PREPARATIONS, WIRE-LAY AND PIPE PULL

Having dredged a total of 480,000 m³ over the course of December-March, the 23 km of shore approach trench dredging was completed and maintained in time. Meanwhile dredging proceeded, on shore, preparations were made for lay out of 3 x 3,200 steel wire and pipe pull works accordingly. Having completed the dredging works, the Backhoe dredger was modified to a wire-lay pontoon laying a total of 9,600 m of 102 mm and 88 mm steel wires within one week complying to tolerances of 1 meter either side of pipeline and trench alignment. Following the successful and timely performance of lay of all pipe pull wires and arrival of pipelay barge, 3 x shore pull activities were performed using a 500 ton linear winch including winch anchoring system mobilized from the Netherlands. Even though time and local weather conditions had been a great challenge, the completion of the trenching and pipe pull critical path activities were performed without delays and with No Injuries No Accidents (NINA).

DIVING WORKS

After completion of the wire lay, the backhoe dredger Maricavor was modified to a dive support

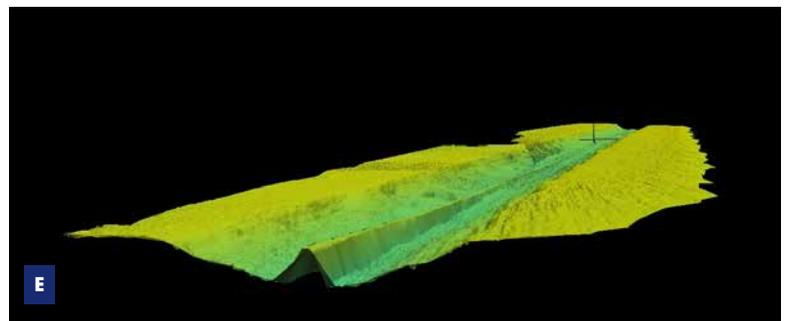
vessel in order to support the client with the removal and transport of 477 pieces of buoyancy tanks that were fitted to the pipeline during the shore pull works. Mobilizing 2 local dive teams under the supervision and management of Boskalis Offshore Subsea Services all buoyancy tanks were removed successfully with a total of 215 individual dives performed in between the shore pull activities.

SURVEY WORKS

By the end of April 2015, additional works were awarded to Boskalis for performing a survey scope consisting of a pre-entry survey of the pipe lay barge anchor corridor, survey support works during shore pull activities and touchdown monitoring during pipe lay activities. Within 3 weeks Boskalis modified, setup and calibrated a shallow draught vessel with a side scan sonar, sub bottom profiler and 2 x multibeam equipment including on board live processing capacities to maximise survey support efficiency.

CONCLUSION

With a challenging schedule and local circumstances, Boskalis provided on time and without any injuries or incidents a full scope shore approach package to our client setting the highest standard for safety, technical performance and client driven solutions, showing the capacity and flexibility to perform in challenging conditions without compromises



- D** Dredging of 3 shore approach trenches using Maricavor, Frigg and Rind.
- E** Pipeline touchdown monitoring during pipe lay operations.

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