Boskalis

PROJECT SHEET

SCARBOROUGH
OFFSHORE GAS DEVELOPMENT

BOSKALIS

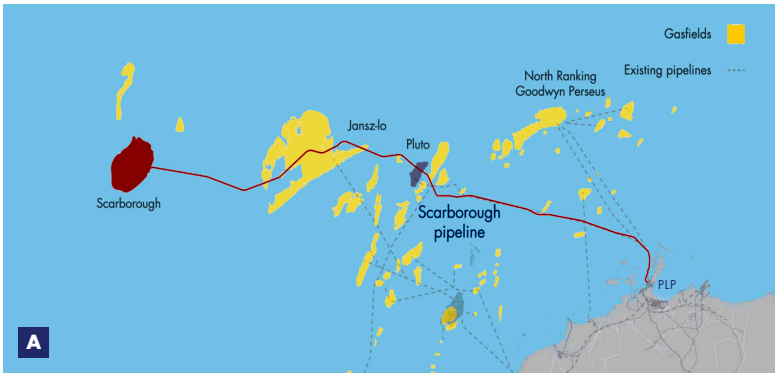
Boskalis is a leading global marine contractor and services provider. With safety as our core value, we offer a wide variety of specialist activities to the oil & gas and renewables sectors. These activities include marine installation and decommissioning, seabed intervention, marine transport and services, subsea services and marine survey. In addition, Boskalis is a global dredging contractor, provides towage and terminal services across the globe and delivers marine salvage solutions.
By understanding what drives our clients we are able to provide the solutions that enable them to meet their specific business goals. For this reason we are constantly looking for new ways to broaden and optimize our offering and are committed to expanding our proposition, supported by our financial strength. With our committed professionals in engineering, project management and operations, 500 specialized vessels and an unprecedented breadth of activities in 90 countries across six continents we help our clients push boundaries and create new horizons.

INTRODUCTION

Woodside Energy Limited's (WEL) Scarborough Project, represents a groundbreaking offshore gas development in Western Australia. This ambitious initiative aims to transport dry gas between the Scarborough Floating Production Unit (FPU) and the Pluto LNG Plant (PLP) via the Scarborough Trunkline (SCATL). With a complex route spanning 433 km, including navigating deep water depths up to 1,400 m, this project showcases a commitment to innovation and environmental stewardship, setting new standards for offshore gas transportation.

FEATURES

Client	Woodside Energy Limited (WEL)
Location	Western Australia
Period	January 2023 - May 2024
Contractor	Boskalis Australia Pty Limited



A Overview of the gas pipeline trajectory from the Scarborough field, to the Pluto LNG Plant.
B Pipe pull spread at shore crossing with the Baldur in sight undertaking trenching works.

BOSKALIS SCOPE

The scope of activities included the pre-trenching of the nearshore pipeline route along a 38 km section, the post installation burial and other protection works to ensure the stability and protection of the pipeline, offshore deep water excavation works, pre-lay deepwater concrete mattress installation, pre- and post-lay rock berm installation for pipeline and fibre optic cable crossings. The shore crossing to the onshore processing facility the Pluto LNG Plant on the Burrup Peninsula as well as rock supply of roughly 350,000 tonnes of rock also formed part of the Boskalis scope of works.

PROJECT EXECUTION

- At the Shore Crossing operations began with site preparatory activities and supporting civil works, followed by trench excavation. Additional complication here was the presence of exceptionally hard rock in combination with being in a live gas plant and within 10 m distance of the existing Pluto Gas Export Pipeline, which prevented the use of explosives. Non-explosive materials and rock breaking techniques were applied to remove the rock and achieve the required design. A bedding layer was installed in the trench to protect the pipeline during the 800 m pipe pull operation which was undertaken by a 300 t linear winch. Backfilling on top of the installed pipeline in layers with filter and armour rock followed. Trenching and rock installation was undertaken by a bespoke design triple-boom CAT395 excavator which was required in view of its exceptional 28 m reach.
- The Backhoe Dredger (BHD) Baldur was employed for dredging the first kilometer of the trench adjacent to the LNG Jetty and some sections further down the pipeline trajectory where harder material was encountered which could not be removed by the trailing suction hopper dredger (TSHD). After the trenching was completed the Baldur installed bedding layer in the marine part of the first 800 m. After the Scarborough pipeline had been laid, the BHD Baldur commenced installing filter and armour rock for

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protection and stabilisation of the pipeline.

- Trailing Suction Hopper Dredger (TSHD) Gateway was deployed for trenching and backfilling operations in the nearshore 38 km section of the pipeline. The vessel completed these tasks in two campaigns. Between the campaigns, the Gateway underwent upgrades to the drive system for the two dredge pumps in Singapore, enabling simultaneous operation at depths exceeding 40 meters. These upgrades were necessary for executing the backfilling campaign. During backfilling, dredged material sampling and testing took place, in order to confirm that the dredged material met the required specifications for backfilling.
- At 208 kilometers from the landfall point in Dampier at the Continental Slope Crossing where the seabed drops from 400 m to 1,000 m, the construction support vessel (CSV) BOKA Tiamat performed a unique operation. Utilizing a profiling grab and a Remotely Operated Vehicle (ROV), it excavated the Continental Slope Crossing at a depth of nearly 600 meters. At this depth, the seabed had to be reshaped to ensure that the trunkline would not be overstressed during lay and operation. A bit further out at 212 km from the landfall point, the pipeline trajectory crosses the existing Pyxis flow lines. At this location the vessel placed 10 concrete mattresses at a depth of 1,000 m. These mattresses elevate the trunkline, enabling it to safely cross the existing infrastructure at this water depth.
- The Scarborough Project was also the maiden project for the Dynamically Positioned Fall Pipe Vessel (DPFPV) Seapiper which operated both nearshore in the first 25 km section of the trajectory installing filter and armour rock to protect the installed pipeline and offshore constructing rock berms to create six subsea crossings with existing seabed infrastructure consisting of pipelines and fibre optic cables, ranging in depths from 50 to 150 meters. The DPFPV Seahorse will conclude the project by undertaking the post-lay stabilization works at these offshore crossings.

PROJECT CHALLENGES

The project operated within a complex stakeholder environment, necessitating extensive compliance with environmental, cultural, and safety commitments. A few of the encountered challenges were:

- Adhering to stringent biosecurity requirements for Australia and environmental requirements of the project consisting of amongst others marine fauna observation work, light management, and turtle deterring measures, highlighting the significance of preserving the local ecosystem.
- Recognizing the importance of cultural heritage, efforts were made to respect and protect sensitive areas, including the Toolshed, which was an ancient heritage site situated close to the onshore working area. The need for careful operations within this intricate and culturally significant environment was of utmost importance.


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- Operations undertaken in close proximity of live assets such as the live LNG Facility, including associated marine traffic (see Picture B). For the majority of the pipeline trajectory the existing Pluto Gas Export Pipeline was situated at approximately 80 m distance of the Scarborough Pipeline trajectory. This distance became even smaller as the landfall point was approached. In addition closer to the shore dredging and rock installation had to take place adjacent the Pluto LNG Jetty. The existing approach channel to another nearby LNG Plant also crossed the Scarborough Pipeline trajectory introducing further interfaces with marine traffic. Further offshore our rock berm installation scope was in close proximity of live assets (pipelines and fibre optic cables).
- Very challenging conditions for the Shore Crossing operations where the works were undertaken within a live gas plant. Additional complication here was the extremely limited footprint available for executing the works.
- All operations had to be managed within the Woodside's Integrated Safe System of Work (ISSOW), permit to work system. Effective planning and communication with the LNG Plant and other contractors resulted in the safe simultaneous execution of all construction activities in conjunction with the day to day LNG production activities, ensuring personnel safety and operational success.

C Seapiper before getting loaded at the rock load out facility in Dampier.
D Multibeam survey of the Continental Slope Crossing Excavation.
E Horizontally profiling grab with control hub excavation at 600 m depth.

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- Operating to the highest quality standards in order to meet the Dry Commissioning Strategy of our client.
- Working at significant water depths with newly developed tools.

F Placing concrete matresses bij BOKA Tiamat.
G Gateway off the Dampier coast.

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