PROJECT SHEET

BERRI DRILLING ISLANDS
AL JUBAIL, KINGDOM OF SAUDI ARABIA

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

The Berri Increment Program is being operated by the state-owned Saudi ARAMCO to draw an additional 250,000 barrels per day of Arabian Light crude oil from the Berri Oil Field which is one of the largest offshore oil fields in the world, located in the Arabian Gulf.

FEATURES

Client	Saudi ARAMCO
Location	Al Jubail, Kingdom of Saudi Arabia
Period	October 2019 - June 2020
Main contractor	China Harbour Engineering Company
Contractor	Boskalis Westminster Al Rushaid Co. Ltd.

The master plan for the Berri oil field proposes an expansion of the current capacity by 250 MBCD to reach 500 MBCD by January 2022.

The project's main objective is to construct two (2) drilling islands in close proximity to Jubail King Fahd Industrial Port (KFIP). One drill site "A" with an approximate overall area of 616,553 square meters is located south of KFIP causeway and will be directly connected to the shore and the second drill site "B" is located north of KFIP causeway with an approximate area of 263,855 square meter and will be connected to the causeway via one single bridge and one and half kilometers in length.

Boskalis was awarded by CHEC (China Harbour Engineering Company) a contract to construct the two Berri drilling islands by means of dredging and reclamation works.

MAIN ELEMENTS OF THE PROJECT

- Dredging of access channels for the two islands
- Reclamation of the two islands

A Reclamation near to completion.

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DREDGED QUANTITIES

South Island	North Island	Accumulated volume
5 million m^3	1.5 million m^3	6.5 million m^3

DREDGING AND RECLAMATION

Boskalis's Cutter Suction Dredger 'Helios' dredged a 5.2 km long access channel from offshore towards the southern island. By using a combination of floating and submerged pipelines, the dredged materials were reclaimed to build the southern island.

Identical scope of works was performed for the northern island which involved dredging a 2.2 km long access channel.
Both access channels had to be dredged to -7.0 m LAT depth, designed for future barges and tugboats for navigational purposes. Support of the dredger on water was provided with various auxiliary floating equipment.

Furthermore, the reclaimed material was transported through shore pipelines and placed with the assistance of dry earth movement machines ensuring the required level of the reclamation of both islands.

PROJECT CHALLENGES

SOIL CHARACTERISTICS: Unforeseen hard material such as strong rock and caprock above sand were encountered during dredging activities which were significantly harder in comparison to the soil investigation received from the main contractor during tender phase.

IMPACT OF COVID-19: Saudi Arabia closed its borders for 16 weeks which prohibited the entry and exit of personnel and a mandatory quarantine period of 14 days required the necessary flexibility for all the project personnel. A curfew was set from 19:00 to 06:00 hours which required a special pass to move about in that period. Closure of recreational facilities and eateries resulted in a longer working duration for our project staff and crew for which a Fatigue Management Plan was introduced to minimize employee risk of burnout and exhaustion and improve the overall project safety. Once the borders were opened, repatriation of the project team was made possible with the assistance of the Dutch, Indian and The Philippines Embassies.

STRINGENT REGULATIONS: Adhering to Saudi Aramco's safety rules and the country's regulations were quite challenging and involved extensive planning for various activities such as permit to work for all related activities on the project and importation of spare parts for equipment. During project execution, a new import system called SABER, introduced by SASO replaced the old system for issuing SASO Certificate of Conformity (CoC) for goods exported to Saudi Arabia.
Hiring of only Saudi Aramco approved land-based equipment operators proved to be a challenge as their experience with dredging and reclamation works was limited.

MAIN CONTRACTOR'S EQUIPMENT: The main equipment used was the seagoing self-propelled Cutter Suction Dredger 'Helios' which was able to cope with the challenging mixed soil conditions and hard caprock layers up to 15 MPA with pumping distances up to 6.5 km. Handling of side anchors in shallow areas and harder layers proved challenging. Various solutions were developed involving the use of different types of anchors jointly with dyneemas.
Besides handling of floating and submergible pipelines, auxiliary vessels (A-Frames, the mutlicat BKM 104 and Bronte barge) were used for fuel transport and logistics during a significant period of the dredging and reclamation works.

B DEM equipment engaged in reclamation process.
C Aerial view of the reclamation process.

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SAFETY, HEALTH, ENVIRONMENT & QUALITY

Safety performance was a top priority throughout the project, with a strong emphasis on the Boskalis NINA safety program. NINA Refresher Trainings were organized to further improve the safety awareness under all operational employees. Adhering to Saudi Aramco's requirements, the below mentioned trainings were undertaken:

- **Project staff and crew:** BOSIET, FOET, STCW basic safety training or equivalent and H2S Awareness Certificate.
- **Captain, chief officer and second mate:** ICS Marlins English Language Test
- **Onshore personnel:** Qyadati (driving course)

In line with the Client's environmental requirements, Boskalis was obliged to use Saudi Aramco approved garbage/oil collectors.

The execution of the project was performed during the COVID-19 pandemic. To ensure health and safety of all involved, whilst still finalizing the works in time, Boskalis introduced the COVID-19 Outbreak Management System enlisting guidelines/procedures in relation to operational and traveling processes applicable to all employees working on vessels, project sites, newbuild and repair projects. Strict measures were followed such as daily record of project personnel temperature, frequent disinfection, usage of face masks, minimizing the number of visitors and suppliers on the project site and arranging online meetings.

An incentive program was launched during which, on monthly basis the best idea to improve the safety performance of the Project, initiative or exceptional behavior was being awarded not limited to just Boskalis personnel but also subcontractors.

SUCCESSFUL COMPLETION

Despite the COVID-19 restraints and challenges faced, the project was successfully completed, aided by open and effective communication leading to exceptional teamwork. A dedicated and experienced transport coordinator onsite ensured the smooth import, mobilization and demobilization of spare parts and equipment for the completion of the project in a timely manner.

EQUIPMENT DEPLOYED ON THE PROJECT

- Cutter Suction Dredger Helios
- Multicat BKM 104
- Bronte

D CSD Helios
E Bronte

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