

Case Study

NKNK03 Olefin Project





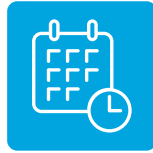
Industry
Petrochemical



Cargo Highlights
Primary fractionator (724 MT), C3 splitter (525 MT)



Volume
87,350 FRT of heavy lift and oversized refining and processing equipment



Period
March–December 2020



Client
Linde Engineering



deugro Team
25 experts



Job site in Nizhnekamsk, Republic of Tatarstan, Russia

Case Study: NKNK03 Olefin Project

In close collaboration, the deugro Hanau and deugro Moscow teams executed the NKNK03 Olefin Project on behalf of Linde Engineering. After intensive planning and engineering, deugro moved nearly 90,000 freight tons of heavy lift and oversized cargo from various origins in the Far East and Europe to a remote job site in Nizhnekamsk, Republic of Tatarstan, Russia.

The cargo consisted of more than 300 heavy and oversized units of valuable refining and processing equipment, including a 724-metric-ton primary fractionator measuring 78 x 9.8 x 9 meters and a C3 splitter weighing 525 metric tons and measuring 96 x 7 x 6.9 meters.

deugro developed a tailor-made transport solution for this challenging petrochemical project. The solution considered the complex logistics schedule with short navigational periods and the challenging passing of the winding Don River and Volga-Don Canal to reach the remote location of the Naphta Cracker in Nizhnekamsk.

Ocean transportation

In close cooperation with its Breakbulk and Heavy Lift Chartering Desk, deugro chartered and coordinated a total of nine full-charter vessels for the ocean transportation. The heavy lifts and overdimensional cargo items were shipped from various international ports in South Korea, Turkey, Germany, Italy and China to Nizhnekamsk (dry dock and Transkama Port) in the Russian Federation. The loading operations were executed by own vessel cranes in single or tandem lift configuration.

Due to the cargo specifications of the first lot out of nine, including the weight and total volume, only three shipping companies were able to offer the ideal vessel type required for the optimal accommodation and stowage of the cargo within the timeframe.

Based on its chartering experience and close contacts to the chartering

market, deugro was able to charter the MV *Happy Star*. This vessel was the perfect fit for the cargo thanks to its lifting capabilities, capacity and weather deck that extends across the entire width of the vessel, allowing the load space to be fully utilized.

Transshipment Romania

The Port of Constanta, Romania was chosen as the strategic transshipment hub for all cargo originating from the Far East, including the heaviest and largest cargo units. The distance to this port was shorter compared to other transshipment ports in the North Continent, resulting in lower freight rates. Furthermore, it has broad experience in performing sophisticated transshipment operations.

After the cargo arrived at the Port of Constanta, the biggest and heaviest units were unloaded from the oceangoing vessels directly

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Project highlights

- Remote job site in Nizhnekamsk, Republic of Tatarstan, Russia
- 9 full-charter vessels
- Complex logistics schedule with short navigational periods
- Transshipment operations to pontoons
- 120 axle lines (SPMT) operating in Nizhnekamsk



Loading operations at the Port of Ulsan, South Korea

» Our experts were always on the spot during all transshipment operations. «

onto a total of 11 barges by own vessel gear. The barges were well selected in advance by deugro Moscow. Taking the ocean vessels' schedule into account, deugro agreed on a timeline when the barges, which waited for their navigation at Astrakhan before, should arrive in Constanta and be ready for the cargo transshipment. In order to adhere to the strict requirements of the Russian Maritime Register of Shipping (RMRS), our deugro teams worked closely with an approved Marine Design Bureau to develop sophisticated voyage manuals and method statements.

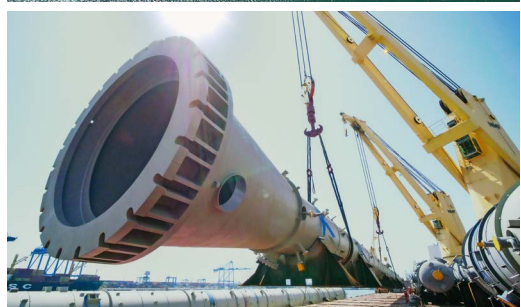
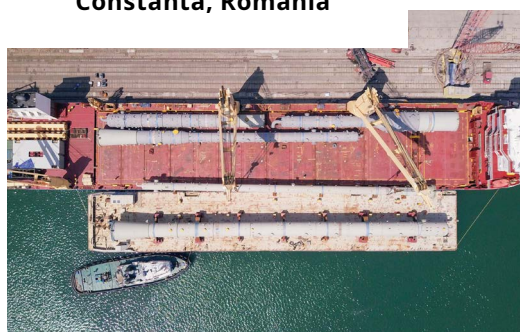
For some of the columns, the outreach was not sufficient for discharge, which meant the barges needed to rotate 180 degrees to commence the operation. After loading onto the barges, all of the cargo units were positioned onto stools on the deck. This resulted in the cargo being elevated, enabling the Self-Propelled Modular Transporters (SPMTs) to drive underneath the cargo for load-in at the dry dock. deugro engineered,

designed, procured and delivered over 200 of such stools, 100 of which were fabricated especially for this project in Germany and transported to Constanta.

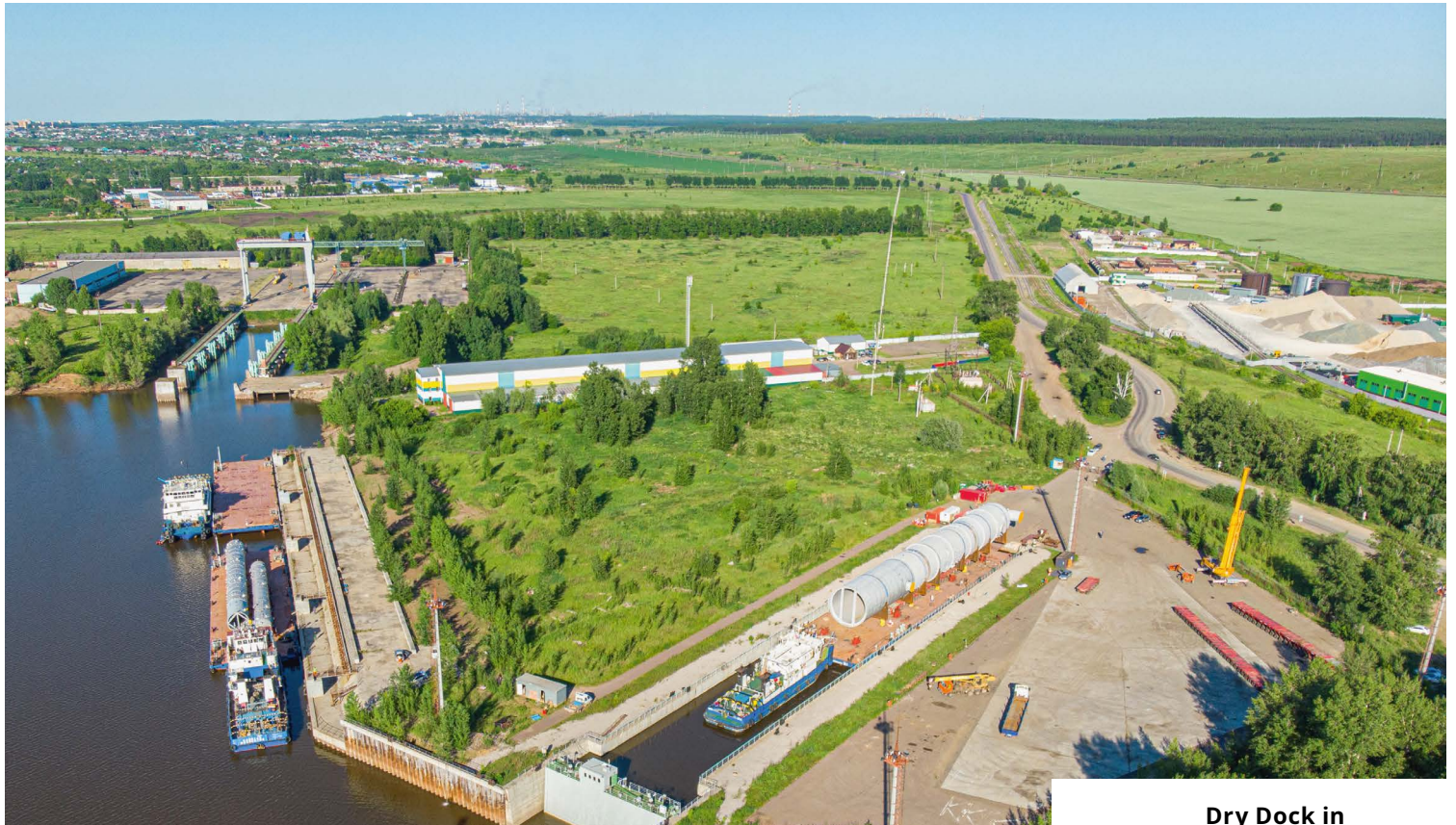
All smaller cargo was unloaded at the quay and then loaded onto various sea river vessels. Our experts were always on the spot during all transshipment operations.

After stowage of the cargo, the barges and sea river vessels departed the Port of Constanta, Romania. They took up their journey of over 1,350 nautical miles through the Don River and Volga-Don Canal to their destinations, the dry dock and Transkama Port in Nizhnekamsk. Due to a limited navigation period from May to October, only a tight schedule to transport all the cargo to Nizhnekamsk was available. The transit time for the barges took around 19 to 22 days, depending on the passage of the locks in the rivers, whereas the journey for the sea river vessels took about 15 to 17 days.

Discharging operations from vessel to barge in Constanta, Romania



Loaded barge on its way to the dry dock in Nizhnekamsk, Russia



Dry Dock in Nizhnekamsk, Russia

Last-mile transport

After arrival of the barges in Nizhnekamsk, they were positioned at the dry dock with tugboats. Following the closure of the dry dock, the water level inside the dock was increased until the necessary level was reached for roll-off; then the cargo was unsecured by the welders. The SPMTs were moved under the cargo to jack it up from the stools using a hydraulic system. Together, the SPMTs and cargo measured over 10 meters in height.

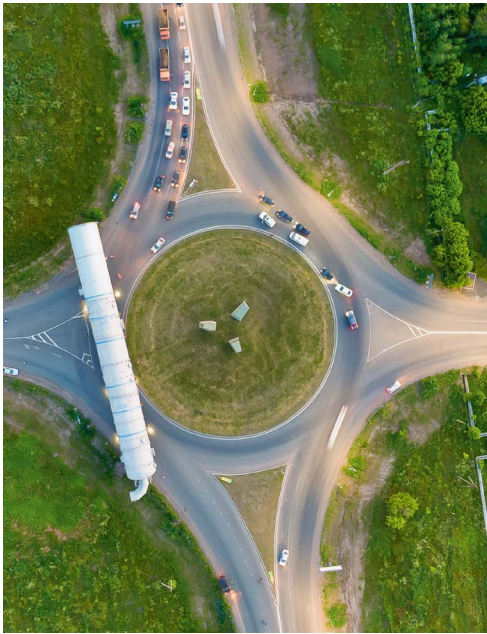
The load-in was performed under continuous supervision of a ballast engineer, who executed ballasting operations in accordance with the method statements prepared and agreed with the hauler. Once the roll-off operation was executed, the SPMTs were ready for transportation to the site.

A challenging 21-kilometer journey to the job site commenced. A year before the project execution started, infrastructure work was undertaken due to its several obstacles.

To ensure smooth road transportation, especially for the largest and heavy lift pieces, several sharp turns, pipe racks, fences, overhead obstructions such as high-voltage power lines and other challenges like rotaries and traffic lights had to be dismantled or improved. After all, a 96-meter column was being transported on this route for the first time in history.



Roll-off operation on SPMTs



Primary fractionator on its way to the job site

Accompanied by escort cars and the road police, who blocked traffic at all intersections, the convoys started in the night and arrived at the site in the morning on the next day. The transportation with the SPMTs took 10 to 13 hours overnight and included passages under electric power lines, complicated curves, and railway crossings for which a special window for passage was agreed with the Russian railway. Afterwards, the empty SPMTs were disassembled at the site and returned to the dry dock by semi-trailers for the next unit roll-off the following day.

More than 300 oversized cargo units were discharged at the Transkama Port and transported overland to the construction site. The biggest boilers, measuring 8.9 meters in height, were delivered from the Transkama Port by SPMT as well.

Due to the short navigational period in which the entire cargo had to reach Nizhnekamsk, every step of the transport chain had to run precisely like clockwork. The successful and safe completion of this extensive project is thanks to the excellent cooperation with our clients, the project owner, and our partners.

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Extraordinary work in an extraordinary time.

During the peak of the project, deugro coordinated 120 axle lines (SPMT) operating in Nizhnekamsk, with a deugro crew of around five members together with various subcontractors supervising the entire operations up to the job site in Nizhnekamsk. The cargo from the dry dock was transported by SPMTs in different configurations.

Top: deugro team supervising the transport of the primary fractionator
Bottom: Job site in Nizhnekamsk, Republic of Tatarstan, Russia



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Project video

Experience the complete transportation—watch the project video on YouTube!