

September 18, 2024

Kawasaki Kisen Kaisha, Ltd. ("K" LINE)

Mitsui O.S.K. Lines, Ltd. (MOL)

Nihon Shipyard Co., Ltd.

Nippon Yusen Kabushiki Kaisha (NYK Line)

Mitsui & Co., Ltd.

Mitsubishi Corporation

Mitsubishi Shipbuilding Co., Ltd.

Approval in Principle (AiP) Acquired from Two Classification Societies for Low-Pressure Type Liquefied CO2 Carriers undergoing Pursuit of Standardization toward Realization of Large-Scale International Transportation from 2028 onwards

- ◆ **AiP certifications for low-pressure type liquefied CO2 carriers have been acquired with a view to standardization for large-scale international marine transportation**
- ◆ **Preparations for early market entry of liquefied CO2 carriers, including application to the Japanese Government's CCS development projects, are being accelerated**

Kawasaki Kisen Kaisha, Ltd. ("K" LINE); Mitsui O.S.K. Lines, Ltd. (MOL); Nihon Shipyard Co., Ltd., a joint venture for ship design and sales between Imabari Shipbuilding Co., Ltd. and Japan Marine United Corporation; Nippon Yusen Kabushiki Kaisha (NYK Line); Mitsui & Co., Ltd.; Mitsubishi Corporation and Mitsubishi Shipbuilding Co., Ltd., a part of Mitsubishi Heavy Industries (MHI) Group have jointly acquired Approval in Principle (AiP)*¹ from the American Bureau of Shipping (ABS) and Nippon Kaiji Kyokai (ClassNK) for two types of low-pressure type liquefied CO2 (LCO2) carriers under their joint development. A presentation ceremony took place on September 17 at the George R. Brown Convention Center, the venue of Gastech 2024, a major international conference on global energy and environmental issues, including natural gas, liquefied natural gas (LNG), and hydrogen, held in Houston, Texas.

Demand for LCO2 carriers is expected to grow in tandem with various CCS (Carbon dioxide Capture and Storage) projects involving the transportation of CO2 captured in Japan to storage sites located overseas. Recently, Mitsubishi Shipbuilding, Nihon Shipyard, Mitsui & Co. and Mitsubishi Corporation have collaborated to achieve standardization of LCO2 carriers suited for use by multiple projects, and to establish a supply chain in order to build and supply LCO2 carriers consistently within Japan, which would contribute towards the realization and improvement of economic efficiency of CCS value chains. These initiatives have led to the acquisitions of two AiPs in collaboration with three major Japanese shipping companies: "K" LINE, MOL and NYK Line.

The two LCO2 carriers that received AiP certifications are low-pressure type 50,000m³-class and 23,000m³-class vessels developed for long-distance ocean voyages. The AiP certifications assume

the use of appropriate cargo tank material as a replacement for the nickel steel previously considered. Additionally, post welding heat treatment (PWHT)*³, one of critical issues in establishing the cargo tank manufacturing, may be omitted by the Engineering Critical Assessment (ECA)*⁴ approach is included.

"K" LINE group is promoting a variety of initiatives to support the low-carbon and carbon-free of its own operations and society in accordance with its long-term environmental policy, "Environmental Vision 2050". In the field of CCS, "K" LINE is the only international shipping company participating in a CO₂ storage project overseas that was selected by Japan Organization for Metals and Energy Security (JOGMEC) as "Advanced CCS Project"*⁵ for fiscal 2024. In addition, "K" LINE will also start Liquefied CO₂ transportation for Northern Lights Project, the world's first full-scale CCS value chain project this year. "K" LINE will contribute to the establishment of CCS value chain through the transportation of liquified CO₂.

【AiP presentation ceremony held at Gastech 2024】



From left:

Mr. Takuya Shirai, Managing Officer, Chief Operating Officer of Mobility Business Unit II, Mitsui & Co.

Mr. Satoshi Kanamori, Managing Executive Officer, "K" LINE

Mr. Hisashi Umemura, Senior Managing Executive Officer, MOL

Mr. Shin Ueda, President & CEO, Mitsubishi Shipbuilding

Mr. Kiyoshi Higaki, President, Nihon Shipyard

Mr. Hayato Suga, Senior Executive Vice President, ClassNK

Mr. Tsutomu Yokoyama, Executive Officer, NYK Line

Mr. Mikito Nakaniwa, Division COO, Infrastructure, Ship & Aerospace Div, Mitsubishi Corporation



Seventh from the left:

Mr. Patrick J. Ryan, Senior Vice President and Chief Technology Officer, ABS

Notes

- *1: Approval in Principle (AiP) indicates that the certification body has reviewed the basic design and approved it as satisfying the technical requirements and safety criteria. The assessment was conducted in accordance with the IGC Code*2 and the American Bureau of Shipping (ABS) and Nippon Kaiji Kyokai (ClassNK) classification rules applicable to vessels transporting liquefied gas in bulk.
- *2: IGC Code (The International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk) is an international regulation stipulating conditions to ensure the safety of vessels that transport liquefied gases (LCO2, LNG, etc.) in bulk.
- *3: In post welding heat treatment (PWHT), structural materials are reheated to a set temperature after welding and held at that temperature for a specified amount of time. This process aims to lower residual stresses generated during welding and improve the quality of welding joints. PWHT is generally performed by placing structural products into a dedicated furnace. When the products are of large size, furnace size may cause bottlenecks in the manufacturing process.
- *4: Engineering Critical Assessment (ECA) is a method for evaluating the safety of welded structural components. Using micro initial defects in the welding joints and the estimated stress history together with characteristics of the material, the ECA confirms that no major quality issues will occur during the product's service life.
- *5: Commission a CCS engineering design work in Sarawak, Malaysia as the "Japanese Advanced CCS Projects" in FY2024

<https://www.kline.co.jp/en/news/carbon-neutral/carbon-neutral-20240913.html>

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