



WAVESPEC Limited



WAVESPEC Limited

Marine Engineering and Naval Architecture Consultants

A Braemar Seascopce Plc. Group Company

WAVESPEC Limited,
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2006

Wavespec's Background

- **Wavespec founded in 1992**
- **40 years staff experience with major VLCC, PC, LNGC and FPSO projects**
- **Worldwide international client base**
- **ISO 9001:2000 Certification**
- **Queen's Award for Export Achievement**
- **Member of the Braemar Seascope Group**
- **Key Participant in LNG Shipping Growth**



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s.s. Methane Princess - 1964



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Wavespec's Main Activities

- **Project Managers for Ship Construction on behalf of Owners, Charterers and Financial Backers**
- **Conversions of Vessels for all Marine and Offshore purposes**
- **Support to Owners or Manufacturers in carrying out their Technical Projects**
- **Sale and Purchase Inspections**



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Technical Support

- **Charterer's Technical Representatives**
- **Ship Surveyors and Inspectors**
- **Marine Advisers to Golar, BG, IMT, K Line, NYK, MOL, Qatar LNG, Maran Gas, CPC, etc.**
- **Providers of Project Teams and Skilled Manpower for Major Contractors and Manufacturers**
- **Litigation and Professional Consultants**

New Construction Services

- **Initial Outline Specifications to Shipyard**
- **Shipyard Inspection and Audit**
- **Detailed Specification and Contract Review**
- **Technical Negotiations & Design Development**
- **Plan Approval and Equipment Selection**
- **Construction Supervision & Factory Inspections**
- **Commissioning and Sea Trials**
- **Guarantee Period**



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Specifications and Studies

- **Conceptual Designs**
- **Outline Specifications**
- **Full Detailed Specifications**
- **Newbuildings and Conversions**

Crude Oil Carriers

Product Carriers

Liquefied Gas Carriers

FPSO (Hull and Marine Systems)

Offshore Support Vessels



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Marine Inspections and Audits

- **Classification Society Searches**
- **Management Audits**
- **Pre-Charter Surveys**
- **Sale and Purchase Evaluations**
- **Technical and Cost Evaluations**
- **Terminal and Ship/Shore Interface Audits**
- **Safety and Operational Surveys**
- **Failure Mode and Effect Analyses (FMEA)**



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LNG Experience

- **Shell Brunei LNGC newbuildings (1970s and 2000s)**
- **North West Shelf LNGC newbuildings (1990s and 2000s)**
- **Nigerian LNGCs conversions and newbuildings**
- **Technical LNGC advice to Korean Shipyards**
- **Drydocking support for DISTRIGAZ chartered LNGCs**
- **Advice to Trinidad Government Atlantic LNG project**
- **LNGC surveys for Cabot and Osprey Maritime**
- **Audits for Qatar LNG Shipping**
- **Automation retrofits for MISC LNGCs**
- **Drydocking support for MOL and NYK LNGCs**
- **Golar LNG newbuildings at HHI and Daewoo**
- **BG Group LNG newbuilding at SHI**
- **Qatargas II & RasGas II projects**
- **Life extension study for Golar LNG vessels**



Current LNG Shipping Projects

- **Supervision and commissioning in Far East**
- **Participation in Qatargas II shipping team**
- **Commissioning of integrated automation systems**
- **Technical advice to short haul LNGC project**
- **Review of alternative propulsion systems**
- **Studies of reliquefaction plant and exhaust gas cleaning**
- **Investigations into new gas containment systems,**
- **including LNG and CNG**
- **Newbuild ship design and specification advice**



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Methane Princess - 2003



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LNG Client Base

- **Golar LNG Management**
- **Osprey Maritime**
- **BG Group**
- **Cabot LNG**
- **Distrigaz LNG**
- **NWSSSC**
- **Samsung Heavy Industries**
- **Daewoo Shipbuilding
& Marine Engineering**
- **Yokogawa**
- **BP Global LNG**
- **STASCO (Shell)**
- **Qatargas II (ExxonMobil)**
- **Qatar LNG Shipping**
- **Mitsui OSK Lines**
- **NYK**
- **K Line**
- **Maran Gas**
- **CPC (Taiwan)**
- **Alstom**
- **South Hook LNG**
- **Grain LNG**



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FPSO Experience

- **Fulmar FSU Conversion and Upgrade**
- **Castellon and Tazerka FPSO Conversions**
- **Specification and Advice for Banio and Vega FPSOs**
- **Experience in Cossack Pioneer Conversion and Upgrade**
- **Technical Support for Erawan FSU Upgrade**
- **Anasuria FPSO Site Supervision Experience**
- **Laminaria Newbuild FPSO Consultancy**
- **Technical Support for Nigerian EA and Bonga Newbuild FPSOs**
- **Technical Support for Soroosh FPSO Conversion**
- **Bijupira-Salema FPSO Conversion Consultancy**
- **Technical Support for IMT FPSO and FSO Projects**



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FPSO Client Base

- **STASCO (Shell)**
- **Enterprise Oil**
- **Woodside Offshore**
- **IMT (ExxonMobil)**
- **Marathon Oil**
- **Kvaerner Oil and Gas**
- **Intec**
- **GTI**
- **Afren**
- **Pinsent Masons**



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Recent Clients and Projects

- Golar Management
Seven 135,000 m³ LNG Carriers
- BG Group (British Gas)
138,000 m³ LNG Carrier and Various
Consultancy Projects
- Samco
Six 300,000dwt Crude Carriers
- Stelmar Shipping
Four 70,000dwt Crude/Product Carriers
- Gulf Management
300,000dwt Crude Carriers and LPG
- Sakhalin Energy
Technical Advisor to Charterer
- South Hook LNG and Grain LNG
Ship/Shore Compatibility Studies
- STASCO (Shell)
LNGC, VLCC & FPSO Projects
- Yokogawa (France and Japan)
Design Engineering for
LNGC Integrated Automation Systems
- IMT (ExxonMobil)
Support for Oil and Gas Projects
- SIEP (Shell)
OSV DP FMEA Study
- GlobalSantaFe and Transocean
Drillship DP Reliability Studies
- Kristen Navigation (Maran Gas)
LNGC Specification Review
- TESMA
LPG Specification Review

Golar Frost On Trials



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Golar Viking at HHI



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