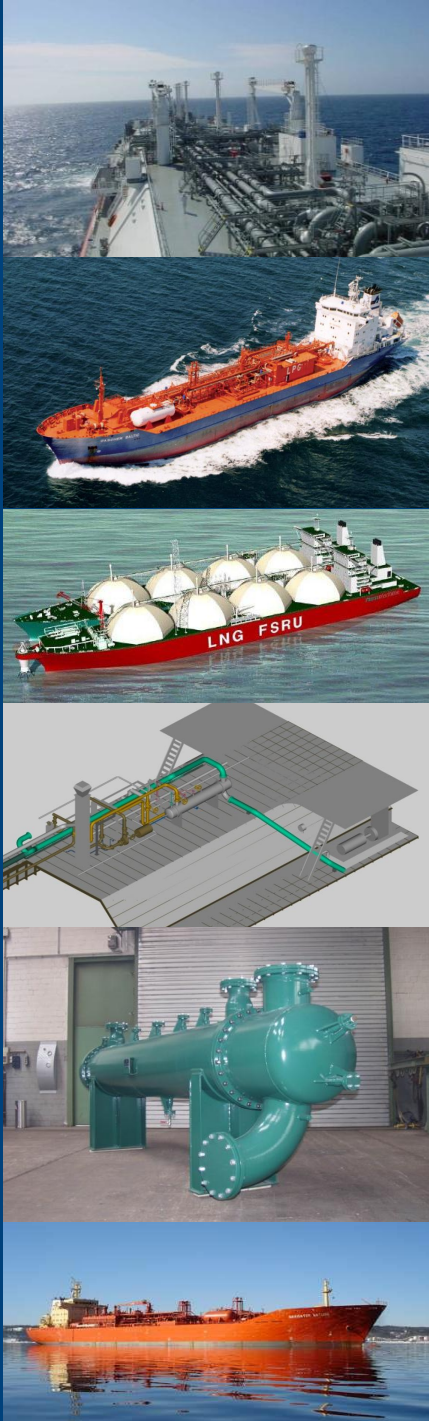


REFERENCE PROJECTS

OFFSHORE FACILITIES GAS CARRIER



Offshore Facilities Gas Carrier



PROJECT

Project name:

LNG Carrier Costing Study

Country:

Australia

Client:

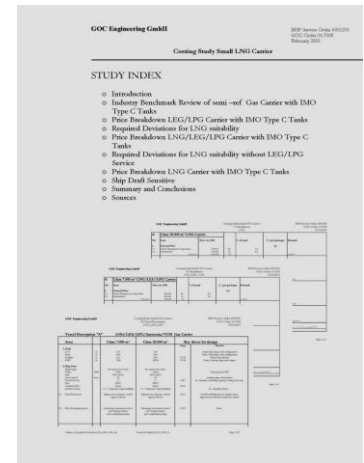
BHP-Melbourne

Year:

2001

GOC project:

7005



PROJECT DESCRIPTION

Study of a unique trade pattern with semi-pressurized LNG carrier for short-term coastal services in Europe

Cargoes:

LNG/Ethylene/LPG

Capacity range: 7,000 - 20,000 m³

PROJECT PHASES

Technical/commercial study

GOC DISCIPLINES

Process

Marine engineering

Commercial

GOC WORK SCOPE

Industry benchmark of semi-ref gas carrier

Vessel description

Prices breakdown

Required deviations for LNG suitability

Price breakdown for LNG/LEG/LPG carrier

Price breakdown for LNG carrier

Ship draft sensitives

Offshore Facilities Gas Carrier



PROJECT

Project name:

Ethylene Gas Tanker

Country:

Germany

Client:

Reederei Hartmann
for GASCHEM

Year:

2003

GOC project:

7015/7017/7020



Source: Hartmann Reederei

PROJECT DESCRIPTION

Reliquefaction system for 8,600 m³ semi-pressurized gas tanker

Cargoes:

Ethylene, Propylene, Propane/Butane Mixtures, Commercial Propane, Ammonia including:

Two open-cycle reliquefaction systems with three oil-free labyrinth reciprocating compressors (Cargo compressor)

Two closed refrigerant cycles with two screw compressors (refrigerant compressor) Refrigerant R 404 A

Process equipment, condenser, vaporizer, flash drum, surge drum

R404 screw compressors with unique VFD start up and control device

PROJECT PHASES

Consultancy

Design

Engineering

GOC DISCIPLINES

Process

Mechanical & rotating equipment

Instrumentation & control

GOC WORK SCOPE

Pre-design and selection of reliquefaction system

Process simulation

Process design basis

Process data sheets

Control function description

PFD/PID

Specification of mechanical & rotating process equipment

Procurement assistance

Specification-process & utility instrumentation

Offshore Facilities Gas Carrier



PROJECT

Project name:

JOTAGAS

Country:

Germany

Client:

Sloman-Neptun

Schiffahrts-AG

Year:

2003

GOC project:

7024



PROJECT DESCRIPTION

Replacement of a Cargo heater for a 7,300 m³ semi-pressurized gas tanker

Cargoes:

Propylene, Propane/Butane Mixtures, Commercial Propane, Ammonia

Shell & tube type heat exchanger, heating medium: seawater

Design: ASME VIII Div. 1, TEMA, IGC-Code, BV-Rules

Design pressure/temperature (barg/°C): shell (33/-48); tube (6/+45)

Transfer surface: 232 m²

PROJECT PHASES

Engineering

Procurement

GOC DISCIPLINES

Process

Piping layout

Mechanical equipment

GOC WORK SCOPE

Engineering

Procurement

Inspection

Offshore Facilities Gas Carrier



PROJECT

Project name:

OMEGAGAS

Country:

Germany

Client:

Sloman-Neptun

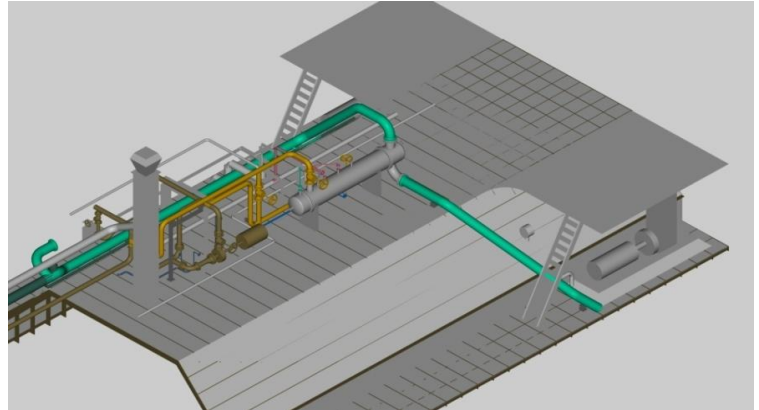
Schiffahrts-AG

Year:

2003

GOC project:

7025 + 7036



PROJECT DESCRIPTION

Increase of cargo heating capacity of a 3,750 m³ semi-pressurized gas tanker by installing of an additional cargo heater on deck.

Cargoes:

Propylene, Propane/Butane Mixtures, Commercial Propane, Ammonia

Shell & tube type heat exchanger, heating medium: seawater

Design: ASME VIII Div. 1, TEMA, IGC-Code, GL-Rules

Design pressure/temperature (barg/°C): shell (25/-48); tube (6/+50)

Transfer surface: 116 m²

Transfer surface: 116 m²

Instrumentation & control

Piping & valves

PROJECT PHASES

Engineering

Procurement

Supervision of erection & test

GOC DISCIPLINES

Process

Mechanical equipment

Piping layout

Instrumentation & control

Supervision

GOC WORK SCOPE

Design

Engineering

Procurement

Supervision of erection & test



Offshore Facilities Gas Carrier



PROJECT	<u>Project name:</u> BETAGAS <u>Country:</u> Germany <u>Client:</u> Sloman-Neptun Schiffahrts-AG <u>Year:</u> 2003 - 2004 <u>GOC project:</u> 7028	
PROJECT DESCRIPTION	Replacement of a Cargo heater/vaporizer/condenser for a 5,760 m³ semi-pressurized gas tanker Cargoes: Propylene, Propane/Butane Mixtures, Commercial Propane, Ammonia Shell & tube type heat exchanger, heating medium: seawater Design: ASME VIII Div. 1, TEMA, IGC-Code, BV-Rules Design pressure/temperature (barg/°C): shell (25/-48); tube (10/+45) Transfer surface: 198 m²	
PROJECT PHASES	Engineering Procurement	
GOC DISCIPLINES	Process Piping layout Mechanical equipment	
GOC WORK SCOPE	Engineering Procurement Inspection	

Offshore Facilities Gas Carrier



PROJECT

Project name:
ALPHAGAS/BETAGAS

Country:

Germany

Client:

Sloman-Neptun

Schiffahrts-AG

Year:

2005

GOC project:

7041



PROJECT DESCRIPTION

Additional level instrumentation for two 5,760 m³
semi-pressurized gas tanker

Cargoes:

Propylene, Propane/Butane Mixtures, Commercial Propane, Ammonia

High level alarm switches for cargo tanks (98% LSAH trip function)

PROJECT PHASES

Engineering
Procurement
Installation

GOC DISCIPLINES

Process
Piping layout
Instrumentation & control

GOC WORK SCOPE

Engineering
Procurement
Installation & tests

Offshore Facilities Gas Carrier



PROJECT

Project name:

HAVLYS (Ex BUSSEWITZ)

Country:

Germany

Client:

Reederei F. Laeisz

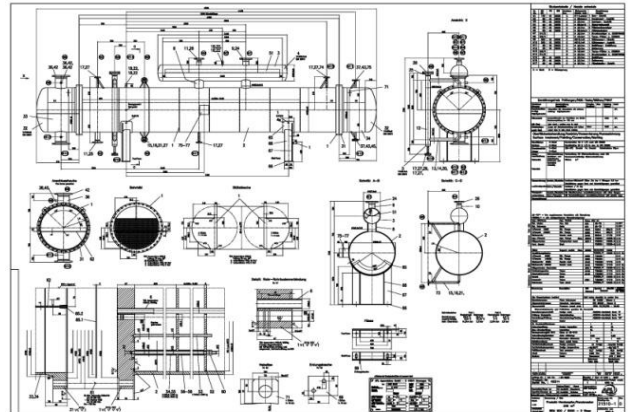
Rostock

Year:

2006

GOC project:

7069



PROJECT DESCRIPTION

Replacement of a Cargo vaporizer/condenser for a 17,000 m³ semi-pressurized gas tanker

Cargoes:

LPG, Ammonia

Shell & tube type heat exchanger, heating medium: seawater

Design: ASME VIII Div. 1, TEMA, IGC-Code, GL-Rules

Design pressure/temperature (barg/°C): shell (25/-48); tube (10/+45)

Transfer surface: 250 m²

PROJECT PHASES

Engineering

Procurement

GOC DISCIPLINES

Process

Piping layout

Mechanical equipment

GOC WORK SCOPE

Engineering

Procurement

Inspection

Offshore Facilities Gas Carrier



PROJECT

Project name:

OMEGAGAS

Country:

Germany

Client:

Sloman-Neptun

Schiffahrts-AG

Year:

2007

GOC project:

7070



PROJECT DESCRIPTION

Additional level instrumentation for a 3,750 m³ semi-pressurized gas tanker

Cargoes:

Propylene, Propane/Butane Mixtures, Commercial Propane, Ammonia

High level alarm switches for cargo tanks (98% LSAH trip function)

PROJECT PHASES

Engineering
Procurement
Installation

GOC DISCIPLINES

Process
Piping layout
Instrumentation & control

GOC WORK SCOPE

Engineering
Procurement
Installation & tests

Offshore Facilities Gas Carrier



PROJECT	<u>Project name:</u> ETAGAS <u>Country:</u> Germany <u>Client:</u> Sloman-Neptun Schiffahrts-AG <u>Year:</u> 2006 <u>GOC project:</u> 7071
PROJECT DESCRIPTION	Replacement of a Cargo heater/vaporizer/condenser for a 8,300 m³ semi-pressurized gas tanker Cargoes: Ethylene, Propylene, Propane/Butane Mixtures, Commercial Propane, Ammonia Shell & tube type heat exchanger, heating medium: seawater Design: ASME VIII Div. 1, TEMA, IGC-Code, BV-Rules Design pressure/temperature (barg/°C): shell (25/-48); tube (10/+45) Transfer surface: 198 m²
PROJECT PHASES	Engineering Procurement
GOC DISCIPLINES	Process Piping layout Mechanical equipment
GOC WORK SCOPE	Engineering Procurement Inspection



Offshore Facilities Gas Carrier

PROJECT

Project name:

OLT LNG Toscana

Country:

Italy

Client:

EON-Ruhrgas/
OLT Offshore

Year:

2009 - ongoing

GOC project:

7081

Source: OLT



PROJECT DESCRIPTION

Floating storage and regasification unit (FSRU)

Moored offshore Livorno, Italy and export gas to shore via a sub sea pipeline

Existing LNG carrier of MOSS design

Turret mooring

Side-by side mooring system

Loading arms

LNG regasification system

BOG handling

Metering

PROJECT PHASES

EPC

GOC DISCIPLINES

Process

Safety engineering

GOC WORK SCOPE

Engineering Review

Participation HAZOP review meetings

Follow up of HAZOP findings

Review commissioning procedure

Preparation of plant performance guarantee criteria

Participation Test run BOG compressor as Owner's representative

Offshore Facilities Gas Carrier



PROJECT

Project name:

LNG Gasport

Country:

Germany

Client:

RWE

Year:

2008

GOC project:

7083



PROJECT DESCRIPTION

Floating storage and regasification unit (FSRU)
Excelerate Gas Port Facility

Source: Excelerate

PROJECT PHASES

Study

GOC DISCIPLINES

Marine engineering
Safety engineering
Authority engineering

GOC WORK SCOPE

Feasibility study