

# ODS Metering Systems

**klöckner & co** multi metal distribution



offshore metering  
packages

pipeline metering

metering control  
systems

## REFERENCE LIST

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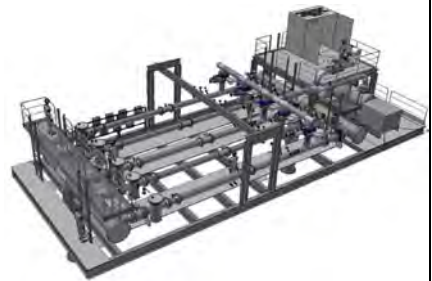
## REFERENCE LIST



**Bumi Armada**



This project covers single point responsibility for all aspects of scope of supply including design, engineering, procurement, project management, fabrication, manufacture, supply, inspection and testing, painting, packing, delivery, documentation & performance guarantees of a Crude Oil Offloading Skid along with Metering Control Systems for installation and operation on FPSO for ENI Angola Block 15/06 East Hub Project. The FPSO is located in about 450 m water depth at the south-east end of the Cabaça North field and at northeast of the Cabaça South East Upper and Lower Miocene fields.



Wintershall Group

This project covers the design, manufacturing, shop test and supply of the RAVN (which stands for Reconnaissance Arial VTOL Navigator) project metering package for Wintershall in the Dutch Sector of the North Sea. The scope of work existed of various oil and gas metering skids, water meters, analyzing and sampling systems and a total platform metering control system.



MID APPROVED

ODS Metering Systems supplied twenty three (23) oil and gas metering systems for the Aegean Refinery project in Turkey (Star Project). The scope of the Aegean Refinery project (ARP) is to build a new oil refining facility to be located within PETKIM land at Alia, close to Izmir, Turkey. The project scope also includes the construction of new Jetty facilities that will be used for feedstock import and products export to/from STAR Refinery. All systems have been designed and built according European MID / CE regulations.

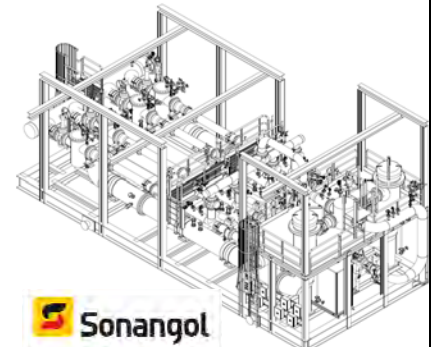


saipem



TOTAL

This project covers the design, engineering, project management, construction, supply, inspection and testing, painting, packing & documentation of both Oil & Gas (Fiscal) Metering Systems destined for the Total E&P Angola - Kaombo project North and South FPSO's which are to be installed in the Block 32 area which encompasses Gengibre, Gindungo, Canela, Louro and Mostarda West fields. The systems are designed according the Angolan standard NMF ("Normas de Medicao Fiscal de Hidrocarbonatos") and built in full compliance with the Angolan local content requirements.



# ODS Metering Systems

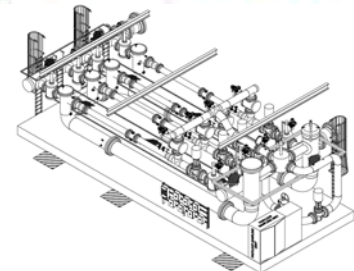
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## REFERENCE LIST



DEPARTMENT OF PETROLEUM RESOURCES  
The Petroleum Regulatory Agency of Nigeria

ODS was awarded the delivery of a fiscal metering package to be installed on the FPSO EGINA. The FPSO will operate offshore Nigeria. The package existed of an Oil Fiscal Metering System, designed for measuring a maximum capacity of 7.200 m<sup>3</sup>/h and a 4,6 MSm<sup>3</sup>/d Gas Fiscal Metering System. The Oil Metering Unit contains a bi-directional sphere prover to calibrate the Helical turbine meters. Two remote Flow Computing and control Panels including a Metering Supervisory Computer System were part of the delivery. The whole package has been designed and built in full compliance with the local DPR regulations



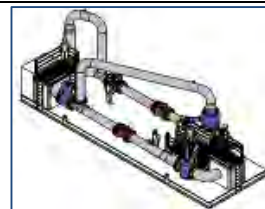
This Project includes the delivery, configuration, engineering, testing, document control and certification of 2 (two) coriolis metering systems for NuStar Terminal Amsterdam. The project is intended to measure the two outgoing flow-lines to the loading arms. The system is designed for two uni-directional measurements and consisted of Coriolis flowmeters and a flow computer cabinet. ODS took full responsibility for the required MID / NMI approvals.



BW Offshore



BW Offshore awarded ODS the delivery of the fiscal metering package for Catcher FPSO operating on UK North Sea major oil discoveries Catcher, Varadero and Burgman fields. The full scope of supply comprises of the delivery of a crude oil offloading system and an export/import gas metering system including an extensive oil and gas sampling and analyser. Also a metering control system including CER flow computer cabinet and CCR HMI system has been delivered. The project has been designed and built according to the latest DECC guidelines, PED, CE, CompEX and DNV classification approval.



ODS was awarded to revamp the complete metering system of FPSO Fluminense. This project has started with inspection of existing flow metering system as per ISO 10012 requirements. The revamp included design, engineering, configuration, manufacture, assembly, inspection and testing, painting, packing and forwarding of the complete metering package. Additionally a Metering Control System will be supplied to integrate all metering points. Everything is designed and installed as per ANP regulations.



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An order was awarded to ODS for the project management, design, engineering, configuration, manufacturing, assembly, inspection and testing, painting, packing and forwarding and documentation of a metering system to be installed at the Donkerbroek/Hemrik gas field in the Netherlands. The scope of supply consisted of a gas metering skid with redundant flow meters, dual pressure and temperature transmitters, a metering control system (MCS) and a gas analyzing system. All has been designed, built, tested and approved under the Measuring Instrument Directive (MID).



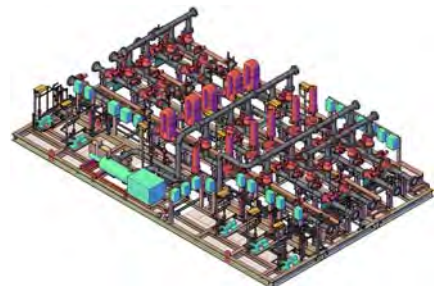
For Aasta Hansteen floating, production, storage and offloading (FPSO) platform topsides process ODS was awarded the minimum technical requirements for the process and mechanical design, fabrication, inspection, testing, and documentation of fifteen (15) sets of V-Cone flow meters. The Cone meters have been designed and built according the latest NORSOK and Statoil specifications.



Botlek Tank Terminal awarded ODS for a Rail car loading metering system with MID approval. The scope of supply included four Coriolis Mass flow meters (Emerson) with flowcomputers (FLOW X SPIRITIT), Cabinets and a HMI Exlerate system. The operator will control the loading via the HMI system. The HMI system is connected to SAP for Order control.



ODS was awarded the design, construction, testing and delivery of Custody Metering Systems (4 nos) for the Lubref Yanbu Refinery Expansion project. The metering systems are designed for the custody transfer measurement of Propane, Diesel, Naphtha and consisted of metering skids, prover skids and metering control systems. All skids are built according Saudi Aramco Oil Company specifications.



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For the FPSO Tupi 9 (FPSO Cidade de Caraguatatuba MV27) ODS was awarded the project management, design, engineering, configuration, manufacture, assembly, inspection and testing, painting, packing and forwarding of the complete metering package. The scope of supply included crude oil metering skids, various process meter runs, flare gas metering, gas chromatographs and an integrated Metering Control System. This FPSO is to be operated in the concession areas related to the Santos Basin, off the coast of Brazil.



For the Sadara project ODS Metering Systems delivered a new bi-directional Custody Metering System inside Al-Waha (Sahara) battery limit designed for combined flow of Sahara and flow from Tasnee and Advance Petrochemical Company (APC). The Custody Metering System consisted of metering skid, small volume prover, redundant flow computers with Metering Supervisory Control and provides all metered data to Al-Waha DCS via redundant Modbus serial interface.



This Project includes the design, engineering, manufacturing, testing, document control and certification of 6 (six) coriolis metering systems according to GOST standard with a max flow of 1.400 m<sup>3</sup>/h, for the Dragon Oil Crude oil Tank Farm in Turkmenistan. The scope further includes two redundant RVP analysers mounted in two cabinet with HVAC installation and flow computer cabinet with supervisory system.



This Project includes the design, engineering, manufacturing, testing, document control and certification of 5 (five) coriolis metering systems with MID certification and max 2000 m<sup>3</sup>/h for the Vopak SIMPP Project. The scope further includes flow computer cabinet and supervisory system. This Service Improvement Project is to increase customer satisfaction by further developing the terminal infrastructure, ICT systems and organizational processes.



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Shell



Single Buoy Moorings Inc.

The Stones development is located along the Walker Ridge protraction area in the deepwater Gulf of Mexico, in a water depth of 7,500-9,500 feet (2,286 – 2,896 m). Nominal production capacities are 60,000 bpd of oil, 30,000 bpd of produced water and 15 MMscfd of associated gas. The Stones FPSO is based on a Suezmax size, double hull tanker. ODS was awarded the full metering package for the FPSO, existing of a 33,000 BBL/H offloading skid, a fiscal gas metering skid and several oil, water and gas process metering points. The full project has been built in accordance with USCG regulations.



Engineering For The Petroleum & Process Industries

الهيئة العامة للغذاء والدواء  
Saudi Aramco



Saudi Aramco

ENPPI awarded ODS the single-point responsibility from front end engineering, design, construction through start-up activities of a 33,000 BBL/H custody metering system for crude oil for the Yanbu Export Refinery Project, Tank Farm Package (SP-01) in accordance with Saudi Aramco Standard SAES-Y-103 "Royalty Metering of Hydrocarbons Liquids". The scope of supply comprised of the following main components: Custody Transfer Crude Oil Metering Skid, Bi-directional Sphere Prover, Automatic Sampling System, Fast Loop Density skid and a common Metering Control System (MCS).



Petrobras



Single Buoy Moorings Inc.

For the 7th and 8th FPSO of the Tupi field (FPSO Marica and FPSO Saquarema), ODS was awarded the project management, design, engineering, configuration, manufacture, assembly, inspection and testing, painting, packing and forwarding of the complete metering packages. The scope of supply included crude oil metering skids, various process meter runs, flare gas metering and integrated Metering Control Systems. The project has been executed with full incorporation of specific Brazilian regulations such as ANP, INMETRO, etc.



DARI B.V.

**BLENDING SYSTEM**

ODS was awarded the design, assembly, testing, inspection, delivery and start-up of a blending system for the SVB Vantage. The blending system comprises of two custody transfer Positive Displacement (PD) meters, a digital flow control valve, temperature elements and filters with dearators. To control the blend, ODS developed blending software for an easy and clear blend process. The batch amount and viscosity of the blend can be inserted in the main screen, after which the system automatically chooses all parameters. After completion, a batch report is printed with all relevant blend details.



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For the FPSO Tupi 6 (FPSO Cidade de Itaguaí MV26) ODS was awarded the project management, design, engineering, configuration, manufacture, assembly, inspection and testing, painting, packing and forwarding of the complete metering package. The scope of supply included crude oil metering skids, various process meter runs, flare gas metering and an integrated Metering Control System. The project has been executed with full incorporation of specific Brazilian regulations such as ANP, INMETRO, etc.



**Saudi Aramco Shell Refinery Company (SASREF)**



**Fluor Arabia**



ODS was awarded the delivery of a Custody Transfer metering system consisting of a 140,000 kg/h Coriolis metering skid, bi-directional sphere prover and a full redundant Metering Control System with flow computers and HMI for measuring the HFO import from SASREF plant to SADARA KFIP Facilities. The HFO Custody Metering System was an addition to the Sadara main plant metering systems and is provided downstream of the transfer pump at SASREF plant. The system has been designed and manufactured according to Shell DEP's.



**Single Buoy Moorings Inc.**

The scope of work for this project includes the design, procurement, manufacture, assembly, testing, mechanical completion, supply of goods and services and documentation for the complete metering package on board of the FPSO Cidade de Ilhabela. The package included fiscal oil metering skids and a number of gas, oil and water metering runs, analyzers and a control panel. The FPSO is operated on a lease contract basis at the concession area referred to as Block BM-S-9 in the Campos Basin (Guará Norte).



**YPergas Venezuela**



**Doris Engineering**

For the Yucal Placer Phase 300 Project in Venezuela, Ypergas awarded ODS the delivery of the metering package. The full scope of supply comprises the delivery of a sales gas metering skid, analyser package with field mounted process gas chromatographs, HC and H<sub>2</sub>O dew point analyser and Metering Control System (MCS) which will process the signals from the field instruments. The metering skid exists of a base frame structure with three 12" 600# flow orifice meter runs in 3x50% Z-configuration for a maximum flow rate of 260 MMSCFD.



# ODS Metering Systems

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### Perenco Oil&Gas Gabon

Perenco awarded ODS the design, engineering, project management, manufacturing, assembly, inspection and testing, painting, packing and forwarding, spare parts and documentation of a Custody Transfer Metering System to be installed on the Fernan Vaz FSO. The FSO is storing and offloading crude oil from the Olende and Oguendjo fields offshore Gabon. The max. flow rate of the system is 39.000 BBL/hr and consists of 4 turbine meter streams with compact prover, sampling system, density measurement, BS&W analyser and a Metering Control System with Flow Computers, PLC and a standalone HMI system.



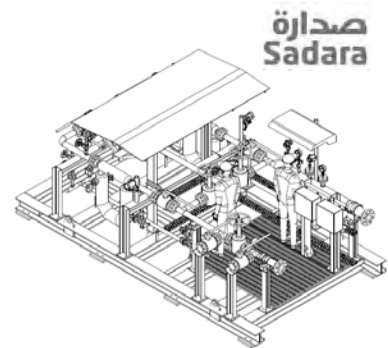
### S-Chem Saudi Arabia

/



### Fluor Arabia

ODS was awarded the delivery of a Custody Transfer metering system consisting of a 45.000 kg/h bi-directional Coriolis metering skid and a Metering Control System with flow computers for measuring the Ethylene, which is imported or exported to/from S-Chem via ethylene pipeline which is 20 km to SADARA Inlet Facilities.. The Ethylene Metering System was an addition to the Sadara main plant metering systems.



ODS was awarded the delivery of a Custody Transfer Naphtha metering system consisting of a 2000 m3/h metering skid, small volume prover, density measurement and a full redundant Metering Control System with flow computers, PLC's and HMI for measuring the Naphtha import from SASREF plant to SADARA KFIP Facilities. The Naphtha Custody Metering System was an addition to the main plant metering systems and is provided downstream of the transfer pump at SADARA Port – Pipelines Import/Export Area.



### Shell SPDC Nigeria



### Makon Engineering

Shell Petroleum Development Company of Nigeria Limited (SPDC) awarded ODS the single-point responsibility from front end engineering, design, construction through start-up activities of a Sales Gas Metering System for Nigeria's Alakiri Gas Field. The scope of supply comprised of a 2x100% 12" 600# orifice sales gas metering skid and a complete analyser package with redundant analysers such as field mounted process gas chromatographs and dew point analysers. A Metering Control System with redundant Supervisory Computers was included to visualise all the field signals and act as overall control system.



# ODS Metering Systems

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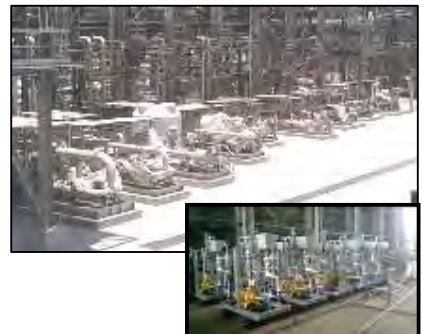
This project involved the design, manufacture, testing, inspection and delivery of one Ethane gas metering system for Saudi International Petrochemical Company (SIPCHEM) in Saudi Arabia. The system was designed and constructed in accordance with Aramco Engineering Standard SAES-Y-101 – “Custody Metering of Hydrocarbon gases” and consisted of a 20.4 MMSCFD Filter Skid, Emergency Isolation Valve Skid, Metering Skid, Flow Control Skid and a Metering Control System.



ODS was awarded the project management, design, engineering, configuration, manufacturing, assembly, inspection and testing, painting, packing, forwarding and documentation for a custody transfer metering package to be installed at the Maasvlakte Oil Terminal (MOT). The scope of supply consisted of a 2x100%, 6" 600# Gas metering skid; an Ultrasonic meter run, 3 off Coriolis flow meters, a combined Metering Control System (MCS) and an analyzing system with two Gas Chromatographs, a Water and HC Dewpoint analyzer.



For the SADARA Chemical Company, ODS took the single-point responsibility from design and construction to start-up activities for a total of thirteen Custody Metering Skids to measure n-Butanol, Naphta, Propylene, Fuel Oil, Ethylene, Methanol, C8+, Benzene, Butene, Sales gas, Octene, Heavy Oil and Light Oil. Five fixed Compact Provers and one portable Compact Prover have also been delivered. All thirteen metering systems are controlled by the three Metering Control Cabinets which include 14 Flow Computers, several PLC systems and an EXLerate HMI system.



Shell Nigeria

This project covered the project management, design, engineering, manufacturing, assembly, inspection and testing, packing and forwarding, spare parts and documentation of three allocation gas metering systems to be installed at Shell Petroleum Development Company of Nigeria Limited (SPDC). Each system has been executed with 2x100% Ultrasonic Flow Meter runs, built up with the necessary manual isolation valves, electric actuated on/off block valves, differential Pressure, Pressure and Temperature measurements. The metering systems comply with applicable Shell DEP's and local regulations.



# ODS Metering Systems

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Single Buoy Moorings Inc.



For the relocation of Xikomba FPSO for "West Hub" deep water field development, in the Angolan block 15/06, Single Buoy Moorings awarded ODS with the refurbishment of the offloading skid to make it fit for purpose for the new 15 year lease life. Before the actual refurbishment, ODS performed a complete survey of the skid on the vessel to determine the required extend of work. The scope finally existed of replacement of the turbine meters, automatic sampling system, prover sphere and detectors, cleaning of all valves and new coating layers where necessary.



DARI B.V.

### BLENDING SYSTEM

ODS was awarded the design, assembly, testing, inspection, delivery and start-up of a blending system for the MTS Elay. The blending system comprises of two custody transfer Positive Displacement (PD) meters, a digital flow control valve, temperature elements and filters with dearators. To control the blend, ODS developed blending software for an easy and clear blend process. The batch amount and viscosity of the blend can be inserted in the main screen, after which the system automatically chooses all parameters. After completion, a batch report is printed with all relevant blend details.



For the refurbishment and upgrade of Ithaca's floating production vessel FPF1 which is located in the North Sea, ODS supplied a Sales Gas Metering System including a redundant analyser package with GC's, H<sub>2</sub>O and H<sub>2</sub>S analysers. The scope further comprised of a Custody transfer Oil Metering System including compact prover, automatic fast loop sampling system with Density and BS&W analysers. Both metering systems are controlled by a combined Metering Control Cabinet with OMNI flow computers and PLC's in a redundant configuration. The systems are designed according all North Sea pipeline regulations, such as CATS and Fortys requirements.



The scope of work for this project covered the design, construction, supply and commissioning of a skid mounted custody transfer condensate metering system for NAM location Delfzijl. The metering skid is based on 2 off 8" Coriolis mass flow meters mounted in a series/parallel configuration. A control cabinet is supplied including Spirit IT Flow computers. The system has been designed according Shell specifications and is certified as per MID module B and F.



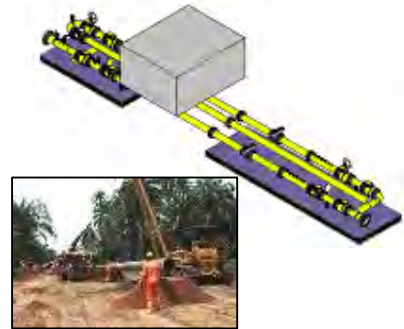
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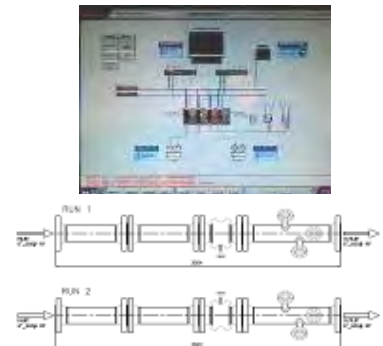
## REFERENCE LIST



Through Saipem Nigeria ODS delivered a Sales Gas metering system for the Northern Option Gas Pipeline Project, owned and operated by Total E&P Nigeria Limited. The full scope of supply comprises of a sales gas metering skid, analyser package with redundant analysers such as field mounted process gas chromatograph, oxygen analyser and dew point analyser and Metering Control System (MCS) which processes the signals from the field instruments.

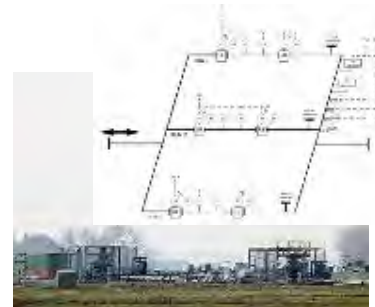


Wintershall awarded ODS a contract for the project management, design, engineering, configuration, manufacturing, assembly, inspection and testing, painting, packing and forwarding and documentation for a Gas Metering System to be installed in Ijmuiden. The scope of supply consisted 2 off Gas metering runs, a Flow computer cabinet with Flow-XR flow computers, a Metering Control System (MCS), Analyzing system with two GC's (one per run) and a Water & HC Dewpoint analyzer.

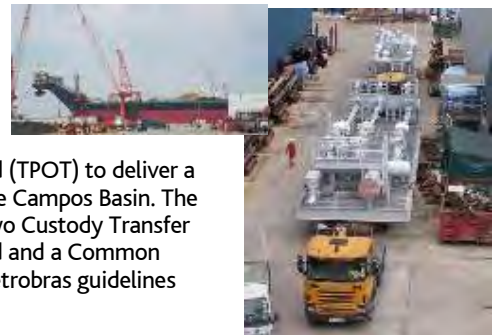


### UNDERGROUND GAS STORAGE

For the second stage of an Underground Gas Storage (UGS) project, ODS supplied the project management, design, engineering, configuration, manufacturing, assembly, inspection and testing, painting, packing and forwarding, spare parts for construction / commissioning, two years operational & maintenance spares, performance guarantee, special tools and documentation of a Gas Metering System. The scope of supply consists of 3 off Gas metering runs 20" mounted on a skid, a Metering Control System (MCS), an Analyzing system with two GC's, redundant H<sub>2</sub>S Analyzers and redundant Water & HC Dewpoint Analyzers as well as three manual samplers.



ODS was awarded a contract by Tanker Pacific Offshore Terminals Pte Ltd (TPOT) to deliver a metering package for the FSO UOTE which is located offshore Brazil in the Campos Basin. The scope of supply included the design, fabrication, testing and delivery of two Custody Transfer Crude Oil Offloading Metering Skids including a Master Meter, Prover Skid and a Common Metering Control System. The system was built in full compliance with Petrobras guidelines and Brazilian regulations.



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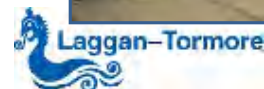
ODS was awarded for the full metering package of the FPSO OSX-3 for OSX Brasil. This project included the design, procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, and water meters. Additional a Metering Control and supervisory System was supplied. The measurements were for Fiscal, allocation and operational purposes. All measurement points were designed as per ANP regulations.



For Al-Khafji Joint Operations (KJO) Gas & NGL export plant, an extensive fiscal metering package for the delivery of Sour gas, Lean gas and NGL has been designed and supplied by ODS. For each product two skids were foreseen to supply the products in a 50:50 ratio to Kuwait Gulf Oil Company and Aramco Gulf Operations. The total project included 2 pieces fiscal metering skid and a bi-directional ball prover for NGL, 2 pieces fiscal metering skids for Lean Gas, 2 pieces fiscal metering skid for Sour Gas, an analyzer package and the HMI/PLC/Flow computer panels.



On the Shetland territory, the Shetland Gas Plant (SGP) was built and is now owned and operated by Total E&P UK Ltd. For this so called Laggan Tormore project ODS supplied seven metering systems to measure fiscal oil, gas, condensate and water. All systems have been designed and constructed in compliance with the Total general specifications. Located approximately 125km north-west of the Shetland Islands, the Laggan and Tormore fields represent the future of the UK oil and gas industry.



For the FPSO Tupi 5 (FPSO Cidade de Mangaratiba MV24) ODS was awarded the project management, design, engineering, configuration, manufacture, assembly, inspection and testing, painting, packing and forwarding of the complete metering package. The scope of supply included crude oil metering skids, various process meter runs, flare gas metering and an integrated Metering Control System. This FPSO is to be operated in the concession areas related to the Santos Basin, off the coast of Brazil.



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The scope of work for this project includes the design, procurement, manufacture, assembly, testing, mechanical completion, supply of goods and services and documentation for the metering package on board of the FPSO OSX 2. The package includes an oil metering skid, a number of gas, oil and water metering runs, analyzers, and a control panel. The OSX 2 is located in the Campos Basin, offshore Brazil in a nominal water depth of 135 meters.



This project covered the design, engineering, project management, manufacture, supply, inspection and testing, painting, packing and forwarding, transportation & documentation of five (5) custody metering systems for the RTDB-2 & DR-2 Pipelines Project in accordance with Saudi Aramco Standard SAES-Y-103 "Royalty Metering of Hydrocarbons Liquids"



ODS was awarded the upgrade of the Fiscal Oil Metering System for the FPSO Polvo. This project included the design, procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of a Fiscal Oil Metering System. Additionally a Metering Control and Supervisory System was supplied together with the integration of this system into the clients Supervisory Systems. Everything was designed as per ANP regulations.



ODS was awarded the upgrade of the Fiscal Oil Metering System for the FPSO Fluminense. This project included the design, procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of a Fiscal Oil Metering System. Additionally a Metering Control System was supplied. Everything was designed as per ANP regulations.



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ODS was awarded the oil and gas metering package for the FPSO Cidade de Anchieta (Previously FPSO Espadarte) for its relocation to the Beleia Azul field offshore Brazil. The scope of supply consisted of the design, supply, testing and commissioning for 8 crude oil metering points, 18 gas orifice meter runs, 11 magnetic water meter points, Analyzers, flare metering and the complete control system.



**SAUDI ARAMCO TOTAL Refinery and Petrochemical Company**



**Gulf Consolidated Contractors**

The project for SATORP Refinery included the design, manufacture, testing, inspection and delivery of a benzene and a propylene custody transfer metering system both consisting of 2 x 100% meter runs, small volume prover, and supervisory system. Further we supplied a liquid sulphur metering system including a master meter run and control panel.

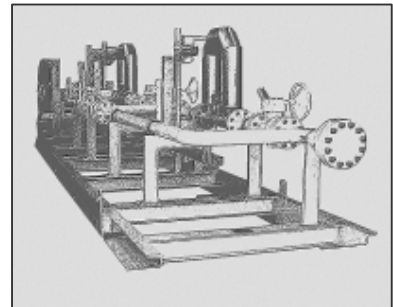


**Dealim Industrial**



**Saudi Aramco**

This project covered the design, engineering, project management, manufacture, supply, inspection and testing, painting, packing and forwarding, transportation & documentation of one sales gas delivery metering system for Arabian Chlor Vinyl Company in accordance with Saudi Aramco Standard SAES-Y-101 "Custody Metering of Hydrocarbon Gases"



**Shell SPDC Nigeria**



**Makon Engineering**

Shell Petroleum Development Company Ltd. (SPDC)

This project covers the design, engineering, project management, manufacturing, supply, inspection and testing, painting, packing and forwarding & documentation of two Custody Transfer metering systems and a valve skid. The project is executed by Makon Engineering, the systems will be used for the Shell Nigeria Domestic Gas (DOMGAS) project. The metering skids are designed for a capacity of 150 MMSCFD with 2 fully redundant 12" 600 lbs Orifice meter runs complete with analyser systems (GC, dewpoint) and supervisory control system. The systems will be approved by DPR (Nigerian Department of Petroleum Resources).



# ODS Metering Systems

klöckner & co multi metal distribution

## REFERENCE LIST



Shell Global Solutions



Spie Controlelec

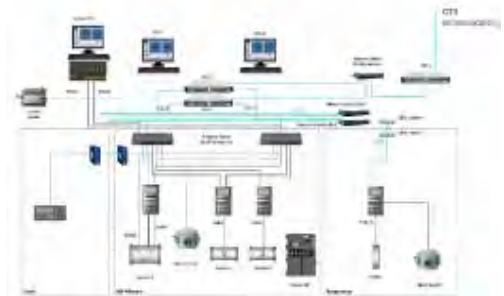
This project covers the design, engineering, project management, manufacture, supply, inspection and testing, painting, packing and forwarding, transportation & documentation of a MID approved Custody Transfer metering system. The system will be used for the Shell Crude Hub pipeline to Germany. ODS manufactures the Metering skid for a capacity of 4300 m<sup>3</sup>/h with 3 off 12" 150 lbs Coriolis meters complete with flowcomputer cabinet and virtual printer package. The system will be MID approved module B+F.



TAQA

Taq Bergermeer

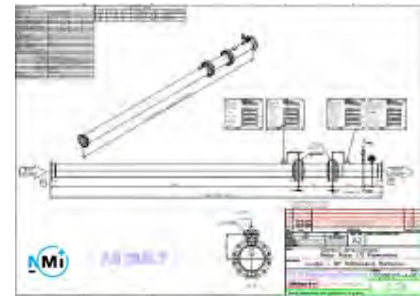
The scope of work for this project includes the design, procurement, manufacture, assembly, testing, mechanical completion, supply of goods and services and documentation for the installation of a 12 inch Sick Quatro meter. The system includes an analyser system and the upgrade of the existing metering control system. The redundant metering control system is connected to 5 flowmeters in the region and gives information to the GTS network. This is the first part of the underground gas storage project of Bergermeer.



BP Refinery Europoort



The scope of work for this project includes the design, procurement, manufacture, assembly, testing and calibration, mechanical completion, supply of goods and services and documentation for a wax and heavy crude ultrasonic flow metering system. The 8" 300 # flowmeters are connected to Omni flowcomputers in a MID approved metering system.



ExxonMobil

Exxon Mobil Refinery Slagen Norway

ODS was awarded for the replacement of an existing prover by a Calibron Syncrotrak S50 prover together with the replacement of the existing flowcomputer cabinet. The system will be Justervesenet approved.



Justervesenet



# ODS Metering Systems

klöckner & co multi metal distribution

## REFERENCE LIST



Lyondell Basell Europoort



EC-type examination  
Certificate

Number T10000 revision B  
Project number 020488  
Page 1 of 1

This project includes the delivery of four metering systems with MID approval. Lyondell has 4 custody transfer points that had to be revised to comply with MID. ODS delivered MID approved flow meters together with the upgrade of the flow computers. ODS used the Module B + Module F to comply with MID (2004/22/EC).

Issued by

M&M Certin B.V.,  
designated and notified by the Netherlands to perform tasks with respect to  
conforming modules mentioned in article 9 of Directive 2004/22/EC, after  
having established that the Measuring instrument meets the applicable  
requirements of Directive 2006/20/EC, is:

Manufacturer

ODS Metering Systems  
Goudastraat 2  
2004 BA Rotterdam,  
The Netherlands



Total Raffinaderij Vlissingen

ODS was awarded for the upgrade of the flow computers of Total Raffinaderij Vlissingen. These flow computers need to be upgraded to comply with MID M1005 for all custody transfer points. 13 flow computers were upgraded to comply with MID.



Centrica Energy F6A Platform North sea

ODS was awarded for the delivery of three UF gas meters (2 off 14 inch Carbon steel and 1 8 inch Duplex) with up- and downstream section and instrumentation. The meters are placed on the J6A platform of Centrica.



Petrobras /



ODS was awarded for the full metering package for the FPSO Cidade de Itajai (Tiro & Sidon) for Petrobras Brasil. This project included the design, procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, high pressure gas injection metering system and water meters. Additionally a Metering Control and supervisory System was supplied. The measurements were for Fiscal, allocation and operational purposes. All measurement points were designed as per ANP regulations.



# ODS Metering Systems

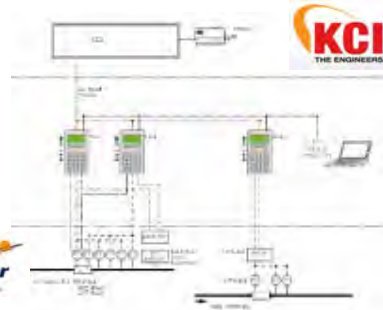
klöckner & co multi metal distribution

## REFERENCE LIST



### Oranje Nassau energie M07 platform tie inn M09

The scope of work for this project includes the design, procurement, manufacture, assembly, testing and calibration, mechanical completion, supply of goods and services and documentation for a UF flow metering system with high pressure calibration and flow computers. The metering system is used for the M07 tie-in on the M9 NAM SHELL platform



### Petrobras / MODEC

ODS was awarded the full metering package for the second pre-salt FPSO, FPSO Cidade de Sao Paulo (TUPI Guara) for Petrobras Brasil. This project included the design, procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, high pressure gas injection metering system (605 barg) and water meters. Additional an Metering Control and supervisory System was supplied. The measurements were for Fiscal, allocation and operational purposes. All measurement point were designed as per ANP regulations.



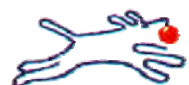
### Saudi Aramco / Gulf Consolidated Contractors

This project covers design, engineering, project management, manufacture, supply, inspection and testing, painting, packing and forwarding, transportation & documentation of two custody metering system for crude oil for the Qassim Fuel Oil Pipeline Project in accordance with Saudi Aramco Standard SAES-Y-103 "Royalty Metering of Hydrocarbons Liquids"



### ADCO / Petrofac

This project covers the engineering, detail design, manufacturing, procurement, supply, configuration and programming, testing, inspection, painting, preparation for shipment and guarantees for custody transfer metering skids for the ASAB Full Fields Development Project.



# ODS Metering Systems

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## REFERENCE LIST



**Northern Petroleum Nederland**



gas transport services

ODS was awarded a metering contract to provide a 3" 600# redundant gas metering system and a condensate & water 3" truck loading skid for onshore exploration locations in The Netherlands (Wijk en Aalburg, Brakel, Geesbrug and Grollo). The gas metering systems are connected to the GTS pipeline network.



ODS was awarded a frame agreement for the upgrade of the BBT terminal of PDVSA. The project involves the engineering, design, delivery and start-up of all loading and unloading Metering Systems including automation.



**Tullow / MODEC**

This project includes the project management, design, engineering, configuration, manufacturing, assembly, inspection and testing, painting, packing and forwarding of a metering system to be installed on an FPSO to be operated at the Jubilee field offshore Ghana, West Africa.



**PETROBRAS**

**Petrobras / MODEC**

ODS was awarded the full metering package for the FPSO Cidade de Angra dos Reis (TUPI Pilot 1) for Petrobras Brasil. This project includes a large qty. of oil, gas and water metering points in accordance with ANP classification.



# ODS Metering Systems

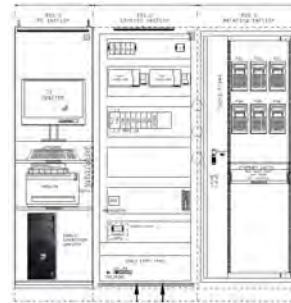
**klöckner & co** multi metal distribution

## REFERENCE LIST



**Woodside / [Redacted]** Single Buoy Moorings

For the FPSO OKHA to be located offshore Australia, ODS was awarded the contract for the design, engineering, project management, manufacture, supply, inspection and testing, painting, packing & documentation of a full Metering Package. The project is part of the CWLH Redevelopment Project.



**BASF** BASF Antwerpen N.V.

This project includes the engineering, design, supply of materials, fabrication, testing, transportation, configuration and supply of documentation for a metering station for ethylene including all hard- and software, services etc.



**Petrobras / [Redacted]** Single Buoy Moorings

This project covers design, engineering, project management, manufacture, supply, inspection and testing, painting, packing & documentation of various Metering Requirements for the FPSO P-57. The spread moored P-57 FPSO shall be designed to produce oil and gas at the Jubarte field, and will be installed in a maximum water depth of 1300 meters.



**ExxonMobil** Esso Refinery

The upgrade project included a modification from a turbine metering station to a coriolis meter based metering station. Three parallel (3 x 50%) 12" coriolis meters were used for an loading rate of 2.500 m<sup>3</sup>/h. The meters are connected to a new Metering Control System.



# ODS Metering Systems

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## REFERENCE LIST



Petrobras /  MODEC MODEC

This project includes the design, fabrication, testing and delivery of oil, water and gas metering systems for the FPSO Cidade de Santos MV20 (Opportunity Gas 2) for Petrobras Brazil. The project was executed at the Brazilian subsidiary of ODS to comply with local content requirements.



Total /  Hyundai Heavy Industries

This project included the design, procurement, fabrication, manufacturing, testing and delivery for an Oil & Gas Metering Unit including all associated fittings, connections, skids, documentation, manuals, for the FPSO USAN located offshore Nigeria. The Oil Offloading Metering Unit is designed for a maximum capacity of 7.260 m<sup>3</sup>/h crude oil and contains a bi-directional prover to calibrate the turbine meters.



Total Exploration & Production

Total has selected ODS as supplier for various Gas Metering packages for offshore platforms F15A, K5P and K6P. Redundant multipath ultrasonic flow meters make Sick Maihak were used in combination with high pressure calibration at Pigsar.



Saudi Kayan /  Fluor Arabia

For the new plant of Saudi Kayan, ODS was awarded the contract for the design, manufacture, testing, inspection and delivery of a crude oil metering system complete with a bi-directional sphere prover in accordance with Saudi Aramco Engineering Standard SAES-Y-103.



# ODS Metering Systems

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## REFERENCE LIST



This project included the design, engineering, project management, manufacture, supply, inspection and testing, painting, packing & documentation of a complete Metering Package to be installed and used on MOPU Encana Deep Panuke, located approximately 250 km southeast of Halifax, Nova Scotia. The scope of supply included a gas export metering skid, condensate, gas and water separate meter runs, various process meter runs, flare gas metering and an integrated Metering Control System.



ODS was awarded the gas metering package for the FSRU Golar Winter for Petrobras Brasil. This project included the export gas (16" 900#) and fuel gas (18" 150#) metering systems.



ODS was awarded the contract for the engineering and supply of a large Gas Metering Skid to measure the sales gas from Saudi Aramco to the Marafiq IWPPP (Independent Water and Power Plant). The Gas Metering Skid was designed for A flow rate of 608 MMSCFD and consisted of a 30" header and 3 x 50%, 20" meter runs and a redundant 16" flow control section. The complete system was built in accordance with SAES-Y-101.



This project included the engineering, detail design, manufacturing, procurement, supply, configuration and programming, testing, inspection, painting, preparation for shipment and guarantees of 2 coriolis based metering skids to be used for the multiproduct pipeline from Qatar Petroleum to Masaieed. In addition a fast loop density skid was supplied.



# ODS Metering Systems

**klöckner & co** multi metal distribution

## REFERENCE LIST



**BR PETROBRAS** Petrobras /  **BWO**

BWO Norway selected ODS Metering Systems as supplier for the fiscal Oil Offloading system for the FPSO Cascade & Chinook. This FPSO of Petrobras Americas (PAI) is the first FPSO located in the US sector of the Gulf of Mexico. The metering system was designed in accordance with the US regulations MMS for an offload capacity of 4.000 m<sup>3</sup>/h. Due to the high viscosity, helical bladed turbine meters were used with a 24" ball prover.



**TALISMAN ENERGY** Talisman /  **Single Buoy Moorings**

This project included the engineering, supply and certification of various metering points for a MOPU for the Yme Re-development Project. The Yme field is located in the Egersund basin in the North Sea, approximately 110 km offshore in the Norwegian Continental Shelf. The project included a Crude oil offloading system based on 12" coriolis meters with master meter setup. In addition a fuel gas meterrun, two flare gas meterruns and an integrated metering control system was supplied. All has been designed and built according the NORSOK standards.



  
NORWEGIAN PETROLEUM  
DIRECTORATE

NPD

 **Saudi Kayan / *FLUOR* Fluor Arabia**

For the new plant of Saudi Kayan, ODS was awarded the contract for the design, manufacture, testing, inspection and delivery of six utility metering skids based on coriolis meters. All skids were designed in Z-configuration to allow on-line meter validation.



**Shell /  Single Buoy Moorings**

This project included the design, raw material procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, and water meters to be installed on the Shell FPSO Espirito Santos for BC10 field. In addition an Metering Control and Supervisory System was supplied. A wide variety of measuring principles were used to fulfil the process and authority requirements. The measurements were for Fiscal, allocation and operational purposes. All measurement point were designed as per ANP regulations.



# ODS Metering Systems

klöckner & co multi metal distribution

## REFERENCE LIST



**Saudi Kayan / *FLUOR* Fluor Arabia**

For the new plant of Saudi Kayan, ODS was awarded the contract for the design, manufacture, testing, inspection and delivery of five metering skids (sales gas, ethane and 3 x butane) complete with two sphere provers and three Metering Control Systems. All systems were built in accordance with Saudi Engineering Standards SAES-Y-101 and SAES-Y-102.



**Shell Qatar GTL / MW Kellogg *KELLOGG* / *CHYODA***

ODS was awarded the frame agreement to be the sole supplier for all Metering Packages for the new Shell Pearl GTL (Gas To Liquid) plant located at Ras Laffan Qatar, 85 km. north of Doha. The project included a total of 12 liquid and gas metering skids with three Metering Control Systems. The metering systems are used for fuel gas import/export (incl. analyser house) , jetty loading, ethane, sulphur and field condensate.



**Chevron / *Single Buoy Moorings***

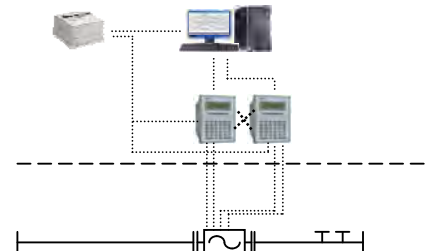


This project included the design, raw material procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, and water meters to be installed on the Shell FPSO Frade. In addition a Metering Control and supervisory System was supplied. A wide variety of measuring principles were used to fulfil the process and authority requirements. The measurements were for Fiscal, allocation and operational purposes. All measurement point were designed as per ANP regulations.



**GDF Production Nederland B.V.**

Manufacturing, supply, testing, and documentation of two 900# duplex meterruns in accordance with Gaz de France specifications. In addition we took full responsibility for the integration with the existing MCS system (flow computer and supervisory system).



# ODS Metering Systems

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## REFERENCE LIST



### Saudi Formaldehyde Chemical Company

This project included the design, manufacture, testing, inspection and delivery of a sales gas metering system consisting of metering skid, Emergency shut-off valve with local shutdown cabinet, by pass valve for emergency shutdown valve redundant filter skid, air receiver with relief valve, and flow computer control panel, designed in accordance with Aramco Engineering Standard SAES-Y-101 custody transfer of hydrocarbon gases.



### Engineers India Limited / Oil India Limited

This project includes the design, manufacturing, testing, factory acceptance, supply and commissioning supervision of metering systems based on ultrasonic flow meters in liquid hydrocarbon application of sizes upto 6" and rating upto 600#. The flowmeters were supplied inclusive of flow straightener / profiler, meter runs, flow computers, interconnecting signal cables, etc.



### Tasnee Petrochemicals

This project included the design, manufacture, testing, inspection and delivery of a sales gas, ethane metering skid and a propane metering skid with bi-directional ball prover for Tasnee Petrochemicals. The systems were designed in accordance with Aramco Engineering Standard SAES-Y-103 – Custody metering of Hydrocarbon liquid and SAES-Y-101 custody transfer of hydrocarbon gases. Further ODS supplied the separate Control panel, HMI/supervisory system for the gas and liquid systems



### APPC Petrochemicals

This project included the design, manufacture, testing, inspection and delivery of one propane metering system consisting of 2 x 100% meter runs, Bi-directional prover, and supervisory system in accordance with Saudi Aramco standard SAES-Y-103 Custody metering of Hydrocarbon liquid. Further we supplied a separate sales gas metering system with control panel a sales gas in accordance with SAES-Y-101 custody transfer of hydrocarbon gases.





### Saudi International Petrochemical Company

This project included the design, manufacture, testing, inspection and delivery of a sales gas metering system consisting of metering skid and flow computer control panel, designed in accordance with Aramco Engineering Standard SAES-Y-101 custody transfer of hydrocarbon gases. The metering skid was in a 2 x 100% in Z-configuration and with a redundant flow control valves.



/ Saipem



This specification covers design, engineering, manufacture, supply, inspection and testing of a Oil Metering Systems designed for a maximum capacity of 6.300 m<sup>3</sup>/h. The metering system will be used on a FPSO located offshore Angola. The system is designed with three 50% multipath ultrasonic flowmeters and a 30" ball prover.



### Natural Gas Distribution Company – Riyadh Saudi Arabia

The scope of work for this project includes the design, procurement, manufacture, assembly, testing, mechanical completion, supply of goods and services and documentation for the upgrade of an existing pressure and reducing station. Activities include mechanical modification on site, upgrade of instrumentation, recalibration, and reconfiguration.



### Bluewater Energy Services B.V.

This project includes the design, manufacturing, testing and supply of the Crude Oil Offloading Metering System for the FPSO "Aoka Mizu" with DTI approval, located in the Nexen Ettrick Field. The metering skid contains of 26" in- and outlet headers, 2 equal 50% duty meterruns with in- and outlet block valves, Ultrasonic Flow Meters, pressure & temperature transmitters, thermal relief valves, Flow Control Ballancing valves and a complete 50% master ultrasonic flowmeter run. The metering system has been designed to comply with the NORSOK standard I-105 specifications.



# ODS Metering Systems

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## REFERENCE LIST



Fluor Daniel B.V. /



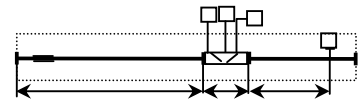
DOW Chemical

This project covers the design, procurement, fabrication, manufacturing, testing and delivery for a Fuel Gas Metering system for Kuwait Olefins Co. (JV between DOW and Petrochemicals Industries Co.), including all associated fittings, connections, skids, documentation and manuals. The Fuel Gas system will be designed to measure the fuel gas supply at a rate of max. 78 mT/h. The system will be located at Shuaiba, Kuwait.



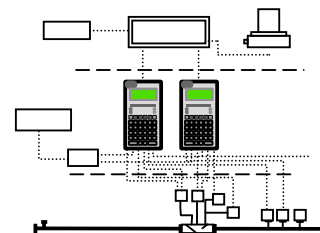
BP Nederland Energie / JE JACOBS Jacobs Engineers & Constructors

This project covers the engineering, detail design, manufacturing, procurement, supply, configuration and programming, testing, inspection and painting for a skid mounted ultrasonic flow metering system. The 12" fiscal gas metering will be installed on the BDF location, for metering of the natural gas imported From the GTS HI-cal grid.



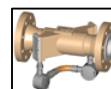
Total Exploration & Production (E&P)

This project involves the design, manufacture, testing, inspection and delivery of a 10" ultrasonic flow meter system for measuring export gas on platform K5P. A Flowcomputer and supervisory system was included based on OMNI Flowcomputers and the eXlerate HMI package. The system will be designed for max.  $10,2 \times 10^6 \text{ Nm}^3/\text{d}$



Snamprogetti

This project included the design, procurement, fabrication, manufacturing, testing and delivery for a NGL metering system and DEO gas metering system including all associated fittings, connections, skids, documentation, manuals and design data certification for installation in Ruwais, Abu Dhabi. Both metering packages are based on multi-path ultrasonic flowmeters. A Metering Control and Supervisory system is supplied for flow calculations, valve line up, reporting, trending, vizualisation and data communication.



# ODS Metering Systems

klöckner & co multi metal distribution

## REFERENCE LIST



**PETROBRAS**

/ Saipem



This project included the design, raw material procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, and water meters to be installed on the Petrobras FPSO Vitoria. In addition a Metering Control and supervisory System was supplied. A wide variety of measuring principles were used to fulfil the process and authority requirements. The measurements were for Fiscal, allocation and operational purposes. All measurement point were designed as per ANP regulations.



**Saudi Aramco / Technicas Reunidas S.A.**

This project included the design, manufacture, testing, inspection and delivery of two liquid custody metering stations for C2+ and C3+ metering at Ju'aymah gas plant expansion Saudi Arabia. The systems were designed in accordance with Aramco Engineering Standard SAES-Y-103 – Custody metering of Hydrocarbon liquid. Both systems consist of one meterrun and one by pass to an existing prover. The systems were designed for 192.000 bbl/day (C2+) and 110.000 bbl/day (C3+).



/ Single Buoy Moorings

This project covered the engineering, detail design, manufacturing, procurement, supply, configuration and programming, testing, inspection, painting, preparation for shipment and guarantees for a fiscal oil offloading system and a high pressure gas metering system for the FPSO Kikeh located offshore Malaysia. The offloading system is designed for 7000 m3/h and included 4 parallel turbine meterruns and a compact prover. The gas system is designed for 359 barg and included two 8" meterruns based on orifice fittings. Both systems were designed per Petronas guidelines.



**DSM Special Products**

This quotation covered the design, construction, supply, testing, calibration and quality assurance of two custody transfer metering skids and flow computers for loading of "bald" to tank trucks. The metering installations will be approved for custody transfer by NMI. The metering systems will use Bopp & Reuther PD meters as primary element.



# ODS Metering Systems

klöckner & co multi metal distribution

## REFERENCE LIST



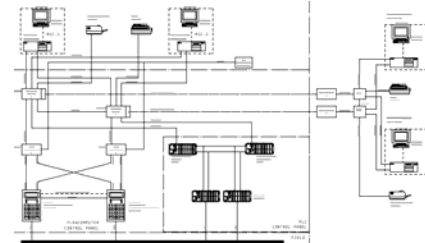
**Saudi Aramco**

The scope of supply consisted of the replacement of the existing Daniel flowcomputer system at the "Feed & Surge" location of the Ju'aymah Gas Plant. The upgrade included instrumentation cabinets with a full redundant flow computer system including 36 multi stream OMNI Flowcomputers, associated MCS Computers, PLC system and a Human Machine Interface (HMI). The complete system complies with the Saudi Aramco SAES-Y-103 specifications



**Saudi Aramco**

The scope of supply consisted of the replacement of the existing Daniel flowcomputer system at the "Sea Island" location of the Ju'aymah Gas Plant. The upgrade included instrumentation cabinets with a full redundant flow computer system including 10 multi stream OMNI Flowcomputers, associated MCS Computers, PLC system and a Human Machine Interface (HMI). The complete system complies with the Saudi Aramco SAES-Y-103 specifications.



**Saudi Aramco**

The scope of supply consisted of the design, supply, testing and commissioning for all the settlement and Back-up Metering Systems for the Ju'aymah and Ras Tanura Gas Plants. Metering systems are supplied for; HP steam, feed water, potable water, utility water, sales gas metering and sales supplementary firing metering. Instrumentation cabinet are supplied for the required compensation, reporting and communication functionality.



**Saudi Aramco Shell Refinery Company (SASREF)**

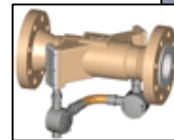
This project covered the engineering, detail design, manufacturing, supply, testing, inspection and guarantees for two kerosene skids. Each Metering System has been delivered pre mounted and consists of piping and fittings, instruments and valves, steel structure, etc. Each system consists of two parallel measuring streams in a "1+1" configuration using 6" coriolis mass flowmeters. A bi-directional ball prover was included for on-site calibration purposes of the two metering skids.





/ Single Buoy Moorings

This project covered the engineering, detail design, manufacturing, procurement, supply, configuration and programming, testing, inspection, painting, preparation for shipment and guarantees for an export metering skid that is installed on an EWT system for Block 1 offshore Turkmenistan in the Caspian Sea. The system uses two multi-beam ultrasonic flowmeters in a duty/standby configuration controlled by a multi channel flow computer.



Petro-Canada b.v.

This project involves the design, manufacture, testing, inspection and delivery of an Export Metering Package for use on the De Ruyter platform in the North Sea. The package consists of the following main systems: Common Export Metering Package Skid, Wet gas metering system, Crude oil offloading metering system and a Common Metering Control Panel.



/ Visser & Smit Hanab b.v.

ODS is awarded by Visser & Smit Hanab with a frame agreement for the engineering, construction, supply, installation, commissioning and maintenance of primary pressure reduction and metering stations for a CO<sub>2</sub> pipeline. And distribution grid that connects the Shell refinery in Pernis with the greenhouses in the Dutch "Westland" and "B-Driehoek" regions. CO<sub>2</sub> is used by the greenhouses to stimulate the growth of the plants.



### Natural Gas Distribution Company – Riyadh Saudi Arabia

The project included seventeen pressure reduction and flow metering skids, used for the supply of sales gas to serve additional industries in the Second Industrial City (SIC) of Riyadh by connecting to the existing Fuel Gas Distribution Network. The metering skids were equipped with valves, filters, flow conditioning section, flowmeter, pressure regulator, flow controller, piping, supports, base frame and solar powered flow computers. All the metering systems are manually-operated systems and designed for a stand-alone / unattended operation.



# ODS Metering Systems

klöckner & co multi metal distribution

## REFERENCE LIST



Linde-KCA / Basell Polyolefins 

This project included the design, engineering, construction and supply of Ethylene meterruns for installation on the Basell Polyolefins site in Wesseling Germany. The meterruns were constructed as per ADM requirements for use in the ethylene pipeline grid of the Aethylen Rohrleitung Gesellschaft.



**Gulf Advanced Chemical Industries Company Limited**

This project, awarded by Fluor Arabia, covered the engineering as per Saudi Aramco Engineering Standards, testing and commissioning of a metering system which will be used for the import from the Saudi Aramco JJBUT Butane pipeline to the Gulf Advanced Chemical Industries Company (GACIC). The metering skid is equipped with valves, filters, flow conditioning section, flowmeter, piping, supports, base frame, compact piston prover and is controlled and monitored by a redundant PLC supervisory flowcomputer system.



**Total Raffinaderij Vlissingen b.v.**

Total Raffinaderij Nederland is a joint venture between TOTAL France and DOW Chemicals. For their barge loading operation, ODS was awarded the contract for the design, construction, supply and certification upgrade of their flow computer automation system. The project included 19 loading points at various locations.



**Mobil Oil B.V.**

This project covers the design, construction, supply, testing, calibration and quality assurance of four custody transfer metering skids and flow computers for loading different types of lube oil to tank trucks. The metering installations are approved for custody transfer by NMI. High accuracy PD meters were used for these high viscous liquids.



# ODS Metering Systems

**klöckner & co** multi metal distribution

## REFERENCE LIST



**PETROBRAS**

/ Single Buoy Moorings

This project included the design, raw material procurement, fabrication , assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, and water meters to be installed on a Petrobras FPSO Marlim Sul. A wide variety of measuring principles were used to fulfil the process and authority requirements. The measurements were for Fiscal, allocation and operational purposes. A control and supervisory system was supplied based on OMNI flow computers.



**Shell Petroleum Development Company Nigeria / Daewoo Engineers & Constructors**

The design, fabrication, assembly, testing, guarantees, painting and preparation for shipment of a full natural gas and condensate metering system for mounting and operation at the SPDC Cawthorne area in Nigeria. The project included three gas metering skids (ultrasonic/orifice), two condensate metering skids (coriolis), sampling system, analyser house with gas analytical equipment and a control, supervisory and validation system.



**Shell Nederland Chemie BV / Jacobs Engineering & Constructors**

This project included the design, procurement, fabrication, manufacturing, testing and delivery of a mass flow metering skid with supervisory and control system and safeguarding system. The system is an integral part of a delivery station to dispatch supercritical ethylene to an existing ethylene grid. Ultrasonic flowmeters were used with an OMNI flowcomputer that calculates density out of the measured sonic velocity.



**ExxonMobil** / **ExxonMobil** Single Buoy Moorings

This design, engineering, construction, testing, calibration, inspection and authority approval of two crude-oil offloading system. The metering system will be installed on two FPSO's located offshore Angola and Equatorial Guinea. The system designed for an offload capacity of 7500 m3/h and are equipped with turbine meters, a 30" bi-directional ball prover, sampling and analyser package and control system with HMI for fully automatic operation.



# ODS Metering Systems

**klöckner & co** multi metal distribution

## REFERENCE LIST



### Hyundai Heavy Industries / Korean National Oil Company

The engineering, fabrication, assembly, testing, calibration, inspection, commissioning, guarantees, painting and preparation for shipment of two metering packages for export gas and condensate. The metering packages will be used for the Dong Hae-1 field development project offshore South Korea. The gas system is equipped with a multi-path ultrasonic flowmeter and gas analyser package. The condensate package uses high pressure coriolis meters make Rheonik. A combined instrumentation cabinet is supplied for calculation, control and communication purposes.



### ExxonMobil Ezzo Deepwater Ltd. Nigeria / Single Buoy Moorings

The design, engineering, construction, testing, calibration, inspection and authority approval of a crude-oil offloading system. The metering system will be installed on the FPSO "Falcon" located offshore Nigeria. The system is designed for an offload capacity of 7500 m<sup>3</sup>/h and is equipped with turbine meters, a 30" bi-directional ball prover, sampling and analyser package and a control system with HMI for fully automatic operation.



### Saybolt

This specification covers the engineering, fabrication, assembly, testing, calibration, inspection, guarantees, painting and preparation for shipment of a Mobile Calibration System. The system consists of a metering skid mounted on a truck with local prover Computer. The system is designed for calibrating volume and mass flowmeters from 0,45 m<sup>3</sup>/h upto 480 m<sup>3</sup>/h.



### Shell Nederland Chemie b.v. / GTI Rotterdam Industrie b.v.

The engineering, construction, testing, custody transfer approval and commissioning of 17 flow computer cabinets for the Shell site in Pernis near Rotterdam. The flow computer cabinets are equipped with over 40 multi-stream OMNI flowcomputers. The cabinets are used in the "Feedstock & Utility project" for the (internal) accounting of various utility and feedstock flows between the different companies on the Pernis site.





### TOTALFINAELF

The design, fabricate, assembly, test, calibration, inspection, commissioning, guarantees, painting and preparation for shipment of a Custody Transfer Flow Measuring System for Fina Raffinaderij Antwerpen N.V. The Metering Skid consists of 2 ea. 12" Rheonik coriolis mass flowmeters mounted in series for real time comparison and redundancy. A dual stream OMNI flow computer is supplied providing real time comparison between the two coriolis meters as well as signal processing, control, archiving, report generation and communications according to the applicable rules by the Belgium IJkwezen.



### Shell Petroleum Development Company Nigeria / Hyundai Heavy Industries

The design, fabrication, assembly, test, calibration, inspection, commissioning, guarantees, painting and preparation for shipment of three Export Crude Oil Metering Packages to be used for the Forcados Yokri Integrated Project of Shell Petroleum Development Company of Nigeria Ltd.



### GDF Production Nederland B.V.

The supply, software engineering, configuration, testing and commissioning of flow computer and SCADA systems on the 8 offshore platforms of Gaz de France in North Sea. Multi stream OMNI Flowcomputers were used for data processing (orifice, ultrasonic), archiving, report generation and communication to the various supervisory systems.



### Solvay Polyolefins Europe - Belgium

The design, procurement, fabrication, manufacturing, testing, calibration and commissioning of a 4" metering station for supercritical ethylene (max. 60 T/h). This station connects the Solvay factory to the C2H4 network of ARG. The metering station is built according to the ADB guidelines. The projects included a metering skid, PLC control cabinet and modifications to the existing flow computer cabinet.



# ODS Metering Systems

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## REFERENCE LIST



**Hyundai Heavy Industries / VEBA Oil Nederland B.V.**



The engineering, fabrication, assembly, testing and commissioning of 3 metering and chemical injection systems for Veba Oil. The gas import metering treatment system is designed for a pressure of 120 barg. An electric heater is supplied to avoid hydration problems. Furthermore the project included a corrosion inhibitor and a methanol injection system.



**Shell Nederland Raffinaderij / Jacobs Engineering & Constructors**

The design, procurement, fabrication, manufacturing, testing and delivery of 5 metering, blending and injection systems for the Shell Refinery in The Netherlands.



**ABB Lummus Global / Petrogal BP Borealis J.V.**

The design, construction, fabrication, assembly, testing, calibration And commissioning of a Custody Transfer Metering System for liquefied Propane (LPG). The system consists of a metering skid with a dual filter section, gas separator, density section and two parallel turbine meterruns (600 m3/h each). A flow metering cubicle is supplied with dual redundant configured flow computers.



**NAM / Woodstork**

The design, construction, supply and commissioning of a custody transfer skid mounted metering system. The metering skid will be located on the F3 platform in the Northsea to measure crude oil and condensate. A control cabinet will be supplied with two multi-stream Omni Flowcomputers in full redundant mode. A PLC is used for communication purposes.





### Fluor Daniel B.V. / Ceska Rafinerska (Shell)

The design, construction, supply and commissioning of custody transfer metering systems for the Ceska Rafinerska in the Czech Republic. The metering systems consist of Coriolis Mass flowmeters make Rheonik and various orifice meterruns for steam (upto 550°C), nitrogen and fuel gas. Omni Flowcomputers are used for compensation and communication. Furthermore 16 Rheonik mass flowmeters are supplied for process applications.



### Hyundai Heavy Industries / VEBA Oil Nederland B.V.



The design, construction, supply and commissioning of two custody transfer skid mounted metering systems for crude oil and natural gas. The crude oil metering system uses two 12" Rheonik coriolis meters in series. The gas metering system is based on two parallel meterruns with gas turbine meters. A combined cabinet is used with Omni Flowcomputers and Monitor Pro Human Machine Interface for visualisation and trending.



### NAM Den Helder

The design, construction, supply and commissioning of a custody transfer skid mounted condensate metering system. The metering skid is based on 2 ea. 6" Rheonik coriolis mass flowmeters mounted in a series/parallel configuration. A control cabinet is supplied with Omni Flowcomputers and a PLC for communication purposes.



### Shell Nederland Raffinaderij BV / Jacobs Engineering & Constructors

The design, construction, supply and commissioning of a skid mounted metering/injection system for Paradyne. The metering system is based on 3 x Rheonik coriolis mass flowmeters, 2 x Gear Pumps, Flow control valves, etc. A free standing instrumentation cabinet using Omni Flow-computers is used for measurement and control purposes.



# ODS Metering Systems

**klöckner & co** multi metal distribution

## REFERENCE LIST



**Maersk Oil Qatar**

The design, construction and supply of high accurate metering systems based on Rheonik coriolis mass flowmeters and Controlotron in-line ultrasonic flow-meters for liquids and gas to be used for an off-shore platform in the sea of Qatar.



**Fluor Daniel B.V. / Bluewater Engineering B.V.**

The design, construction, supply and commissioning of a 100% redundant fiscal gas metering system for the Bleo Holm FPSO operating in the Ross Field, U.K. sector North Sea. The metering system uses traditional orifice meters, Daniel gas chromatograph and Omni Flowcomputers.



**BASF Antwerpen N.V.**

The design, construction, supply and commissioning of a pressure reducing/ metering station for natural gas and the revamp of an ARG metering station for supercritical ethylene. Capacity of the natural gas metering station: 25.000 Nm<sup>3</sup>/h, pressure 17 -> 4 bar. The revamp consisted of increasing the capacity and making the station suitable for import and export use.



**Kuwait Petroleum Europoort B.V.**

The design, construction, supply, commissioning, calibration and NMI approval of a new barge loading installation consists of 12 metering skids (each suitable for 1200 m<sup>3</sup>/h), instrument and power supply cabinets with Omni Flowcomputers, Supervisory system with HMI based on NMI approved PLC's from Telemecanique.

