

Upstream

Expert advice for safe and efficient exploration, production and transport of onshore and offshore oil and gas.



Lloyd's
Register

LIFE MATTERS

Contents

Providing assurance; enhancing reliability	02
Our credentials as your impartial, technical expert	
How we help	04
Introducing our services	
Through-life support	08
We're there at every stage	
Who we help	10
Projects, software applications, research and development initiatives	
Expert insight	12
Deeper knowledge	
Our wider services	16
Other industries that benefit from our services	
Your nearest contact	17
Getting in touch	



Cover: Oil and gas drilling platform and supply ship in the Pacific Ocean.

This page: Floating Production, Storage and Offloading (FPSO) Ningaloo Vision.

© Prosafe Production.

Lloyd's Register helps upstream companies around the world to operate with confidence and tackle the industry's ever-growing technical, regulatory, commercial and environmental demands.

We work closely with the oil and gas industry to help improve the safety, reliability and performance of assets, people, systems and processes. Clients turn to us for support across the key upstream areas of exploration, production and transportation. They include owners, operators, build yards, equipment vendors, manufacturers, engineering procurement contractors and regulators.

Our range of capabilities in the areas of compliance, technical consulting and business solutions cover the full life cycle of every upstream asset type, from fixed offshore platforms to semi-submersibles, drilling ships, floating units (FPSOs, FSOs and FLNGs) to onshore and offshore pipelines. We support individual projects, help to solve unique technical issues and can assess entire asset portfolios, including advising on how to enhance operations and management.

Our clients, many of whom are involved in joint-venture, cross-regional projects, value our independent status, in-depth industry insight, technical excellence and global reach. You will find our specialists in 247 strategically located offices, worldwide.



Providing assurance; enhancing reliability



Our ModuSpec business, is the number one provider of offshore drilling rig pre-charter surveys and assessments in the world.

Stakeholders in high-risk industries need to be certain that operations will run reliably and safely. The first task is to assure all equipment, components and assets are designed correctly and built to specification.

The Lloyd's Register Group is one of the world leaders in assessing facilities, equipment and products against regulatory, voluntary or proprietary standards, industry codes, regulations or schemes. Choosing us as your technical expert demonstrates your commitment to getting the critical early stages right, first time.

Five reasons to choose us

Operate with confidence

We are global leaders in providing independent assurance services in the safety and performance of assets, systems, people and processes. We participate in world renowned technical committees such as the American Society of Mechanical Engineers (ASME), and lead CEOC's energy and efficiency committee and participate with CEOC on their inspection committee and pressure equipment committee. We present insight into modern-day safety and performance challenges, lead on discussion forums and papers at industry-wide events such as ICONE, and contribute to the development of international standards in Asia, Europe and Americas.

Benefit from our expertise

Our people are of the highest technical calibre. They understand the business of oil, gas and refining. Our work includes many high-integrity projects, from the development of the first land-based boiler rules through to the world's largest integrated refinery project.

We appreciate the technical and commercial challenges faced by the oil and gas industry and that to achieve a sustainable and growing business, stakeholders need to think beyond compliance.

Get support worldwide

Oil and gas is a global business, as is our network of over 8,500 specialists. You will find us in over 186 countries, from the key upstream hubs around the world to the harshest and remote parts of the planet. Clients benefit from our in-depth knowledge of local operating conditions and global bank of expertise.

Improve safety while enhancing reliability and competitiveness

We do more than carry out inspections. We help our clients solve problems, working collaboratively towards a common goal: to improve business performance throughout the supply chain. Our consultancy services focus on research and development breakthroughs and commercialising new products, as well as industrial innovation in smart, safe and sustainable rig operations – extending valuable benefits to your clients.

Count on our third-party impartiality

You can be assured of our complete independence. We are able to make technical decisions free of commercial and political pressure. With no institutional or private shareholders, Lloyd's Register reinvests surplus resources to fulfil its 250 year-old mission: 'to work to protect lives at sea, on land and in the air'. This mission influences everything we do as an organisation.



We routinely resolve complex, real world upstream issues with the latest ideas and technologies for:

- drilling and drilling equipment
- drill ships
- jack-ups
- semi-submersibles
- offshore production
- onshore production
- topsides
- fixed platforms
- floating offshore installations
- LNG terminals
- subsea
- umbilical risers and flowlines
- electrical systems and instrumentation
- other plant equipment
- rotating equipment
- pipelines
- lifting equipment and appliances
- cylinders, tubes, drums, tankers and containers
- welding and fabrications
- procurement management systems
- global vendor quality management

How we help



Compliance

Certification

Assure stakeholders that your assets, equipment and systems conform to agreed standards or specifications with our independent services.

We confirm that design and construction meet required codes and specifications and, where mandated by regulation, can certify the operational suitability of your assets. If standards or specifications do not exist, we can work with you to develop appropriate criteria against which certification can be provided.

Classification

Operate with confidence knowing that your Floating Offshore Installations (FOIs) and Mobile Offshore Units (MOUs) are designed, constructed and operated to recognised standards.

Our internationally recognised Rules set standards for the design, construction and operation of FOIs, MOUs and other floating units around the world. We provide independent confirmation that these Rules are being met throughout your asset's life cycle.



Independent verification and validation

Have confidence that you have identified and addressed your assets' major accident hazards.

We provide independent confirmation that the design, construction and operation of safety critical equipment and systems are in accordance with the required performance standards, and that appropriate schemes for examination and testing are in place.

Vendor inspection

Know that even the smallest bolt on your asset meets with the right code, standard or specification.

We carry out vendor inspections at facilities around the world, checking that a particular product, component or installation meets the necessary requirements, giving you confidence in your procurement supply chain.

Technical consulting

Integrity management

Be confident that your assets' critical systems and equipment will perform to your expectations.

We help assess and monitor the condition of your physical assets, equipment and hardware, as well as the processes and people in place, to develop asset-specific risk-based monitoring programmes that provide you with data on safety, reliability and operating performance. This service is supported by our licensed software products Reliability Based Mechanical Integrity (RBMI) and Knowledge Based Asset Integrity™ (KBAI™). With our support, you can optimise the performance of your assets throughout their life span.

Risk and engineering consultancy

Be assured that your risk management and operational decisions are based on sound technical foundations.

Our technical advice helps you make critical decisions regarding your management of risk and operation of equipment. Our specialist expertise spans a range of risk and engineering disciplines, including safety, structural, electrical, corrosion, geotechnical, process plant machinery, noise and vibration and environmental engineering. Together with our modelling skills in finite element analysis and computational fluid dynamics, we can provide technical advice on all aspects of your operations, including probabilistic risk assessment, safety case preparations, fire and explosion modelling, and noise and vibration studies.

Our RiskSpectrum® software is a world leader in probabilistic safety analysis.

Operational readiness support

Use our specialist knowledge to support the design of your equipment, systems and processes – improving safety, health and operational performance.

Our team achieves an understanding of how your people interface with processes, systems and physical assets through a broad range of operational integrity related services. These services include human factors, training, management systems, root cause incident analysis, and process safety management.

Field life extension

Have confidence in the integrity of your ageing assets.

Tomorrow's challenges will be overcome by understanding the technical, systems, and competency demands of the next phase of your asset's life cycle. We bring together the breadth and depth of our services to support your future risk management requirements in relation to plant, systems, processes and people.

Materials/equipment failure investigation

Benefit from an independent assessment of why materials or equipment have failed.

We conduct tests and detailed analyses to determine the likely cause of failure of any materials and components. Failure investigation provides valuable data that can be used to prevent future problems. With this data and our expert advice, you can be confident that you are working to engineering best practices.

Business solutions

Business performance improvement

Add significant value to your business with our software, training, performance-improvement support and best practice management systems.

We can combine any of our diverse range of specialist capabilities to deliver a business consultancy service that meets your specific requirements.

Options include sophisticated human factors' services, organisational integrity consulting support and business and supply chain assurance.



We are the number one provider of independent verification services to offshore operators in the UK. We are class leaders in Canada's Eastern Seaboard and leading certification providers in Australia, New Zealand and The Netherlands and are recognised as a leading authority in Kazakhstan for our compliance services.

As our client you have access to the entire resources of the Lloyd's Register Group, and our range of specialist services to meet your oil and gas challenges.

Reliability Based Mechanical Integrity (RBMI) software

Provides a fully integrated risk-based inspection and maintenance programme for pressure vessels, piping, storage tanks, heat exchangers (including bundles), relief devices, pipelines, rotating equipment and instrumentation. RBMI is a third-party solution, certified to API 580, and can be integrated with back-office systems such as SAP, CMMS, document management solutions and data historians.

Pressure relief analysis software

Combined with our expertise on pressure relief analysis, this software is part of our service portfolio offering accurate analysis to help support the identification of potential safety issues associated with pressure relief systems, from consistency of documentation used to support design principles with regulatory requirements, through to the strategic solutions of pressure relief system capacity.

ModuSpec

The global leader of a wide range of innovative services to ensure operational integrity of drilling assets, ModuSpec helps clients to become world-class in maximising their productivity responsibly and safely.

Martec

Specialises in developing advanced engineering simulation technology for the design and analysis of complete structures, materials and systems.

Scandpower and RiskSpectrum®

A leading independent risk management company with 40 years experience of providing consulting services and software to the international energy market. Its RiskSpectrum® software assesses qualitative and quantitative risk and reliability. The software suite includes advanced tools for fault-tree and event-tree analysis, risk monitoring, failure mode effect analysis and documentation.

Lloyd's Register ODS

Offers rotating equipment diagnostics, noise/vibration analysis, finite element analysis, fluid/structural analysis and equipment dynamics tools.

Human Engineering

The world's largest human factors consultancy. Addressing human factors is essential if people, plant and processes are to perform successfully in any complex system. Our Human Engineering team has specific capabilities in CAD design for control rooms and work environments; optimising the usability of technology, especially control systems; and assuring organisational integrity for efficient and sustainable operations.

LRQA

A leading independent provider of business assurance services including certification, validation, verification and training. LRQA is accredited by over 45 accreditation bodies and delivers services to clients in more than 120 countries. Its services help you manage your systems and risks to improve and protect your organisation's current and future performance.



Load-out of the Deep Panuke production field centre. Photo courtesy of SBM Offshore.

We're there at every stage

From concept to operational life and decommissioning, we can support your assets during every life cycle stage and across the energy supply chain.

Whether it is complex deepwater drilling rigs, floating units or pipelines in the Arctic, we will help you safeguard your upstream assets while improving overall business performance. Our teams consist of specialists with an in-depth knowledge of all the materials, components, equipment, systems and operational complexities involved in this high-risk, capital-intensive sector.

Taking your asset's entire life cycle into consideration at the beginning of the project enables you to make informed decisions later, benefiting both safety and performance throughout operation and at the life-extension and decommissioning stages.

Operate with confidence at every stage	01 Concept and design	02 Procurement and construction	03 Transport and installation
<p>Our specialist expertise covers all equipment, components and assets:</p>    	<p>Helping you define the project scope and risks during the design stages – minimising overall project costs. This may cover material procurement, fabrication, assembly and legislation. Full life cycle cost analysis is normally carried out.</p> <p>Examples of how we help:</p> <ul style="list-style-type: none"> – design safety case support – approval in principle – environmental assessments – human factors – HAZID/HAZOP support – supporting studies for risk and HSE: EERA, ESSA, FERA, noise, vibration, SIL, reliability – provision of verification schemes – design appraisal for FEED and detailed design – advice on materials suitability and selection – corrosion risk analyses – structural strength and fatigue analyses – static and dynamic flexible riser analyses – pipeline systems analysis – hydrodynamics, motions and moorings analyses – finite element analysis – support on procurement and contracting strategies. 	<p>Ongoing monitoring of your project, management of vendor inspection, controlling sub-contractors and ensuring deadlines are achieved with total integrity.</p> <p>Materials selection is confirmed using codes, standards and procedures, fabrication and assembly.</p> <p>Examples of how we help:</p> <ul style="list-style-type: none"> – preparation of specification and scheme plans – independent review and audit of designs, specifications and test results – project risk analysis and risk management – specialist engineering analysis including noise and vibration predictions – survey during fabrication and installation – approval of welding specifications and procedures – vendor equipment surveys – materials production surveillance and certification – provision of written schemes of examination – notified body services for PED and ATEX – NDE and NDT advice – product certification. 	<p>Applying expertise in logistics, planning, preparation, vendor organisation, including precision control for loading and unloading equipment, safe handling and storage assessments and on-time delivery. Also human factors' assessments.</p> <p>Examples of how we help:</p> <ul style="list-style-type: none"> – precision planning, routing and permit recommendations – vendor management and logistics execution – effective handling and staging of complex cargo challenges – secure siting facilities – safe delivery (JIT) and installation of sensitive, technical and valuable components – documentation review, survey and audits.
<p>Leading experts at:</p>	<p>Helping you meet your requirements and maximising asset value</p>	<p>Helping you deliver your projects on time and budget, to the correct specification</p>	<p>Ensuring ocean and land-based logistics are cost-efficient and effective, and final component installation meets all technical and legal requirements</p>

04 Commissioning

Creating a framework covering integrity policy, strategy, codes of practice procedures, specifications and guidelines – all of which are required for successful operation.

- Examples of how we help:
- survey during commissioning
 - commissioning of drilling systems
 - confirmation of functionality of safety critical systems and equipment
 - implementation and project management
 - independent validation and verification during testing and commissioning
 - review of documentation
 - project characteristic measurement
 - measurement of rotating equipment (noise, vibration, surge testing, etc)
 - training
 - ASME and RCCM code inspection services.

Reducing set-up problems and improving coordination, quality and cost management

05 Operation (in-service)

A range of skills and software to help implement measurement, failure, inspection and investigation strategies to ensure that assets remain safe, productive and fit for purpose.

- Examples of how we help:
- in-service inspection (compliance)
 - asset management assurance services (BSI PAS 55)
 - risk-based inspection
 - integrity services and management of integrity inspection activities; structures, lifting equipment, pipelines, pressure vessels
 - corrosion and NDE studies
 - failure and root cause analysis
 - technical troubleshooting (vibration, noise and high-speed rotating equipment issues)
 - fitness for purpose assessments
 - process safety management
 - management systems audit
 - operational risk assessments
 - technical due diligence
 - bridging documents
 - asset transfer support
 - human factors
 - training.

Successfully optimising safety, reliability and productivity

06 Life extension and re-use

Integrate our knowledge and technology to help extend the safe performance of your asset, process or systems.

This could include corrosion rate monitoring, process monitoring and inspection, data collection, analysis, reporting and corrective action.

- Examples of how we help:
- systematic reliability analysis, including life cycle optimisation
 - maintenance strategies and audits
 - fitness for service evaluation
 - current condition surveys
 - structural fatigue and redundancy analyses
 - assistance when retrofitting emissions control equipment (de-SO_x, de-NO_x) and carbon capture post combustion technologies.

Reducing downtime and optimising safe performance

07 Decommissioning, removal and disposal

Supporting decommissioning and the safe disposal, or re-use of, existing assets.

- Examples of how we help:
- concept modelling for asset regeneration and replacement
 - removal and disposal assessment and management
 - structural analyses
 - environmental studies
 - HAZID/HAZOP support.

Mitigating risk to people and the environment

Who we help

Client:

BP Exploration Operating Company (BP).

Application:

Fixed production platform and export pipelines.

Project scope:

Independent verification under UK Safety Case Regulations for asset design, construction, installation and operation and integrity services during design and construction.

The BP Clair project brought the advantages of a Gulf-of-Mexico-style design and contracting arrangement to the environmentally challenging frontier of the North Sea, with significant cost advantages anticipated by our client. The large-scale, geographically diverse project required us to work with designers in Houston, fabricators in Norway and the UK, and vendors across Europe, America and Canada.

The implementation of different standards, practices and processes into a UK regulatory environment posed particular challenges for the verification scheme, which we embraced with an innovative and flexible approach. The client also valued our specialist technical capabilities in addressing the project's particularly difficult geotechnical aspects (foundations and piling).

Our independent services helped to assure the client of the suitability of the safety critical elements of the asset and that integrity was designed in to the project, with material selection, equipment arrangement, insulation and corrosion monitoring arrangements of particular focus. We now act as the operational Independent Verification Body (IVB).

Lloyd's Register continues to work closely with BP on a number of new construction projects, provides ongoing asset verification services and is supporting the front end engineering design phase of the Clair Ridge development, as our client and its field partners look to further develop one of the largest remaining undeveloped reservoirs in the UK sector.

Client:

Woodside Energy Ltd, Perth, Western Australia.

Application:

Steel jacket and deck.

Project scope:

Independent validation of design, construction and installation.

Lloyd's Register Asia has a strong and ongoing relationship with Woodside. Our validation services to the North Rankin Redevelopment (NR2) are performed under the frame agreement with Woodside for the provision of validation and classification services. Besides North Rankin 2 we are providing validation operations verification and/or classification to the majority of Woodside's new offshore projects and existing assets, including the North Rankin A, Goodwyn A, Angel and Pluto fixed facilities and the Maersk Ngujima-Yin, Northern Endeavour and Nganhurra FPSO units. We are supporting the refurbishment of North Rankin A, one of the world's largest capacity gas-production platforms, in readiness for the installation of the North Rankin B alongside.

North Rankin B platform presents its own unique challenges. Installing the deck by 'float-over' method will make this project one of the largest of its kind in the world. A core requirement is to connect the new platform by two 100-metre bridges to the existing North Rankin A offshore facility. Our team of structural and foundations' experts will help contribute to the project's success, backed up by our extensive knowledge of the existing North Rankin A facility and local regulatory environment.

The Perth, Western Australia office is performing the project management of the validation services. Detailed design review of the jacket and deck is being performed by the Kuala Lumpur office supported by specialists based in our Aberdeen and London offices. The jacket is under construction at PT McDermott Indonesia's fabrication facilities in Batam, Indonesia, and the deck at Hyundai Heavy Industries' yard, Ulsan, South Korea. Our surveyors are attending both sites, as well as a number of equipment vendors worldwide. Our independent validation services will not only help to assure the client that the business is complying with regulations, but that project contractors are meeting the desired performance standards.

North Rankin B is scheduled for completion in 2013. With North Rankin A, it will operate as a single integrated facility.

Client:

Helix Energy Solutions Group (the operator) and Kommandor LLC (vessel owner).

Application:

Conversion of an ice-class train ferry to a Floating Production Unit (FPU).

Project scope:

Independent classification and technical consultancy services.

Tropical storms and hurricanes in the Gulf of Mexico present ongoing safety and business concerns to oil and gas operators and investors in the region. To address this threat, *Helix Producer 1* is the Gulf's first ship-shaped, disconnectable, dynamically positioned FPU.

In place of a conventional mooring, the unit incorporates a side-mounted, disconnectable transfer system (DTS) and seven 12 megawatt electric thrusters and dual 4,000-pound hydraulic thrusters. The design enables the FPU to disengage quickly from the risers so that it can leave its location in the event of oncoming extreme weather. In an emergency, the procedure is possible in as little as a minute. Where more notice is available, a controlled disconnect (including flushing the flow lines and lowering the buoy) would take between 12 and 24 hours.

Throughout this three-year project Lloyd's Register provided classification services and regular technical consulting expertise, guiding the clients through international safety standards and helping to solve technical challenges. The project team comprised specialists from several of our offices, including Aberdeen, Copenhagen, Halifax, Houston, London, Piraeus and Rijeka.

Helix Producer 1 will process oil and gas from subsea wells approximately 85 miles off the Louisiana coast in approximately 640 metres of water, with capacity to handle 45,000 b/d of oil, 70 MMcf/d of gas and 50,000 b/d of water.



Expert insight



Tim Protheroe.

Americas

Tim Protheroe, Americas Regional Manager, Lloyd's Register North America, Inc.

Decreasing marginal field life. The move to Arctic environments, the Macondo Well incident, deep waters and other demanding locations, such as Canada's oil sands. Ever stricter regulations. A shortage of technical talent. The climate change agenda and carbon-trading requirements. These are a handful of the pressures and demands that the oil and gas industry faces today, all of which require higher than ever levels of stakeholder commitment and investment. And it is a pattern that is set to continue as new regulations look to repair lost reputation and rebuild community trust.

To help our clients tackle these challenging circumstances, we have evolved our through-life, asset performance assurance packages. We are ready to help where and when our clients need independent advice, with a capability as broad as assessing the entire portfolio of assets, advising on how to improve performance, enhancing the way a business operates, and its safety agenda, helping to provide solutions to management problems. Our technical and consulting 'know-how' brings together an unrivalled depth of practical understanding of assets, technology, operations and environmental conditions with organisational integrity and world-leading human factors' expertise.

We assist in solving unique technical problems and supporting individual projects, from new construction compliance services for platforms to consultancy solutions that help shape a project from the outset, encompassing regulatory advice, technical issues, field risks and vendor selection. This depth of expertise provides operators in the US Offshore Continental Shelf with the necessary independent assurance and across the 3Ps of HSE management: People, Plant and Process. Few companies will escape the need for drastic, long-term cultural change as they strive to respond to the Safety and Environmental Management System (SEMS).

More than ever before, companies are requiring specialist guidance and expertise in assurance compliance to help them navigate complex new operating frameworks and help them survive. Our audit protocol is just one example of the approach we are taking to help stakeholders through 13 comprehensive elements to meet with the new regime. This proposition is based on making a demonstrated contribution to the performance of our clients' assets and businesses.

Have your say

Contact Tim by email at tim.protheroe@lr.org



Richard Nott.

Europe, Middle East and Africa

Richard Nott, Aberdeen Operations Manager, Lloyd's Register EMEA

The upstream industry in the North Sea faces significant challenges as it moves into increasingly difficult environments west of Shetland and seeks to further develop a large, mature asset base in economic conditions which are never likely to be less than difficult. Elsewhere, emerging areas – including the Arctic, the Caspian, north of Norway and Northern Siberia – present technical and potentially cultural, logistical and political challenges. Given the acknowledged pressure on the industry's regional skills and competent resources, our experience and knowledge helps turn innovative projects into safe and successful long-term enterprises.

In the North Sea especially, the care and maintenance of aging assets largely operating beyond their original design life require particular care and the help of specific skills and experience. Owners and operators rely on us for their support in this difficult task, bringing all of our organisation's technical expertise and industry understanding to bear. By helping to identify threats and opportunities, collaborating on long-term plans and assisting operators in optimising their asset integrity spend, we have a significant role to play in supporting our clients.

We will continue to evolve our services as the industry matures and advances.

Have your say
Contact Richard by email at
richard.nott@lr.org



Alastair Jones.

Asia

Alastair Jones, Asia Upstream Sector Manager, Lloyd's Register Asia

The 'reliability factor' is of paramount importance to a high-risk, capital-intensive sector seeking engineering, technical integrity, safety and risk management support. This is one of the key reasons why energy leaders such as Chevron and Woodside choose us as their independent validator on largescale developments, including the Gorgon upstream joint venture, North Rankin B and Pluto Liquefied Natural Gas projects.

These relationships are a good example of our client-centric, near-customer strategy to have the right people in the right places across the region. From our client-facing teams in key regional locations such as Bangkok, Beijing, Busan, Jakarta, Kuala Lumpur, Mumbai, Perth, Singapore, Vung Tau and Yokohama, to our specialist technical experts based at our Singapore-Kuala Lumpur hubs, we are strategically placed to best support your business.

Our goal is to provide the highest level of technical competency and service delivery, from aggressive corrosion issues to tight safety-case regimes or the safe exploration of ever-more remote locations. We fully understand that a joined-up approach – both cross-discipline and across countries and regions – is critical to our clients' success.

While new construction and conversion projects continue, particularly the conversion of existing tankers into FLNG, FPSO and FSO units, the region also has a large inventory of ageing platforms and pipelines. Our considerable asset life cycle expertise, developed in the North Sea and introduced to the international sector, proves invaluable.

Have your say

Contact Alastair by email at alastair.jones@lr.org



Our wider services

Lloyd's Register's reputation is built on more than 250 years of protecting life and property. We are dedicated to helping industry meet increasingly complex challenges and to making the world a safer place.

Besides the upstream industry, our Energy business also serves the downstream, power and manufacturing industries. Elsewhere, our other businesses – Marine, Transportation and Management Systems (LRQA) – support a wide range of industry sectors globally.

Offices in
247
cities and
towns.

186
countries
covered.



Your nearest contact

If you would like to speak to a member of our Energy team to find out how Lloyd's Register can help your business or project, visit www.lr.org/inspection for details of your local office or contact one of our regional offices:

Europe, Middle East and Africa

Lloyd's Register EMEA
Denburn House
25 Union Terrace
Aberdeen
AB10 1NN
UK
E upstreamemea@lr.org

Lloyd's Register Group
T +44 (0)1224 267 400
ModuSpec
T +31 (0)118 563 050
Scandpower
T +47 (0)64 844 400

Asia

Lloyd's Register Asia
Suite 21-04, Level 21
Menara Tan & Tan
207 Jalan Tun Razak
50400 Kuala Lumpur
Malaysia
E upstreamasia@lr.org

Lloyd's Register Group
T +60 (0)3 2161 7571
ModuSpec
T +65 6467 4009
Scandpower
T +86 1380 132 0200

Americas

Lloyd's Register North America, Inc.
1330 Enclave Parkway
Suite 200
Houston, Texas
77077
USA
E upstreamamericas@lr.org

Lloyd's Register Group
T +1 (1)281 675 3100
ModuSpec
T +1 (1)281 398 3998
Scandpower
T +1 (1)713 574 0904



Mixed Sources
Product group from well-managed forests and other controlled sources
www.fsc.org Cert no. TP-COC-002242
© 1996 Forest Stewardship Council

Printed on Soporset Premium Offset from the Robert Horne Group. The virgin wood fibre is sourced from Spain and Chile and produced at a mill in Scotland that has been awarded the ISO14001 certificate for environmental management. The pulp is bleached using an elemental chlorine-free (ECF) process. Soporset is an FSC product group from well-managed forests and other controlled sources.

Lloyd's Register is a trading name of the Lloyd's Register Group of entities. Services are provided by members of the Lloyd's Register Group, for details see www.lr.org/entities.

Photo credits

Inside front cover: Photo courtesy of Prosafe Production.

Page 07: Photo courtesy of SBM Offshore.

Page 15: Photo courtesy of Woodside Energy Ltd.

