

ABS Energy News

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OFFSHORE

Supporting Malaysia's Offshore Growth

According to Clarkson Research, production offshore Malaysia averaged 700,000 barrels per day (b/d) of oil and 6 billion cubic feet per day of natural gas in 2013, accounting for 24 percent and 23 percent of offshore oil and gas production respectively in Asia-Pacific – more than any other single country in the region.

ABS holds more than 20 percent of the market share in the Pacific marine and offshore orderbook and 35 percent of the market share in Malaysia. In 2013, ABS delivered two converted liquefied natural gas floating storage units (LNG FSUs) for MISC Berhad's developments offshore Malacca, completed approval in principle (AIP) review for the PFLNG 2 Project and maintained an active offshore and subsea equipment certification service in Malaysia. Entering 2014, ABS is strengthening its position and service delivery in this growing energy economy.

Malaysia's SapuraKencana Petroleum Bhd. has selected ABS to class its first semisubmersible tender assisted drilling unit (SSTDU), KM-3, which is under construction at the company's local Lumut yard. Based on Frigstad Engineering's T70 design, the semisubmersible tender rig is the largest of its kind, with a displacement of approximately 30,000 dwt. Expected delivery is scheduled for 2015.

ABS also is classing Shell's *Malikai* tension leg platform (TLP), Malaysia's third deepwater project after the Kikeh and Gemusut developments. The *Malikai* oil field is situated in the northern area of Block G, offshore Sabah, Eastern Malaysia, in the South China Sea. The TLP will be installed

in approximately 1,640 ft (500 m) water depth and will be tied back to the Keabangan shallow-water hub gas processing facility.

The *Malikai's* processing capacity will be 60,000 b/d of liquids and 50 million standard cubic feet of gas. The work scope calls for ABS to provide design review as well as fabrication and installation surveys for the hull, topsides, tendons, and piles in accordance with the requirements of ABS Rules and Guides for the floating offshore installation (FOI) notation. The anticipated completion date is 2015.

Thomas Tan, ABS Regional Vice President, Southern Pacific, notes that as the offshore market continues to expand and evolve in the Asia-Pacific region, the demand for new design and high specification units is increasing. "ABS is a trusted industry partner across the region, reputable for its consistent, quality service delivery and helping clients achieve greater asset optimization."



Photo courtesy of
SapuraKencana Drilling Pte Ltd.

Mexican Reforms End 75-Year Monopoly

After discussions and debates that have spanned decades, Mexico is in the process of implementing wide-ranging energy reforms that will open oil and gas exploration and development to foreign participation, which has been absent for 75 years.

Mexican President Enrique Peña Nieto presented the constitutional reform to Congress on 12 August 2013. It was approved by the Senate on 11 December and by the Chamber of Representatives the following day. Mexico declared the reform constitutional on 18 December and published it in the official log of the Mexican Federation.

Mexico has nearly 10.5 billion barrels of proved oil reserves and 140 billion cubic feet of natural gas in unexplored reserves, but its legacy fields, the giant Cantarell and Ku-Maloob-Zaap in the Bay of Campeche, are in decline, despite state oil company PEMEX's increased investment. With the less complex fields already in development, oil exploration and production are moving into new areas that present technological challenges. As Mexico opens its doors to foreign operators, the country will begin to lay the foundation for the technology transfer it needs to move into these frontiers.

A sixth generation DP semisubmersible, CENTENARIO GR is capable of drilling in 3,000 m (10,000 ft) water depth. More than 85 percent of the rigs working offshore Mexico are classed by ABS.

ABS, which has been active in Mexico for 58 years, is considered the preferred class society in the country. Continued investment will allow ABS to strengthen its local relationships and increase its involvement in offshore oil and gas development as opportunities emerge.



Photo courtesy of Grupo R

Chevron Mobilizes JACK ST. MALO Installation

In November 2013, Chevron's *Jack St. Malo* semisubmersible floating production unit (FPU) departed the Kiewit Offshore Services integration yard in Ingleside, Texas, on its way to Walker Ridge 718 in the deepwater Gulf of Mexico (GOM). The semi will be stationed in 7,000 ft (2,134 m) of water for what is expected to be a 30-year service life. The offshore installation campaign is in progress, and first oil is anticipated in 2014.

Chevron selected ABS to class and act as Certified Verification Agent (CVA) for the *Jack St. Malo* FPU and *Big Foot* TLP projects. Beginning in 2009, the initial work scope called for ABS to validate that the *Jack St. Malo* FPU front end engineering design (FEED) complied with the intent of ABS Rules and appropriate codes. Following FEED approvals, ABS proceeded to classification and statutory approvals and fabrication and installation surveys.

The *Jack St. Malo* project comprises the joint development of the Jack and St. Malo oil fields, which are part of the emerging Lower Tertiary Trend. The \$7.5 billion development will consist of three subsea centers tied back to a hub production facility with a capacity of 170,000 barrels of oil and 42.5 million cubic feet of natural gas per day.

At 56,000 metric tons, the *Jack St. Malo* hull is the world's largest to date. The FPU will receive the FOI notation under ABS class.

ABS has classed and acted as the design, fabrication and installation CVA for Chevron's *Blind Faith* semisubmersible (2005-2008) and its *Tahiti* truss spar (2004-2009), both major assets in the deepwater GOM.



Photo courtesy of Chevron

First ISQM Drillship Leaves Yard

ABS has achieved an industry first with the completion of the Rowan Companies' *Rowan Renaissance* drillship. This newbuild, which was built in the Hyundai Heavy Industries (HHI) yard in Ulsan, South Korea, is the first in the world to be constructed using ABS' Integrated Software Quality Management (ISQM) notation.

"No other class society has classed an asset with a software notation that addresses software quality during construction, at delivery and beyond," says ABS Manager Paul Walters.

Historically, class rules have focused on steel and hardware. ISQM focuses on the software that controls the equipment. ABS' ISQM notation provides a clear method of minimizing software-related risk throughout the life of an asset. Following the ISQM process improves safety, reduces environmental risk and minimizes non-productive time, which increases efficiency and productivity of the asset.



Paul Walters

Rowan Companies recognized the ABS ISQM process as the best option for describing the operation of the equipment, identifying and mitigating risk and thoroughly verifying the many safety critical components of its high-specification asset. In its first application on the ultra deepwater drillship *Rowan Renaissance*, ISQM facilitated reliable integration of products from more than half a dozen major suppliers and more than 35 subsystems.

According to Walters, coordination among the owner, builder and class society was the keystone for success in this industry first. "Everyone worked to have this notation be a success for Rowan Companies," he says, noting, "HHI's willingness to move into new territory was critical to achieving that goal."

ABS Approves 20K psi Drillship Design

Acknowledged as a trusted partner and technical leader in the offshore market, ABS was selected to work alongside Keppel Offshore & Marine (O&M) and GustoMSC on a novel proprietary design project for the deepwater exploration, development and completion drilling vessel, *Can Do*. The drillship will be capable of handling dual 20,000 psi well control systems. As part of the design stage, ABS has granted approval of the *Can Do* 20,000 psi drillship's basic design.

Keppel O&M's research and development (R&D) arm and technology center, KOMTech, led the joint development with design partner GustoMSC. ABS engineers offered training in the use of the ABS Eagle Drillship software to enable development of the model and to run analyses. Basic design structure and stability also were assessed by ABS. The vessel will receive the HAB, CDS and ENVIRO-OS notations.

A differentiating factor in the drillship design is that it allows for the installation of third-party equipment used in development and completion drilling activities in addition to modern-day drillship exploration capabilities. *Can Do*'s design incorporates the latest operating requirements, including a functional, useable deck area and ergonomic space

arrangement, enhanced tank capabilities, a fast mobilization time with a high transit speed and improved safety features. Better maneuverability, drilling efficiency and riser hold capacity greater than 12,000 ft (3,658 m) also are key specifications that were integrated into the design.

Construction on the *Can Do* drillship began in Japan in December 2013. The vessel will sail to Singapore for topsides integration at Keppel FELS.



Photo courtesy of Keppel

ABS Opens Energy Corridor Office

ABS has opened a new Houston satellite office to co-locate members from its Engineering, Project Management, Technology and Business Development functions serving the offshore and energy sectors.

The move to a new building in the expanding Energy Corridor in West Houston not only places ABS engineers closer to major clients in the area, it positions ABS in a dynamic offshore and energy research and development hub. “ABS recognizes that our customer base in the offshore industry demands onsite support with best-in-class services,” says ABS Chairman, President and CEO Christopher J. Wiernicki. “We made the strategic decision to provide greater access to our offshore clients by locating ABS’ industry-focused resources in a dedicated facility in one of the world’s most important energy centers.”

In addition to class services, ABS’ West Houston facility will offer education and training seminar rooms for use by local industry. The objective is to provide a forum with access to in-house resources that fosters knowledge-based partnerships and information sharing among operators, service providers, academia and regulatory bodies.



“Our Energy Corridor office will serve as a meeting place for key decision-makers to collaborate on shaping guidelines and solutions for demanding applications such as harsh environments, subsea electrification and global gas solutions,” says ABS Executive Vice President, Energy Development Kenneth Richardson.

NEWS (GAS MARKETS)

Study Outlines LNG Bunkering Regulations

ABS is developing a document that LNG stakeholders will be able to use to guide them through the issues associated with LNG bunkering.

ABS and ABS Group conducted a study to address specific issues associated with LNG bunkering as well as infrastructure at ports and marine accessible terminals. The resulting guidance document will help North American operators and owners of LNG fueled vessels, LNG bunkering

vessels and waterfront facilities that need information to navigate US and Canada federal regulations, state/provincial and port requirements, international codes and standards, potentially applicable waterway requirements and restrictions as well as regional and local regulations.

“The primary objective of the study is to develop a set of implementation aids, check lists, processes and regulatory information that will support vessel owners and operators at various stages of their decision-making processes,” explains Patrick Janssens, ABS Vice President, Global Gas Solutions.

“While a number of LNG bunkering studies have been conducted, this is the first that pulls all the pieces together into a process guide and regulatory framework in the form of a resource repository for LNG stakeholders,” adds Chuck Mitchell, ABS Group Vice President, Global Strategic Initiatives.

Taken as a whole, the report lays out a comprehensive overview of LNG bunkering issues and the emerging technological and regulatory implications of using LNG as fuel.

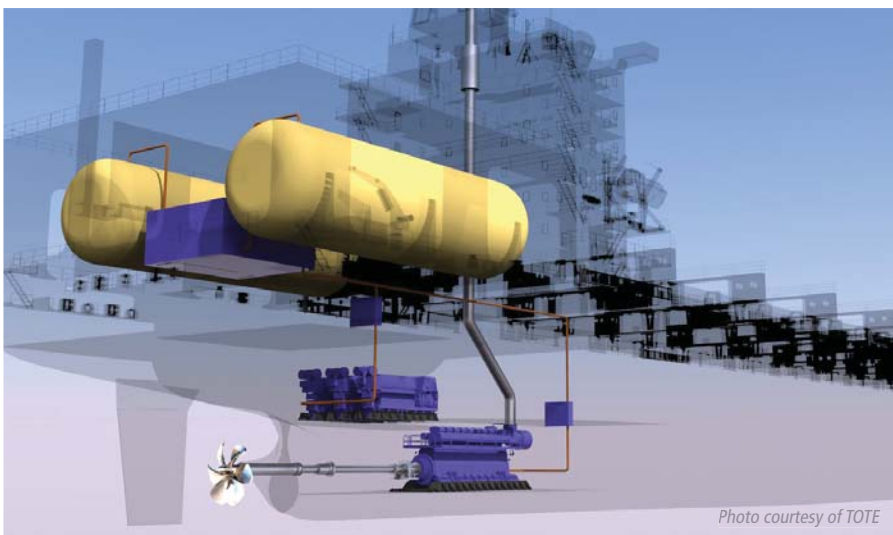


Photo courtesy of TOTE

Wind Tunnel Testing Gains Ground

Reliable assessment of wind loads on mobile offshore drilling units (MODUs) and floating production installations is a key to safe stability practice. In 1988, the Society of Naval Architects and Marine Engineers (SNAME) Technical and Research (T&R) Bulletin 5-4 was published to document industry guidelines on wind tunnel testing as applied to the design of MODUs. Since that time, computational fluid dynamics and other related technologies have advanced, which has resulted in improved wind tunnel testing practices. The SNAME guidelines, however, have not been updated to reflect these improvements.

Meanwhile, regulatory bodies have recently requested that the offshore industry demonstrate the basis for using wind tunnel testing for approvals, particularly for floating



James Brekke

production installations. As a result, the SNAME Offshore T&R Committee sponsored an initiative to update the wind tunnel testing guidelines in SNAME 5-4.

In this ongoing initiative, ABS is leading a SNAME panel that is made up of classification societies, operators, vessel owners, engineering firms, testing facilities and regulatory bodies that is taking on the task of developing wind tunnel testing guidelines with a broad view of international standards and worldwide wind tunnel test facilities.

“The stakeholders have asked for a benchmarking process that is expected to take several years and will require extensive industry funding,” says James Brekke, ABS Director, Offshore Performance, Global Performance Center, who chairs the SNAME Offshore T&R Committee. “The planning process is a key step to successfully establishing a basis for the use of wind tunnel testing for reliable assessment of wind loading on MODUs and floating production installations.”

ABS, Safetec Develop Blowout Risk Model

ABS and Safetec Nordic AS, an ABS Group company that provides integrated risk and asset management services for the offshore industry, are working together to develop a blowout risk model that couples historical operational experience with risk analyses using a novel methodology.

The goal is to be able to detect and manage accident sequence precursor (ASP) indicators – signs that an accident is about to happen – so preventive measures can be taken to avoid a catastrophic event.

“If detected and managed, precursor indicators can provide offshore personnel with critical information that could ultimately help them prevent accident progression leading into a catastrophic incident,” explains ABS Senior Engineer Smarty Mathew John, who leads the ABS effort for the ASP program.

While progress is ongoing to apply ASP to offshore operations, there is a need for an industry-wide effort to collect real-world precursor data related to well integrity and model testing before this methodology can be integrated into daily risk management programs.

“Offshore incidents can have a devastating impact on crew safety, offshore assets and the environment,” says John. “Tools that provide proactive risk management like ABS’ ASP program heighten awareness, offer enhanced reliability and help mitigate risk.”



ASP team members, from left: Olav Brautaset, Jan Dahlsveen, Smarty Mathew John and Beate Riise Wagnild. Not pictured: Ole Magnus Nyheim and Arne V. Pederson.

Competence Center Offers Risk Training

Safetec opened a new Competence Center in Bergen, Norway, in November 2013 to provide education and training for industry-focused organizations. The center’s specialized training courses showcase Safetec’s multi-disciplinary experience in the areas of risk management, safety, reliability and emergency preparedness in the onshore and offshore markets.

Well Containment Equipment Plays Critical Role

As part of its deepwater emergency response plan, HWCG LLC has developed a well containment system that is ready to deploy should an accident occur in the GOM.

ABS Americas President and COO James Watson and ABS Energy Project Development Manager Thalia Kruger recently visited a fabrication shop in Northwest Houston, where HWCG's new well test package was assembled for factory acceptance testing.

The well test package is a component of HWCG's recently expanded well containment plan, to be used in the event of a subsea blowout where the well cannot be capped and must flow to the surface for processing and collection. This well test equipment will be able to process 70,000 barrels per day (b/d) and 140 million square cubic feet per day (MMscf/d).

The well test package can be installed on board the Helix Q4000 deepwater well intervention vessel. ABS is certifying the Q4000 for compliance to the ABS *Guide for Well Test Systems*.

When added to the Helix *Producer I*, an FPU dedicated to the HWCG containment system, the total production capacity will be 130,000 b/d and 180 MMscf/d. Comprising 15 deepwater operators, HWCG is one of two consortiums in the GOM that were formed by operators that have

a common goal to have a subsea blowout response system ready to deploy. The other is Marine Well Containment Company (MWCC), which is made up of ten industry operators.



CLIENT TRAINING

China Shipyard Earns JRP Certificates

In the third quarter of 2013, ABS delivered a new type of client newbuild training for Samsung Heavy Industries (Ningbo) Shipyard Co. (SHNC) as part of a joint research project (JRP). The JRP agreement between the ABS Shanghai Learning Center and the local Ningbo Samsung site office is unique in providing onsite training in the yard for Samsung Ningbo personnel and is one more way ABS is stepping up to meet clients' needs.



Comparable in scope to earlier training offered by ABS to Samsung Heavy Industries in Korea, the basic training session covered hull, machinery and electrical components.

At the conclusion of this half-day event, more than 50 attendees earned JRP certificates that reflect general competencies mastered by completing this course. Dignitaries from SHNC, including President Mr. Jin-Yong Park, Vice Presidents Mr. Woong-Guel Lee, Mr. Choon-Gi Kim, Mr. Tae-Pyo Hong and General Manager Mr. Ki-Jung Nam, attended the closing ceremony.

The success of this event serves as a cornerstone for building and offering future training courses. Plans are in place for ABS to offer additional shipbuilding technology training through the JRP for SHNC.

"The training session served not only as a forum for sharing information, but as a relationship building event that has strengthened ties between ABS and Samsung," says ABS Regional Vice President, Southern China Darren Leskoski.

ABS Names Chief Scientist, CFD

Computational fluid dynamics (CFD) is an established technology that is changing the way engineering challenges are addressed. Recognizing the value of advanced CFD solutions has led ABS to hire Richard Korpus as Chief Scientist, CFD, in the Technology department. Korpus, who holds multiple engineering degrees from the University of Michigan – including a Bachelor of Science (BS) and Master of Science (MS) in Aerospace Engineering and a BS, MS and PhD in Naval Architecture and Marine Engineering – has taught engineering and naval architecture courses at the university level. His theoretical training includes a broad background in applied and numerical mathematics; development of finite volume, difference and element methods; optimization and variational methods; and boundary integral techniques.



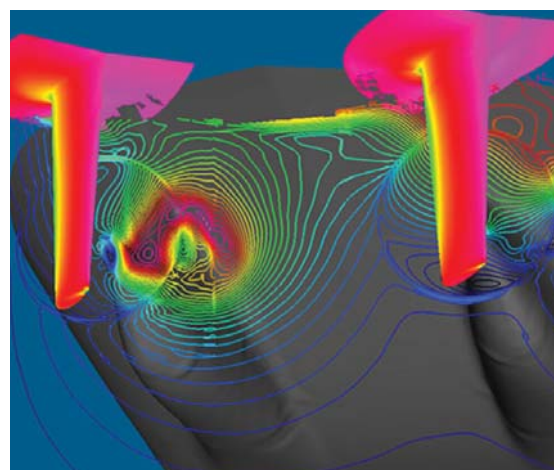
Richard Korpus

As Chief Scientist, Korpus is the corporate technical authority on CFD applications for marine and offshore. He will oversee CFD policy, procedures, long-range planning, tools, capabilities and services. And he will play a vital

role in making sure ABS continues to provide technology capabilities to support industry needs.

Creating the Chief Scientist position is the most recent step in the continuing process of technology investment at ABS. Earlier in 2013, ABS' Operational and Environmental Performance (OEP) team began offering industry services in support of asset optimization, focusing on assessing the energy efficiency of new designs and optimizing retrofits.

CFD is an essential tool in providing these support services to industry. Korpus is teaming with OEP's CFD specialists to develop highly efficient CFD modeling and optimization procedures that use both industry standard and proprietary codes.



ABS to Class Newbuild OCVs

ABS has been selected by Edison Chouest Offshore and Island Offshore through the company Island Ventures II LLC to class two next-generation offshore construction vessels (OCVs). The ULSTEIN SX165 design vessels will be built at Ulstein Verft in Norway and Edison Chouest's LaShip yard in Houma, Louisiana, in the US. This marks the first time an ULSTEIN design vessel will be built in a US yard.

The OCVs will be 28 m wide and 145.7 m long with accommodations for 200 people. They will each be equipped with one 400-metric-ton crane and one 140-metric-ton crane, a large moonpool measuring 11.2 x 12 m and two smaller moonpools with remotely operated vehicles (ROVs) installed in a centrally located hangar. The vessel design includes three separate engine rooms to provide extreme operational reliability, and an SCR catalyst system will reduce NOx emissions.

Health, safety and the environment have been fully considered in the development of this design as well. The vessels will deliver comfort and safety in accordance with the ILO Maritime Labour Convention requirements and each OCV will have four lifeboats.

According to Ulstein Verft, the new OCVs will be the largest vessels to date to be built at the yard and make up the company's largest single shipbuilding contract.

The first vessel is scheduled for delivery in the third quarter of 2015.



Photo courtesy of Island Ventures II LLC

Spars, TLPs & Semisubmersibles

Unit	Company	Year in Service
Big Foot	Chevron	2014
Gulfstar 1	Williams	2014
Jack St. Malo	Chevron	2014
Lucius	Anadarko	2014
Malikai	Shell	2015
Heidelberg	Anadarko	2016

FPSOs & FSOs

Unit	Company	Year in Service
OSX 3	OSX	2014
Spill Capture 2	MWCC	2014
Bering Sea (Manora Field FSO)	OMNI	2014
Cidade de Ilhabela	SBM/QG/Mitsubishi	2014
Cidade de Mangaratiba MV24	MODEC/Schain	2014
Eagle Albany (Cluster 7 Field FPSO)	Buni Armada/ONGC	2014

Unit	Company	Year in Service
N' Goma (Formerly Xikomba) (Relocation)	SBM	2014
Uote 1	OMNI	2014
Salamander Bualuang	Teekay/Salamander	2014
Scorpius (Bukit Tua Field FPSO)	M3nergy/Petronas	2014
Multi Echo (Belida Field FSO)	Multiline/ConocoPhillips	2015
Stones	SBM/Shell	2015

Column Stabilized Drilling Units

Unit	Company	Year in Service
Urca	Sete/QGOG	2015
Portogalo	Sete/Petroserv	2016

Jackups

Unit	Company	Year in Service
Impetus	ISPON	2014
ENSCO 122	ENSCO	2014
Jindal Pioneer	Development Drilling	2014
Mercury	Eurasia Drilling	2014
Noble Sam Turner	Noble Drilling	2014
West Titania	Seadrill	2014
Coatzacoalcos	Perforadora Central	2014
KS Orient Star 1	KS Drilling Ltd.	2014
KS Orient Star 2	KS Drilling Ltd.	2014
Marawwah	Lamprell	2014

Unit	Company	Year in Service
Prospector 5	Prospector Offshore Drilling	2014
Tasha	PT Apexindo	2014
Perisai Pacific 101	PPT	2014
Clearwater 1	Clearwater Capital	2015
ENSCO 110	ENSCO	2015
Alliance Driller 1	AOD	2015
Al Shuwehat	Lamprell	2015
Cantarell 1	Grupo R	2015
Yunuen	PEMEX	2015

Drillships

Unit	Company	Year in Service
Rowan Resolute	Rowan Drilling	2014
Maersk Viking	Maersk Drilling	2014
Ocean Blackhornet	Diamond Offshore	2014
Ocean Rig Athena	Ocean Rig ASA	2014
Ensco DS-8	ENSCO	2014

Unit	Company	Year in Service
Opus Tiger 1	Opus Offshore	2014
West Saturn	Seadrill	2014
Arpoador	SETE	2015
NS Guarapari	SETE/Odfjell	2015

ABS publications applicable to the offshore industry are available for purchase and/or free download directly from the ABS website at www.eagle.org under the Resources tab, Rules & Guides section.