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On the cover: FPSO Cidade de Anchieta.

We want to hear from you: If you have comments about any of the articles in this issue or any ideas for future issues, send them to currents@sbmoffshore.com.

Currents is issued by the Group Communications Department.
Welcome to the new issue of Currents - the SBM Offshore magazine. We will share our stories from around the globe from our offices, construction sites and offshore units.

Currents will seek to go deeply into key projects or stories about who we are and what we stand for. We are transforming how we work, how we think and act maintaining our commitment to our three values: to work as one, to perform and to shape our own future.

In this issue we stay true to our FPSO strategy, we have highlighted some of the recent accomplishments at SBM Offshore - the successful reconversion of the FPSO Cidade de Anchieta, our way forward on the challenging generation 3 FPSO and how team work is critical for successful FPSO operations.

As an extension of our FPSO focus, we see many new market opportunities in the global gas sector and we are working on a viable solution for stranded gas fields with a mid-scale FLNG, which we hope you will enjoy learning about.

We remain committed to the countries where we work and we are involved in joint ventures with local companies. Discover our recent activities at the Brasa yard in Brazil as a shining example of this commitment.

We hope you will enjoy this seventh issue and please remember there will be many more to come.

Bruno Chabas
CEO SBM Offshore
When compared to other players in the industry, in terms of number of units and production capacity, SBM Offshore’s status as the FPSO world leader is a fact. However, it is not something that we take for granted. We continue to improve our products, which is why within this specialised sector we have also become known for FPSO relocations - an emerging trend in the industry due to the inherent cost savings and flexibility, in particular for deep water and remote locations. To date, SBM Offshore has performed seven FPSO relocations around the world. In addition, we are the only company to have relocated two different vessels for the same client on two different fields, further strengthening our expertise in this sector.

An excellent example of relocation execution and proof of the staying power of an SBM FPSO is the Cidade de Anchieta, which has seen three hull conversions during her life with major upgrades of the processing equipment tailored to the clients’ needs. For her second conversion in the year 2000 Espadarte FPSO, as she was known, set a new schedule benchmark in the industry for a world scale deepwater FPSO. She was also designed to be flexible in order to process a range of crude oil from 18˚ to 29˚API.
SBM Offshore / Currents

FPSO Cidade de Anchieta

fast tracks to deeper water

Rapid conversion while still producing

The fast-track refurbishment in 2011 and 2012 of the Espadarte FPSO to the Cidade de Anchieta was completed in a record turnaround time of only nine and half months in the Keppel Shipyard in Singapore. SBM Offshore has achieved great success in reducing work schedules on conversions by building additional, required topsides in a yard while the FPSO is still producing offshore - as was the case for the Anchieta. Stein Rasmussen, Vice President Engineering, from SBM Offshore in Houston, said “The contract terms were very stringent. The total duration from the departure of the FPSO from Brazilian waters to its return after modifications from Singapore was 435 days; inclusive of the 117 days required for the to and fro tow of the FPSO.”

Cidade de Anchieta truly demonstrates how an FPSO is a sustainable system. Today, she has the capacity to process 100,000 barrels of oil and 3.5 million m³ of gas per day and has modified her range for processing crude oil to 28-30˚ API. In brief, the process facility was upgraded with new modules for gas treatment, water injection, gas turbine generators and flare drums to meet the new field production characteristics. She now has a topside weight of 7,500 tonnes compared to 4,500 tonnes for Espadarte. She also moved to a water depth of 1,221 metres, producing in the Baleia Azul Field offshore Brazil.

First oil was achieved on the 10th of September 2012, within days of her new lease kicking off - an achievement even more significant considering the 37-day turnaround from the FPSO’s arrival in Brazilian waters and despite a down time for the weather.

The success of the project merited the honour of a visit on board from the CEO of Petrobras, Maria das Graças Foster on November 6th 2012.

Having previously produced in the Espadarte field for Petrobras, FPSO Cidade de Anchieta is now under lease to the same company producing in the Baleia Azul Field (also in Brazil) for a period of 18 years, ending in 2030.

SBM has collaborated with Petrobras on FPSO projects for over 16 years.

For FPSO relocation projects SBM continues to leverage integrated project management teams that tie in the world-class expertise found throughout the global group of SBM companies. By working closely with our clients to assess their future needs, we push the boundaries of technology to meet those needs with pioneering new solutions.

CEO of SBM Offshore, Bruno Chabas commented: “We are very pleased with the successful start of production on FPSO Cidade de Anchieta for Petrobras as the project has achieved the objectives of minimising stand-by time during the relocation process of a year and half. This substantial investment associated with a major upgrade of the processing equipment of such a complex facility illustrates the bespoke nature of FPSOs and is an excellent example of our leading position in the market.”

"
Making waves in FPSO financing

In January 2013 SBM won an impressive accolade – the Thomson Reuters PFI award for the ‘2012 Americas Bond deal of the year’. The award was in recognition of the exceptional financial deal behind FPSO Cidade de Anchieta, which makes it into the history books as being the first ever project bond financing for an FPSO in the US private placement market with a bond issuance of $500 million.

According to Project Finance Magazine “the transaction will create a new project bond asset class in the offshore production sector”. ABN/TD, Rabo, Mizuho and BTMU are the placement agents for the private placement.

The success of the USPP for Anchieta is a positive sign that the capital markets represent a future complementary source of funding for FPSO conversion costs to the traditional bank market source. The private placement transaction behind Cidade de Anchieta was also awarded the Euromoney Award for ‘Latin America Upstream Oil & Gas Deal of the Year’ in March 2013.

FPSO Cidade de Anchieta Overview

The lease and operate contract for a substantial upgrade of the FPSO was signed in December 2009. The vessel was specially designed for pre-salt production of the Baleia Azul, Jubarte and Pirambu fields in the area known as Parque das Baleias, off the coast of the state of Espírito Santo in the Campos Basin, Brazil.

To begin the conversion the FPSO was disconnected and towed to the yard for refurbishment and upgrade works on the topsides facilities in April 2011.

Vice President Engineering Stein Rasmussen said “The scope involved the addition of six new modules; Gas Treatment Plant, Gas lift Compression, SRP, a new flare tower and a new LER. Additionally, all existing modules were extensively modified including booster compressor, gas turbine driven power generation skid and the water injection skid. The project was truly an integrated effort of personnel from across the SBM Offshore group; SBM Monaco, Brazil, Singapore, Houston and SBM PC. The success of the project is a testimony of the hard work, dedication, teamwork and commitment of all personnel involved.”

FPSO Project Manager, Jennifer Smith said “I would like to acknowledge the Singapore yards Keppel, Dyna-Mac and BT Engineering, strategic partners in this very challenging undertaking. The fast-track conversion, which expended close to 7.8 million man-hours, represents a very significant achievement for all parties involved. Many important upgrades were executed including increasing water depth from 850m to 1221m and increasing the arrival temperature from 20°C to 100°C accommodating 39 risers and umbilicals in the increased water depth. This project was the second major relocation project for SBM Offshore in Houston and the schedule accomplishment was well beyond what had been achieved on other projects.”

On completion, the FPSO was towed back to Brazil in the summer of 2012 with first oil production on 10th September 2012. Her remaining design life is for 18 years including the turret without dry docking.

Today, 6 months after start-up, the vessel is now running smoothly at close to peak capacity. Nevertheless, some important lessons have been learned, which we will apply to future relocation projects as part of our continuous improvement process.
FPSO CIDADE DE ANCHIETA

Type: FPSO
Size: 269,643 DWT
Storage capacity: 1,900,000 bbls
Water depth: 1,221 m
Field: Baleia Azul
Lease period: 18 years
Number of risers: 39
A story to tell as she edges towards her 40th

This is a vessel with an interesting history. Since her launch from the Stord Verft yard in Norway as a new build in 1975 spanning her productive life to her current lease with Petrobras in Brazil – start date 10th September 2012 – the Anchieta has proven her worth in oil barrels.

Diagram 1 charts the evolution from FPSO VI before her conversion to Espadarte and finally to Cidade de Anchieta

<table>
<thead>
<tr>
<th>Vessel Name</th>
<th>FPSO VI</th>
<th>Espadarte FPSO</th>
<th>FPSO Cidade De Anchieta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>Ashland</td>
<td>Petrobras</td>
<td>Petrobras</td>
</tr>
<tr>
<td></td>
<td>12-year lease</td>
<td>11-year lease inclusive of maintenance, operation &amp; shore base facilities</td>
<td>18-year lease inclusive of maintenance, operation &amp; shore base facilities</td>
</tr>
<tr>
<td>Field</td>
<td>Ebughu, Akam and Adanga fields Nigeria</td>
<td>Espadarte fields Campos Basin, Brazil and Marimba Leste</td>
<td>Baleia Azul, Jubarte and Pirambu fields off the coast of the state of Espírito Santo-Campos Basin, Brazil</td>
</tr>
<tr>
<td>First Oil</td>
<td>February 5th 1986</td>
<td>June 30th 2000</td>
<td>September 10th 2012</td>
</tr>
<tr>
<td>Water depth</td>
<td>40m</td>
<td>800m</td>
<td>1,221m</td>
</tr>
<tr>
<td>Storage capacity</td>
<td>1,750,000 bbls</td>
<td>1,900,000 bbls</td>
<td>1,900,000 bbls</td>
</tr>
<tr>
<td>Oil process capacity (barrels oil per day)</td>
<td>80,000 bopd</td>
<td>100,000 bopd</td>
<td>100,000 bopd</td>
</tr>
<tr>
<td>Water injection</td>
<td>110,000 bwpd</td>
<td>110,000 bwpd</td>
<td></td>
</tr>
<tr>
<td>Mooring lines</td>
<td>Tower soft yoke</td>
<td>1x4; 2x3 layout mooring lines</td>
<td>3x3 layout of mooring lines</td>
</tr>
<tr>
<td>Gas handling, export &amp; gas lift</td>
<td>none</td>
<td>87 MMscfd</td>
<td>121 MMscfd</td>
</tr>
<tr>
<td>CO₂ content</td>
<td>none</td>
<td>0.25%</td>
<td>1.33 – 4.17%</td>
</tr>
<tr>
<td>H₂S content</td>
<td>none</td>
<td>none</td>
<td>&lt;200 ppm</td>
</tr>
<tr>
<td>Conversion details</td>
<td>Simple topsides comprising two separation trains of 40,000 bpd each plus associated utility systems</td>
<td>• Replacement of original simple topsides with a more complex processing system</td>
<td>• increased water depth from 850m to 1221m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• removal of soft yoke mooring system &amp; replaced with a large internal turret mooring to accommodate the large number of risers</td>
<td>• decrease in risers from 45 to 39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• rudder steering gear and propeller removed</td>
<td>• increase in arrival temperature from 20°C to 100°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• revised oil quality from 18° - 29° to 28 - 30°API</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• increased gas compression from 88 to 121MMscfd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Amine plant added for CO₂ and H₂S removal</td>
</tr>
<tr>
<td>Capabilities</td>
<td>To process a range of crude oils from 18 - 29° API; offload 1 million barrels in 24 hours</td>
<td>To process a range of crude oils from 28° - 30° API</td>
<td></td>
</tr>
<tr>
<td>Slots for risers &amp; umbilicals</td>
<td>N/A</td>
<td>45</td>
<td>39 (currently 34 being used and 5 spare for future development)</td>
</tr>
<tr>
<td>Mooring systems</td>
<td>Soft yoke mooring system</td>
<td>Internal turret mooring system designed to accommodate the large number of risers</td>
<td>Internal turret mooring system with polyester mooring ropes</td>
</tr>
<tr>
<td>Means of export</td>
<td>Tandem offload</td>
<td>Tandem offload</td>
<td>Tandem offload</td>
</tr>
</tbody>
</table>
Rising to the challenge of the “Generation 3” FPSO

For the last thirty years SBM Offshore has been continually evolving the leased production vessels it provides to the oil and gas industry. But right now the company is seeing a major step-change in the scale and complexity of its latest flagship FPSO projects.

The two units the company is currently converting for Brazil’s prolific pre-salt region are unmistakably launching it firmly into a new generation of industry requirements. The FPSOs ‘Cidade de Paraty’ and ‘Cidade de Ilhabela’ will start service on long-term 20-year lease and operate contracts with Petrobras towards the middle of this year, and next year respectively.

‘Generation 1’ started with SBM Offshore’s first leased floating production vessel, supplied in 1981 for Amoco’s Cadlao field off the Philippines. This was the unit that set the company on course for what has become its core technology: the conversion of tanker hulls into production vessels, and to lease and operate these for clients around the world.

In those days a typical FPSO would carry no more than 1,000 tonnes of topsides equipment, scattered sparsely over its large deck to provide basic separation of oil and flaring of associated gas. And the total shaft power needed to drive all the equipment on board would be less than 20 megawatts.

Now, in clear contrast to that, the two upcoming vessels will carry topside loads of about 18,000 tonnes to 23,000 tonnes to meet the advanced processing requirements of Brazil’s pre-salt Pilot 3 and Pilot 4 production projects. And such is the complexity of rotating machinery to be carried on these vessels that the total topsides shaft power reaches some 190 megawatts to 230 megawatts.

“With these two vessels we’ve launched ‘Generation 3’ in the FPSO story and it’s definitely not ‘business as usual’ anymore,” says Chief Technology Officer Mike Wyllie.
Of course ‘Generation 1’ was a long time ago. These were the simple basic units that pioneered the FPSO business. As well as Cadlao, those vessels included FPSO VI (now FPSO Cidade de Anchieta), which served at Nigeria’s Antan field for 13 years from 1986, and also several other floating storage and offloading units.

Around 1999 these gave way to the first examples of the ‘Generation 2’ vessels, which more or less represent the SBM fleet today. Over the last 15 years the trend has certainly pushed steadily upwards in topside weight and machinery complexity for the 18 or so projects that this category includes.

Those G2 vessels progressed from FPSO Kuito and Espadarte, on through the generic vessels for ExxonMobil in West Africa and a series of FPSOs for Petrobras off Brazil. Typically they support around 100,000 barrels per day of oil production and include conventional systems for gas compression and water injection. In addition, some have limited facilities for gas processing.

At the higher end of the scale their topsides weight approaches the 10,000 tonne mark. Nevertheless, it is clear that the move to ‘Generation 3’ is a significant jump beyond even the most recent of these predecessors.

“What we are seeing now is a real step change,” stresses Mike Wyllie. “There is a big increase coming in the size of the units we’re building. The average shaft power of typically up to 100 megawatts for G2 units is being more than doubled for G3 vessels.”

In its hugely demanding pre-salt development programme, far offshore Brazil, Petrobras aims to exploit vast hydrocarbon reserves that have been obscured deep beneath a mighty blanket of overlying salt until more recent advances in exploration technology have enabled their detection.

What particularly marks out Cidade de Paraty and Cidade de Ilhabela FPSOs as a new league of vessel is the increase in production rate to be handled and the far greater level of sophisticated gas processing and compression technology they will carry.

In terms of oil production, Cidade de Paraty is designed to produce 120,000 barrels per day, and Cidade de Ilhabela will go to 150,000 bpd. Added to these impressive throughput capabilities is the need to deal with high volumes of difficult associated gas.

The reservoir gas contains a high percentage of carbon dioxide (ranging from 10% to well over 50%) which has to be separated out to allow export of purified natural gas. This contaminant - along with some hydrogen sulphide - and the temperatures and pressures that have to be catered for, mean that materials selection is also a challenge.

To filter out the carbon dioxide, a large bank of gas membranes will be used. Once separated, it has to be disposed of by reinjection. This has called for compressors able to pump a CO₂ rich gas at extremely high pressures - up to 550 bar.
At this pressure, carbon dioxide is a very dense fluid - almost a liquid - and the challenge of moving it is at the limit of current compressor technology. Recent factory acceptance tests for Paraty achieved the highest pressure ever reached by a centrifugal compressor operating with CO\(_2\) rich gas. The discharge fluid was at the highest density yet handled by such a machine.

All of this means that the amount of power needed to drive compressors is much larger than normally experienced on the G2 units of the past, and topsides weight and space needs are going up accordingly.

The 23,000 tonnes of topsides to be carried on Ilhabela “is by far the largest we’ve ever designed and constructed,” says Mike Wyllie, “and it’s approaching the limits of what is practical on a converted tanker.

“We’ve run out of space to spread the topsides any more, so we can only build upwards,” he continues. “On some modules we are now up to four operating levels, which makes them heavy, and a challenge to operate and maintain.”

Clients like Petrobras and one or two others are the drivers towards this ‘generation three’ of FPSO conversions. “A few years ago anything that had 20,000 tonnes of topsides would automatically have been a new, custom-built vessel,” points out Wyllie.

“We’re happy to keep pushing the limits of what you can do with tanker conversions because that’s what we do best and it’s where our core technology is,” says Wyllie. “SBM’s position in the market is at the top end, with the most challenging projects, so G3 is natural territory for us.”

As well as building these units, SBM has to be ready to operate them. Since last year SBM has been working closely with its fleet operating company SBM Production Contractors to accelerate preparations, and with its key suppliers who help with the commissioning and early operation of the units.

“We have to be sure of all our systems and processes, along with the training and competency of our offshore crews,” says Wyllie, “so that everything is in place and ready for operation of these new units.”

Things have changed a lot since those early days thirty years ago. At that time the emphasis for the crews was on the marine side. Then G2 brought the start of a transition from marine to process know-how and the topsides crews began to include personnel with offshore production platform experience.

Now the present jump to G3 - with its major increase in size of topsides and machinery shaft power - requires another transition and puts the focus ever more on the advanced separation, treatment and compression technologies on deck.

In the ultra-deep waters (around 2,100 metres) and with the very high well pressures of these pre-salt pilot projects for Petrobras, the riser pipes from seabed to surface vessel are also a significantly challenging part of the overall picture.

The two new units for Brazil will support a large riser and umbilical count - up to 66 of them. In addition they may carry a mix of riser types: both rigid steel and flexible.

Such a large number of risers in ultra-deep water definitely adds to the complexity of the projects and is the reason why spread-mooring has been selected here rather than turret-mooring.

In the past SBM has provided turrets for very high riser counts (notably the Petrobras P53 turret with its 75 slots), and for very high mooring loads (notably the Skarv turret in Norway). It has also connected rigid steel catenary risers to a turret offshore Brazil, at the Espirito Santo FPSO.

But a combination of all three of these elements to allow the two current FPSOs to be moored by turret is not yet proven technology. However, SBM is working to develop such a turret and allow future similar vessels to enjoy the benefits that turret mooring brings.

For the moment, the challenge of launching ‘Cidade de Paraty’ and ‘Cidade de Ilhabela’ into smooth operational life is more than enough to start the company off in this new league of FPSOs.

“But now certain clients are recognising that it is possible to put that weight on top of a converted tanker, and to lease it from a contractor, enabling useful cost and schedule advantages to be gained,” he says.
Measuring complexity

To formulate its statistics on shaft power, SBM counts all rotating machinery greater than 1 megawatt. This means that where compressors are driven by electric motors, the shaft power at the turbo generator and at the motor-driven compressor are both counted. Total shaft power is a good indicator of topside complexity, and this is the measure that has rocketed for ‘Generation 3’ FPSOs.

The other indicator of complexity - growth in topsides weight of FPSOs over the years - has risen in more linear fashion. However, any more topsides at the record weight of Cidade de Ilhabela will definitely start pushing this line to exponential on the graph.

And to cater for whether an FPSO is spread-moored or turret-moored, SBM includes the riser top manifolds in the topsides weight if the unit is spread-moored. In the turret case it includes the manifold chamber on top, and all the associated valving.
Engineers at Schiedam are busy developing SBM Offshore’s pioneering Floating Liquefied Natural Gas (FLNG) concept. With patents in place, basic engineering is continuing and model testing will soon be performed to verify computer simulations.
The development is well timed to take advantage of the strong growth in natural gas demand that is expected during the coming decades. In its World Energy Outlook 2012 the International Energy Agency forecasts that gas demand will rise from 3.3 trillion cubic metres (tcm) in 2010 to 5.0 tcm in 2035, an increase of 50%.

Industry estimates suggest that there are over 2,000 trillion cubic feet (Tcf) of proven undeveloped offshore gas reserves in the world today. Many of these reserves, however, are considered ‘stranded’ i.e. the fields are too far from shore to be considered economic. This, combined with the increasing permitting challenges of building onshore terminals, will drive the market for FLNG.

Kees Willemse Director of Proposals & Technology Development from Schiedam office, said: “With the increasing global demand for gas we expect there will be a strong market for FLNG vessels. FLNG has the potential to make a significant impact on the global LNG market over the coming decade.”

According to energy analysts, Infield Systems, capital expenditure (Capex) on FLNG and offshore regasification markets will increase significantly over the period to 2018. In the short to medium term, the majority of planned FLNG projects are concentrated in Australia and South East Asia. However, further potential projects are likely to be announced in North and South America, Africa and the Middle East.

This new market will be a good complement to SBM’s already strong position in the oil FPSO business. SBM has extensive experience in designing, building and operating FPSOs and is now drawing on this experience to develop its FLNG concept.

Commenting on SBM’s strategy Bruno Chabas, CEO SBM Offshore said: “Our core position is for midscale FLNG (1.5-2 mtpa) conversion.”

From shore to be considered economic. This, combined with the increasing permitting challenges of building onshore terminals, will drive the market for FLNG.

SBM’s design will continue to be validated, not only in terms of economics but also for operability. Some wind tunnel testing has been performed to verify the effect of topside design on the loading of the vessel. The next step is to make a scale model of the vessel for testing in a tank. This testing will provide SBM with the further information needed to confidently offer the concept to potential clients. Willemse summed up: “The concept is at a sufficiently advanced stage of design whereby SBM can accept specific details of the potential field – for example wave and wind conditions and gas composition – in order to tailor an optimum FLNG design to the exact needs of the client.”

Willemses added: “This size is suitable for the 700-plus stranded gas fields between 0.5 TCF and 2 TCF and is also a good fit with SBM’s current FPSO product line, in terms of project scale, risk and investment.”

Many of the technologies and capabilities that SBM has in-house are applicable to the FLNG concept. For example, the same turret mooring systems used for FPSOs can be used for FLNG. Notably, SBM is providing the turret for the first new build FLNG project – a very large-scale project that is currently under construction for Shell.

Although building a new facility is possible, SBM’s innovative option is to convert LNG tankers into FLNG facilities – in much the same way as has been successfully achieved for oil FPSOs. The advantage of this concept includes lower costs and a shorter schedule. With such a conversion, the process facilities along with the storage and crew living quarters are located on deck.

This novel topside layout is achieved by joining together two LNG tankers. This ‘twin hull’ concept allows adequate space for the process facilities with the necessary space between sections of equipment to satisfy safety requirements, while providing sufficient LNG storage capacity.

SBM has performed generic pre-FEED work, together with Linde Engineering, a strong and reliable LNG topsides partner, to cater for a wide range of potential reservoir compositions and environmental conditions, which can then be easily optimised for specific fields.

For the mid-scale FLNG concept, a pre-cooled dual nitrogen expansion process without natural gas liquid (NGL) recovery has been selected, providing an optimum balance between efficiency, simplicity, robustness and safety.

Avoiding the use of mixed refrigerants on the topside and the introduction of several innovative features achieves an efficiency level approaching that of the single mixed refrigerant (SMR) process. This design provides a highly economic solution for mid-scale applications.
It was the perfect gift for Petrobras back on 7th December 2002 when FPSO Brasil achieved first oil just before the holidays. Ten years later she continues to pump the ‘black gold’ at a rate of 35,000 bbls oil per day and plans to reach 60,000 bbls by June 2013 when a new well is added. With an uptime of 99.5%, this is quite an achievement married with the fact that she has achieved a decade in operation without any LTI (Lost Time Incidents). These high performance and safety milestones clearly demonstrate a cohesive team at work onboard and onshore.

Paul Whittle, Onshore Technical Manager for SBM’s Brazilian seven-strong fleet hits the nail on the head when he comments on what matters to our clients “A unit of happiness is a barrel of oil.”

The vessel was partially replaced or refurbished to meet the FPSO design life during the lease with Petrobras, which has extension options. The client is opting for a three-year extension to prolong the current lease due to finish in December 2013. To assess potential modifications required a review of the vessel, which started in February 2013. The review report will recommend what and how alterations and repairs will take place. Often the yard work – for example the upgrading of topsides – can be done while the FPSO continues to operate offshore, until the actual refitting onto the vessel takes place. The options are presented to the client who in discussion with SBM will come to a decision on the best way forward.

What makes an FPSO tick?
Talking shop and safety

SBM clients expect the highest level of productivity from the company’s FPSOs. What clients are most concerned about is that their objectives are met. To ensure the efficient operation of the FPSO communication is key – both written and verbal – between the staff onboard (inter-departmental), between the unit and shorebase (Operations, Technical, Logistics, Purchasing, Personnel) and between SBM and the client both offshore and onshore. The key person who manages this multi-faceted conversation is the Offshore Installation Manager (OIM).

All onboard the FPSO Brasil
Tom Tayne, one of the two OIMs assigned to FPSO Brasil, says “The principal part of my job is overseeing the daily work routine and liaising with the client on a daily basis. We then communicate to shore base keeping them up to date on the running of the vessel with any issues arising. Contact with the shore base manager is indispensable; I rely on him and the General Manager to ensure that logistics run smoothly and that all instructions are implemented, as well as staying on top of all offshore activities, including those conducted by third parties.

He adds “Often crews are a multinational mix, which further underlines the importance of communication in order to work together as a team and get the job done. Being a close knit family per se, communication, whether in English or Portuguese, is essential and it is really important that we recognise good team work. A pat on the back goes a long way to support the team spirit.”

Tom Tayne emphasises the importance of input from the client. “A close collaboration between the SBM team and our client Petrobras ensures that a high level of productivity is consistently maintained. The client’s representative is called a fiscal and they are involved on a daily basis with operations and regularly request for movements of choke setting on wells and chemical usage.”

While the OIM is the focal point of contact offshore for the client, the Operations Manager is the direct link with the client onshore. Antoine Kovacs who fills this latter function is based in the Macaé office. He explains “Onshore we have a weekly contractual meeting with the client, the aims of which are first to verify that SBM isremedying any problems - which could include maintenance of equipment after breakdown, local regulations compliance or personnel issues. Secondly, to line up the information and events related to production/process - which could include gas flaring impact or water injection loss. Everything is registered in the meeting minutes and serves as a log, which is important to ensure clarity between SBM and the client.”

Financial penalties in the industry for reduced or loss of oil and gas production and water injection can be severe. Antoine adds “There is a personal relationship between the key management at Petrobras and SBM, who work together to help mitigate such fines.”

**Good morning Brasil!**

On board an FPSO the crew usually get an early start – often at 6am. Every day begins with the OIM’s vessel supervisor holding a TBT (toolbox talk) where he goes over the current jobs being carried out that day. Any comments are carefully considered.

Equally important for the OIM is the safety and welfare of the crew and ensuring the Management System Compliance is adhered to, which is intrinsically linked to the communication element of the job. Tom Tayne’s signature motto is “Communication is our Best Safety Tool - Use It!” as part of an onboard mindset that is engrained in the crew’s approach to their daily work and inline with SBM’s corporate HSSE policy. He adds “Petrobras is very involved with safety issues.”

Tom further explains “We have a system called the ‘STOP programme’ where individuals have been trained and can stop anybody if they observe an unsafe act being carried out; this is classed as a negative STOPCARD. However, positive actions are also encouraged whereby people are stopped and given a positive STOPCARD. Cards are submitted and at the end of the month we pick the best card and award the person a prize. Recently passing the 10-year mark on FPSO Brasil without any LTIs (Lost Time Incidents) speaks volumes of the high standard and effectiveness of our safety procedures.”

Safety is taken very seriously Tayne explains “All departments hold safety meetings and there is also an environmental meeting. The outcome and minutes of these meetings are communicated to everyone via the notice boards. In addition, we also receive monthly reports from the Health, Safety, Security and Environment department (HSSE) based in the Monaco Head Office. Onboard we have a Committee of Investigation Preventive Accidents (CIPA), which also warrants a meeting and report to be sent to shorebase.”

**HSSE**

Thankfully, nowadays in the industry safety is king. It is the first message that greets workers onboard. The safety briefing is immediately after embarkation and the message is ubiquitous on all vessels. At times the challenge is to change people’s attitude - the crew must want to work safely. This is a matter of time and the head of department and safety officer are there to set a good example. On all FPSOs any incidents are recorded onto the SBM system called SIRS, which monitors and identifies the root cause for analysis.

Safety Officer Isabéle Reginato says “In order to reinforce safety issues, I use the many resources available. I find that encouraging crew interaction boosts thinking about safety practices. I randomly choose an employee to observe a worker in action. Afterwards, the employee compares the actions with the requirements of the Permit to Work (PTW). It is a good opportunity to highlight safe behavior or to reflect upon ways for improvements. The final step is to write the STOP CARD.”
In recognition of outstanding project delivery performance in terms of Health, Safety, Security and Environment (HSSE), quality, cost and schedule, the Estaleiro Brasa yard team in Brazil was honoured earlier this year with the SBM Offshore Focus Award for Project Performance. The tribute is the first of more to come as clients in Brazil are acknowledging the yard’s importance in bringing their projects to fruition and the media is holding up the yard as an example of sustainability.

Through a joint venture with Naval Ventures Corp, the pioneering yard has proven to be an excellent example of commitment to sustainability with SBM Offshore leaving its ethical and ecological imprint on every step of the yard’s development and going far beyond the legal requirements imposed by Brazilian law.

Globally, the project entailed the development of new fabrication yard facilities dedicated to complex FPSOs for the Brazilian market. Specifically, the plan for the 65,000m² yard was to have the capacity to assemble Topsides modules – goals that were realised. The added challenge was to build the yard while adhering to SBM’s ecological programme, which is dedicated to preserving the fragile ecological surroundings.

Situated on the island of Ilha do Conceição within the environmentally sensitive Guanabara Bay, SBM Offshore felt strongly about carefully conserving this heritage whilst at the same time providing a thriving workplace that offers jobs to the local community. In particular, this latter point would help SBM Offshore meet the obligations imposed by the Brazilian government on international companies to source at least 65% local content for all projects in the country. General Manager Rio office, Philippe Levy, underscores the importance of SBM’s expansion by way of the yard “For local content projects the basis for the future is that all complex and heavy modules will have to be built in Brazil.”

The yard’s construction was achieved within a very tight schedule and its completion allowed the assembly of FPSO Cidade de Ilhabela modules to start on time in July 2012. Ilhabela will be leased to Petrobras and is set to become SBM’s biggest FPSO, once she is completed in September 2014. Ilhabela will leave China at the end of July and is expected to arrive at the Brasa yard towards the end of September.

José Miranda Formigli Filho, Petrobras Exploration and Production Director says “I believe that SBM Offshore brings the expertise to the local market and more than that can also bring the mind-set to deliver what is contracted. SBM and Brasa will really contribute to the development of local capacity for delivering big projects like Ilhabela.”

Further underscoring the global importance of the yard, José Miranda Formigli Filho, says “We look at this local content issue as an opportunity to develop the country.”

A yard ideally positioned to serve Brazil

Brasa yard’s unique location in the heart of the capital of the Brazilian Oil & Gas industry, Rio de Janeiro, gives SBM Offshore a competitive edge when bidding for local contracts and increases the company’s flexibility for project execution and delivery.
Philippe Levy says “The location of the yard in Guanabara Bay is unique and convenient - situated just across the Niteroi Bridge. It has the space, which allows the freedom to engineer how best to build modules. With the help of local partners it can accommodate more than two projects at a time. In addition, the four-story office building is perfect as we can have all the project teams together.”

Underlining the key role in the future of SBM in Brazil, Christophe Rousseau, Yard Operations Manager says “Ten modules and 11,200 tonnes for a new yard is a big challenge but we know that we have all the cards in our hands. We know we are better able to control projects than if we had to go to other yards and we are not always their priority. Here we control everything.”

Originally home to an old abandoned yard, work included demolition of the redundant facilities with an estimated 40 tonnes of construction waste being donated to other companies for re-use. In addition, waste soil sampling and analysis were conducted to ensure that the soil was not contaminated. The yard’s environmental programme also includes:

- Assessment and monitoring of ground water pollution
- Installation of a rainwater drainage system, a compact station for sanitary effluent treatment, an oil and water separator box for a car wash, a waste central and containment gutters for buildings
- Milling of wood and plant material, which was incorporated into compost windrows for organic fertilizer production.
- A week-long event ‘Cleaning Guanabara Bay’
- An educational program with local communities and schools for the 2013 World Environmental Week in June (including a celebration for International Environment Day, with activities and games to raise awareness)
- A workshop on an energy saving solution for the yard
- Publication of an environmental booklet on waste reduction and segregation

With the help of volunteers 140 seedlings were planted in a nature reserve at the Municipality of Niteroi City Park, to environmentally compensate for the removal of vegetation at the yard. The exercise helped promote environmental awareness. The trees’ progress will be monitored annually by the eco-volunteers.
The sole intention of this brochure is to share general information.

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