Youngstown, Ohio: The first fully integrated U.S. mill

THE TECH FILES
Collapse challenges and technical solutions

SOLUTIONS
VAM® Field Service: ever closer

ON THE MARKET
Offshore business: setting course!
Dear Readers,

Youngstown, a quiet town in Ohio, has been strongly anchored in a history of steel making. Since 2002 when Vallourec acquired its current steel plant and rolling mill, our goal has been the same as all of the Group’s entities: to improve, adapt and serve our domestic market faster and better with premium products and services.

In the recent years this once stagnant part of the country, also known as the ‘rust belt’, has seen a renaissance in manufacturing, largely due to the boom in the oil and gas shale plays. Anticipating this demand, Vallourec decided to invest in order to better serve our customers locally. This new plant in Youngstown, Ohio, is presented in detail in this magazine. You will discover the characteristics of the state of the art facility that will service the needs of all oil and gas shale plays in North America for small diameter premium casing.

But the North America market has also seen a strong revival in the Gulf of Mexico, and last year we have increased the capacity of our VAM® USA R&D lab in Houston, Texas to an unparalleled size to develop, test, and qualify the reliable premium connections needed for sensitive offshore applications.

Whether in the US or across the globe, Vallourec presents a ‘global offshore offer’ ensuring all of our premium products and services are constantly fine-tuned to satisfy this challenging market, and its extreme environments.

Everywhere in the world, it is clear that timing is a key to success. Thus when creating a new product, service, or a new mill, we seek to anticipate the market expectations, and insure they will be serviced at the right moment. Brazil, China, Middle East, United States… Vallourec endeavors to be present and operational everywhere in the world, whenever it is needed.

Additionally, in order to fulfill our customers’ requirements, nothing replaces the contribution of highly skilled specialists, such as our VAM® Field Service professionals, or our collapse specialists whose expertise is outlined within this publication.

Enjoy your reading!

Skip Herald,
Managing Director OCTG North America
QUALIFICATION OF VALLOUREC’S NEW FINISHING PLANT IN SAUDI ARABIA

Vallourec announces the full qualification of its new finishing plant in Saudi Arabia. Located in Dammam, this unit is dedicated to the heat treatment and threading for the full range of VAM® premium connections, with an annual capacity of 100,000 tons. It will mainly supply Saudi Aramco, the Kingdom’s national oil company, along with other regional operators. With the qualification of this plant, Vallourec is reinforcing its presence in the Middle East where numerous oil and gas projects require high added-value tubular solutions. The new finishing plant has already received an order for 20,000 tons of premium connections.

VALLOUREC RENEWS ITS MAIN FRAME AGREEMENT WITH PETROBRAS

Vallourec’s Brazilian subsidiary V & M do Brasil and Brazilian national oil company Petrobras have signed a 5-year contract to supply Petrobras’ operations with premium OCTG products, including seamless pipes, steel grades and connections using state-of-the-art technology. These products will be used for Petrobras’ offshore Oil & Gas exploration and production wells, including the huge reservoir of the pre-salt fields which bring unprecedented technical challenges for their exploitation. With the renewal of this frame agreement Vallourec pursues its long-term collaboration with Petrobras, dating back to 60 years.
Vallorec group subsidiary V & M STAR has eclipsed a number of project milestones in the long quest to grow its position as the premier domestic supplier of Oil Country Tubular Goods (OCTG) supporting long term development of unconventional oil and natural gas in North America.

...
Following completion of the $1.050 million Fine Quality Mill (FQM) structure in Youngstown, Ohio, in December 2011, Vallourec successfully pierced the first shell from the site of the-ear plant in late June 2012—only 18 months after breaking ground on the construction project. In October 2012, Vallourec began rolling the first commercial pipe to be manufactured at the facility, setting the stage for the first production of OCTG to depart the FQM in December, initially bound for heat-treating and finishing at V & M STAR’s Houston facility.

In total, about 700 metric tons of 5½-inch 20W P110EC Range 3 joints with a DWC™MC semi-premium connection, a very popular product in the shale plays, were the first inaugural shipments of OCTG from the FQM in December. Beginning winter 2012, and throughout 2013, the plant will be carrying out a series of manufacturing qualifications for products, and the fact that they have a variety of production locations gives companies such as Devon comfort that they will be able to produce the pipe on time and at the location that we need.”

Steve Talt, President of Pipeco Services

“Valloerc strength from Pipeco’s perspective is: Balance and Consistency. The Vallourec products that are offered to Pipeco allowed us to move into new markets that historically had been untapped for us.”

Testimonials

According to the EIA (the US Energy Information Administration) the technological advances have created a very promising outlook for shale gas andtight oil development in the U.S. The organization expects domestic production of tight oil to increase by 2.6 million barrels per day between 2008 and 2019 thus contributing in great part to the 1.5 million barrels per day (b/d) domestic crude oil production growth between 2012 (6.4 million b/d) and 2014 (7.9 million b/d). All indicators point to the fact the U.S. imports share of liquid fuels will decline due to increased production of tight oil and gas liquids, and greater fuel efficiency. Additionally, gas production will continue to rise sharply over the next decade, allowing the U.S. to potentially become a net exporter of natural gas in the early 2020s, provided that Federal authorizations are granted.

OCTG from the FQM in December.

The decision to construct the FQM in Youngstown was based upon a few fundamental considerations. First, the availability of a 106 acre parcel of land adjacent to V & M STAR’s existing steel mill was especially propitious. This configuration enabled the production of all API 5CT grades, including Sour Service grades; on-site API, semi-premium, and VAM® premium threading; on-site finishing and third-party inspection based upon PSLL2 criteria; Technical support and VAM® Field Service; network of licensees for accessories and repairs in the area; customer information through Tubular Essentials; a technical class developed to guide our customers through the processes of steel and pipe making, as well as threading.

In 2007 Vallourec elected that its entire Heat Treated OCTG product would be sold to API 5CT PSLL2 criteria in all its operations worldwide, benefiting our customers from this increased safety/quality assurance.

In 2007 Vallourec elected that its entire Heat Treated OCTG product would be sold to API 5CT PSLL2 criteria in all its operations worldwide, benefiting our customers from this increased safety/quality assurance. To date, no other U.S. domestic supplier of seamless, premium OCTG offers that feature as standard, nor has consolidated all these steel- and pipe-making capabilities, and services at one location.

The new FQM is designed to run extremely efficiently with as lean an inventory as possible. Combined with its proximity to V & M STAR’s existing, complementary facilities, the new state of the art pipe mill ranks as one of the most efficient seamless tubular facilities in the U.S., and provides the company with an unmatched speed-to-market capability. In addition, the Youngstown, Ohio, area is situated at the heart of the Marcellus and Utica shale formations, both mature and ascending shale plays in the U.S. From a continental perspective, the new mill complements company facilities in Houston, Texas, and Muskogee, Oklahoma, positioning Vallourec to better serve customers pursuing unconventional oil and gas plays across the U.S. and in Canada.

685,000 metric tons/year of steel-making capacity

ONE MILLION metric tons/year of pipe mill capacity of seamless products
The new mill rolled its first commercial pipe in October 2012.

"CENTER OF COMPETENCY"
Perhaps the most important factor influencing the decision to build the new pipe mill in Youngstown was the presence of experienced steel workers and pipe makers in the region, including many employed at V & M STAR’s existing plants. Because of the availability of a knowledgeable workforce, the company has pursued a phased staffing strategy for the new mill that bases hiring upon the status of activities occurring at the site. Training procedures were established that take advantage of local workers’ manufacturing skill sets. The FQM new hires developed their proficiency via a combination of classroom formation and on-the-job training by shadowing experienced employees in the existing mill. At the start of production, most had over 6 months experience on the job.

With about 20,000 candidates applying for the positions, competition has been intense for the 350 permanent, high paying jobs, created when the new small diameter mill is operating at full capacity, with about 20,000 candidates applying for the positions. In combination with more than 1,200 jobs created during peak construction of the new mill, the impact of the FQM project on the regional economy has been substantial, estimated by regional Chamber of Commerce officials at more than $1 billion.

“We think Youngstown represents a center of competency for us,” Joel C. Mastervich, president and chief operating officer of V & M STAR, “it is where our workforce has been trained and bred to make pipe. We think that is a very important feature for the start up our new facilities, and to produce quality products for our customers.”

RIDING A RENAISSANCE
Vallourec conceived the new FQM in Youngstown specifically to create domestic manufacturing capability in the smaller sizes of casing and tubing used in horizontal wells across U.S. shale plays. The spread of advanced drilling and completion methods invented for shale gas to other low-permeability reservoirs is driving a renaissance in U.S. shale oil production as well. In a recent quarterly Short-Term Energy Outlook, released January 8, 2013, the U.S. Energy Information Administration (EIA) projected that domestic crude oil production will continue to grow rapidly during the current year and therefore into more overall pipe usage. With commencement of operations at the new Youngstown FQM, Vallourec not only has become a major domestic supplier of OCTG, it has become a partner in economic recovery for a region and a nation.

Perhaps more importantly, growing domestic oil and gas output enabled by advanced drilling and completion technologies are fueling a slow-but-steady economic recovery in the U.S. By encouraging plans for constructing new petrochemical plant capacity, new LNG export terminals, and other industrial facilities like Vallourec’s new FQM.

At the same time, the FQM is playing a key role in the industrial renaissance stemming from the oil production boom.

More than 15 years ago, Vallourec began assembling the steel- and pipe-making assets that eventually led to the creation of V & M STAR and construction of the FQM in Youngstown, establishing itself as a major domestic supplier of seamless pipe in North America. With commencement of operations at the new Youngstown FQM, Vallourec not only has become a major domestic supplier of OCTG, it has become a partner in economic recovery for a region and a nation.

The new mill rolled its first commercial pipe in October 2012.
Collapse phenomenon in OCTG is due to external loads applied on the tubular products that have different causes in a well. It can be due to well load cases, such as cementing operations, full evacuation, and APB pressures, or due to floating formations (mainly salt). Collapse refers to the failure mode of external pressure on a pipe (similarly, burst is the failure mode of internal pressure loads). By extension in Oil & Gas industry, collapse designates more generally any external load. Collapse resistance of a tubular depends on mechanical and geometrical parameters, in particular: D/t ratio, ovality, minimum wall thickness, residual stresses and yield strength. Collapse failure will be initiated in the weaker zone of the tubular.

1. DEFINITION OF COLLAPSE

1.1 API COLLAPSE FORMULA (ISO10400)

API 5CT refers to ISO10400 & API5C3 formulas for collapse calculation of API 5CT pipes. There are 4 API formulas defined in these documents, each one applicable on a given domain (D/t ratio and grade ranges). You can refer to chapter 8.4 of ISO/TR 10400:2007 for the detailed equations. When increasing D/t ratio, the collapse equation that apply will be in this order:

• Yield Strength Collapse
• Plastic Collapse
• Transition Collapse
• Elastic Collapse

A schematic view of these applicable domains is shown below.

The collapse resistance is a major concern in some environments, and can be the driving technical constraint of well design. This is often seen in deep offshore HP/HT, with Annular Pressure Build up (APB) pressures on the large OD casings, or pre-salt formations with high shear stresses applied by the external environment on the casing strings.
For yield strength collapse, the collapse value will depend mainly on the material yield strength. This concerns the low DR ratio, e.g., tubing sizes or thick pipes. On the opposite, elastic collapse will be function of pipe geometry mainly, and not yield strength of material. This is typical of very large OD casings. These equations are known to be conservative. One can note also that operators usually apply a 1.0 or 1.5 safety factor to the collapse loads for well design calculations.

### 1.2 OTHER COLLAPSE CALCULATION METHODS IN ISO 10400 ANNEXES

Annexes of ISO 10400/API 5C3 describe statistical approaches based on Collapse test data statistics (Annex G) or production data statistics with Klevetaro-Tamano collapse calculation (Annex H). These calculations come along with practical limitations:
- Annex G requires to do a very large number of collapse tests from samples in production, for each size and grade combination, per manufacturing plant; this is not very realistic to apply to each single product of a full catalogue, and it is costly.
- Annex H formula is based on empirical collapse database from different DCTG manufacturers (Klevetaro-Tamano equation). Consequently it is not optimized as it depends on the manufacturer process, equipment, and know-how. Also, Annex H would require communicating on process statistics which is sensitive data for suppliers versus competition.

### 2. SOLUTIONS TO INCREASE THE RESISTANCE

One can sort 3 main ways to increase the collapse resistance of a casing string: increase the material yield strength, increase wall thickness and/or optimize the pipe collapse properties (proprietary High Collapse pipes).

#### 2.1 INCREASE YIELD-STRENGTH

Increasing yield strength is not meaningful in certain cases: in the first place it may not be a suitable solution if there is H2S in the well environment. But also, as explained in the previous chapter, for elastic collapse range, the yield strength has no more effect on collapse resistance.

#### 2.2 THICKER WALL SOLUTION (INTEGRALS AND MIXED STRING)

##### 2.2.1 Suitable connection design

Naturally, increasing the wall thickness will increase the collapse resistance. However, the operator has to consider the clearance and drift constraints of its well design.

Increasing the wall thickness will either increase the OD or reduce the drift of the pipe. To keep the same clearance while increasing the OD, the connection design must be a most suitable parameter to play with. Typically, a 13 3/8” initial design with threaded and coupled connection (e.g., VAM® TOP) that needs to be switched to a 13 5/8” (88.2# to keep a 12.250” OD or reduce the drift of the pipe. To keep the same clearance while increasing the OD, the connection must be an integral flush connection (e.g., VAM® TOP MUS™) part to pass through a salt formation, made to the 9 5/8” T&C casing.

##### 2.2.2 Mixed string

For specific cases where only a section of the full string needs High Collapse resistance, like salt formation to be passed through, a mixed string can be the best candidate to avoid a too heavy string (cost and weight purpose) and focus only on the zone where the collapse loads are present.

VAM® MUST is a design developed mainly for this purpose: it is a flush connection threaded on very thick pipes, whose OD is comparable to the related T&C casing string: 7 5/8” / 5 3/4” VAM® MUST could be mixed with 7” VAM® 21 string (both 6.000” drift and similar max OD), or 10 ¾” 109#/ VAM® 21 8.000” drift maintained.

Below a schematic view of the use of mixed string:

#### 3. HIGH COLLAPSE GRADES

##### 3.1 PRINCIPLE

High Collapse pipes consist in optimizing product properties to increase their resistance to external pressures. The usual influencing parameters that are worked on are shown in the table below.

<table>
<thead>
<tr>
<th>Yield Strength</th>
<th>Quality</th>
<th>Wall Thickness</th>
<th>Residual Stress</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>API 5CT</td>
<td>Specified by grade</td>
<td>not directly specified</td>
<td>Controlled</td>
<td>Proprietary high Collapse</td>
</tr>
<tr>
<td>Proprietary</td>
<td>not specified</td>
<td>Min yield</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table showing API 5CT pipes vs. proprietary High Collapse pipes Specification

The High Collapse pipes are usually fully compliant with API 5CT specifications, in dimensions, manufacturing and control. They are completed by tighter tolerances, additional controls and quality checks and enhanced manufacturing rules from the supplier.

The High Collapse shall meet at least 2 conditions:

- Robust and proven High Collapse formula: It is based on R&D expertise, collapse tests, and process know-how. This calculation should provide a minimum collapse value guaranteed for the full volume produced.
- Manufacturing control and quality: This relies on process expertise, state-of-the-art NDT equipment, and specific manufacturing procedure. The know-how of the supplier is a key factor.

The field record and collapse testing database is also a good indicator of the product reliability. Some operators ask for collapse tests in production. This is a recommended practice when the operator has no record of High Collapse requirement.

##### 3.2 HIGH COLLAPSE MODEL AND CALCULATION (V & M PROPRIETARY)

Since more than 50 years, Vallourec studied the influential parameters of collapse on the pipes they produce. From this analysis and a large collapse test database, Vallourec developed a proprietary collapse calculation model, from where they can determine the production requirements for a given item to meet a calculated collapse resistance.

Based on this calculation, Vallourec guarantees on the full production of a given high collapse item a safety margin with the claimed collapse rating (which is a minimum “worst case” value).
COLLAPSE CHALLENGES AND TECHNICAL SOLUTIONS

3.3 MANUFACTURING PROCEDURE AND QUALITY CONTROLS

Specific production parameters and improved ND T controls are required.

An internal qualification is performed for each Vallourec mill producing High Collapse, consisting in training, rehearsals, supervision, and inspection on production samples, and audits.

V & M high collapse ratings are guaranteed for all mills through the transfer of know-how, harmonization of best practices, and compliance with V & M model calculation and manufacturing rules.

As an integrated manufacturer, from steel making, green pipe, to heat treatment and threading (finished product), Vallourec can optimize and control all the steps of manufacturing to deliver the best performance.

3.4 COLLAPSE TESTING

Collapse testing procedures are given in API 5C3 document; among other conditions for testing, the minimum length of the sample is a very critical requirement, explicitly defined in API 5C3.

More than 3,000 collapse tests have been performed on V & M high collapse pipes. These tests are done in compliance with API 5C3 collapse test procedure.

Collapse tests are regularly done for R&D purpose but also on production samples. The collapse tests during production are requested by some customers to demonstrate the guaranteed ratings. They are done in-house or at external labs, at a given frequency (1 every 200 pipes for instance) specified by the customer.

4. CONCLUSION

Regarding High Collapse grades in OCTG, since there is no API standard for High Collapse manufacturing and values, it is recommended that operators specify the following when looking for High Collapse product:

- The OCTG supplier’s approach and model for High Collapse calculations
- Explanations on manufacturing procedure and ND T controls, all customers shall be equipped and internally qualified to produce with specific rules
- Collapse tests during production (e.g. 1 every 200 pipes to send to collapse: all the collapse values must be above the claimed rating)
- Qualification of the plant that manufactures High Collapse grades
- High Collapse product catalogue from the manufacturer

This will ensure good quality and reliable performance of the quoted products.

As described in these Tech Files, collapse issues on casing can be managed with different solutions. For the Oil & Gas companies, discussing with premium OCTG supplier to find the most suitable solution will bring added value to their project. Suppliers like Vallourec can advise on a large catalogue of proprietary grades and specific connection designs. Fit-for-purpose solutions could also be developed.

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INTEGRATING HOLE CLEANING SOLUTIONS

IN THE DRILL STRING TO LOWER DRILLING COSTS

Why spend time thinking about drill pipe? Relatively speaking drill pipe is a small expenditure compared to the cost of Non Productive Time (NPT) associated with its use.

Studies have estimated the global industry losses related to stuck pipe and loss circulation to be in the order of 2 billion US dollars per year. This corresponds to more than twice the total amount spent to buy drill pipe in the first place and represents about 20% of the total NPT losses associated with drilling. This also sets the framework around the challenges and opportunities in which VAM® Drilling continuously strives to provide best-in-class drill string solutions. Complex and extended reach drilling (ERD) well profiles are constantly pushing drill pipe manufacturers to redefine drill pipe performance limits. Focusing on well safety and hole cleaning efficiency capabilities of the drill string are not always fully addressed and offered by drill pipe manufacturers. VAM® Drilling, an established industry leader, differentiates by offering hydro-mechanical hole cleaning products and solutions for drill pipe.

A HOLISTIC APPROACH

While hole cleaning is generally considered to be well understood, many drillers still have difficulty properly managing the entire process. Yet managing this process with measurements of key performance indicators (KPI) is essential when drilling deviated and horizontal wells. Experience reveals that less-than optimal hole cleaning can lead to serious problems. Poor hole quality, especially when the hole is downgraded, can lead to the loss of the drill string or even the well. Large holes drilled at high RDPs usually require additional rig time for cleanups whereas smaller shallow ERD holes have annular pressure challenges requiring different pipe solutions. Those challenges are best met through a holistic engineered approach to planning.

VAM® Drilling’s Hydroclean™ product line is part of that holistic approach enabling safer and faster drilling. Use of this technology can improve drilling efficiencies and reduce NPT. Hydroclean™ drill pipe has better hole cleaning characteristics than standard drill pipe in all geometries and hole sizes.
“We will go as far as embedding VAM® Field Service Representatives with our operators to support and supervise all VAM® connections and operations,” says Director, Patrice Brossard. “Our commitment has remained the same since the creation of VAM® Field Service in USA and UK in 1985: to ensure that the VAM® Quality is maintained for the life of the well. With the support of manufacturing plants the offer of full well integrity starts to become a reality.

The advice, the expertise, wherever you are... VAM® Field Service motto could not be clearer: ‘Nobody knows VAM® like VAM®’. Over a period of almost thirty years VAM® specialists were able to provide worldwide operational support from their bases in Aberdeen and Houston however this is not sustainable today. Over the years, VAM® Field Service, a fundamental component of the global “products + services” offer developed by Vallourec OCTG Division, has strategically set up Services Centers throughout the globe to meet the growing local demands.

Today VAM® Services Centers are located in the UK, the USA, Canada, Mexico, Brazil, Nigeria, Angola, UAE, Azerbaijan, China and Singapore. Each of these centers function as independent business units with extended responsibilities to regional offices, such as VAM® USA, which manages operations in Houston, San Antonio, Lafayette, and Oklahoma City.

EVER CLOSER WITH SHARED STANDARDS

VAM® Field Service has developed a well-balanced and organized structure under the leadership of Patrice Brossard. “We are supporting all our service centers from our headquarters in Boulogne-Billancourt, France”, explains Patrice Brossard. “Alastair Brodie leads the technical team, Bernard Wys the commercial processes and Anne Bertrand the quality management system”. Anne Bertrand, QHSE Manager advises: “Even if our local service centers remain autonomous, this organizational structure allows us to ensure the general coordination of our common services and shared standards at our specified expectation levels. New services development, methodology, procedures, quality control, competencies... this is to support all OCTG products offered by Vallourec.”

VAM® Field Service experts have a shared responsibility in both their responsiveness and availability. They are in the field 365 days a year and frequently travel to the most remote corners of the world. Our experts are accustomed to receiving last minute afternoon calls. As an example, a request for service at 13:00, helicopters check in at 16:00 and at the...
EVER CLOSER WITH EXPERT TRAINING

Based on the increasing demands and sophistication of our products, the VAM® Field Service team places a top priority on continual educational proficiency. “In October 2012, we created the VAM® Field Service Academy to support this need”, shares Alastair Brodie, Senior Technical Manager. “First and foremost is our priority towards our new recruits through both theoretical and practical application training courses. This initial training of 3-6 months offers an essential introduction to the processes; however, continuous education is also a priority so that the teams remain in tune with the constantly changing and evolving marketplace. This allows us to provide indispensable ongoing training resulting from the continuous development of operational drilling techniques as well as Vallourec’s tubular solutions.

Ensuring the proper use of CLEANWELL®, our dope-free product, or the latest generation of connections such as VAM® BOLT, requires a solid knowledge base that is provided by our expert technical team with the support of VAM® R&D."

The nearly 200 worldwide VAM® Field Service staff and specialists are evaluated for operational proficiency at least once every year. This training effort represents an overall investment of more than 2 million USD, annually. It is also important to emphasize that training in itself is not the end of the process. The technicians, who complete the VAM® Field Service Academy, are assessed according to recognized industry standards following the methodology of OPITO®.

Organization, careful tracking of market developments, investments, high-level and continuous training... VAM® Field Service does it all to exceed the expectations and goals of its clients. Therefore, it should come as no surprise following a survey of the last 2000 jobs that 97% of our clients are completely satisfied and ready to repeat the experience.

VAM® Field Service range of services...

The project comprises of 3 offshore exploration wells in shallow water and 3 in deep water (seabed at 1,000 m). For these demanding deep water exploratory wells, the operator has given preference to companies, such as Vallourec, which have extensive experience in the Gulf of Mexico or in the North Sea.

In view of the harsh drilling environment, it is not an uncommon practice for operating companies to take a conservative approach especially in deep offshore applications, where a principal driver is to specify the most robust and field proven designs including the connections. It was in this context that Vallourec was selected by the client as a preferred supplier, given its many worldwide references and expertise in these most demanding of deep offshore projects. The VAM® family, which is considered a key brand differentiator for Vallourec, has actively promoted its high performance, new generation VAM® 21 connection in Saudi Arabia for this project. A specific qualification test was performed to a severe test protocol that was successfully completed in 2010.

HAND IN HAND

Vallourec worked very closely with the operator to specify its products for this project. For many years, both companies have worked hand in hand through regular face to face meetings, supported by presentations, technical seminars as well as regular day-to-day exchanges that have paved the way for this success. The client’s requirement is to deliver a project safely, on time, on budget with the highest possible quality standards. Vallourec was clearly delighted to offer its support to one of its strategic partners in this new technologically challenging project. This opportunity has enabled Vallourec to once again bring its expertise, know-how and reputation for delivering high quality products and services.

To address the growing domestic energy needs in Saudi Arabia, drilling for non-associated gas is becoming increasingly important. In order to diversify its source of supply, a leading oil company in Saudi Arabia is actively exploring the Red Sea basin in the North West of the country, in the Tabuk province, where Vallourec has been selected as preferred supplier in this project.

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Valorec pursues its long-term collaboration with Petrobras in Brazil

Valorec’s Brazilian subsidiary V & M do BRASIL (VMB) and Petrobras have signed a 5-year-contract to supply Petrobras’ operations with premium OCTG products, including seamless pipes, steel grades and connections using state-of-the-art technology. These products will be used for Petrobras’ offshore Oil & Gas exploration and production wells, including the huge reservoir of the pre-salt fields.

João Perez, General Manager of OCTG at VMB declared:

“A customer-oriented initiative with our key-account team, working closely with our R&D teams to propose a tailored solution and maintain our Premium market share in this increasing Offshore market. Reliability, Innovation and long-term commitment were key for VMB to become Petrobras first choice for the foreseeable future.

Our commercial offer was aligned with Petrobras technical requests to deal with its current and future challenges in the E&P activities, enhancing and standardizing our product portfolio with the most advanced premium products when 22 new products were developed in a single year.

Moreover, our local presence was key to support Petrobras restrictions in the local content regulation which is a very important issue in our country.

Signing this 5-year-contract after a two year exhausting preparation and alignments with our main customer was an important award in this emerging competitive market.”

HUGE TECHNICAL CHALLENGES AHEAD

The Brazilian pre-salt fields combine several additional challenges besides the salt layer itself: well depths up to 7,000 meters, ultra-deepwater conditions with up to 2,000 meters between surface and seabed, acid corrosion caused by H2S and CO2 contaminants, temperatures and pressures tending toward High Pressure/High Temperature conditions in certain areas. Associating all these parameters together has an important impact on the exploration models, and on the requirements for OCTG material able to withstand such a combination of mechanical, corrosive and thermal constraints. Valorec, through its sustained innovation capability, is able to meet all these technological needs and will supply Petrobras with the most advanced seamless pipes for sour service using high alloyed material as well as the latest and unequalled advanced premium connection VATM® 21.

Anticipating new demands for the pre-salt and growing challenges in the still unexplored equatorial margins, Valorec will open in 2013 a new R&D Center in the State of Rio de Janeiro, located next to Petrobras’ research center CENPES in the Technological Park of Rio Janeiro, and will expand its current R&D facilities located in Belo Horizonte, Minas Gerais.

The Offshore market represents such high technological and financial stakes that it has been segmented into individual business lines: drilling, subsea production systems (SPS), subsea umbilicals, risers & flowlines (SURF), and floating production storage and off-loading platforms.

While the Group’s technical and sales teams act independently, in their respective markets, they are all committed to a clearly defined global Offshore strategy.

VALUE AT EVERY LEVEL

The other common denominator of Valorec’s offshore products and various services is their increased added value. “This is a world where the slightest issue can have very serious consequences on human, ecological, and financial factors”, Christophe Paillieux explains. “Conducting repair or replacement operations in thousands of meters of water is extremely difficult and costly. In addition to the stresses encountered inside the well, our engineered products are capable of withstanding extremely challenging deepwater operating conditions, hydrostatic pressures and corrosion.” This in itself is not enough: they must also add to project profitability and increased revenue to our client’s bottom line.

This is the case with the VATM® 21 downhole casings and tubings, whose design facilitates the self-alignment of male and female connections during stabbing operations on the rig floor, or the latest automated Satunax 9 pipeline welding solutions developed by our subsidiary Serimax. The Offshore environment is both innovative and profit driven; it is especially important for Valorec because of its strategic position in the market. Reliability is the main driver for an operator...
... when choosing partners to support a multi-billion dollar project. To maintain a leadership position it also means having the resources necessary to participate in market development: skills, technologies, manufacturing processes, production and investment capacities...

A COMMITTED STRATEGY

For many years, Vallourec has successfully built its reputation of reliable partner for the offshore sector and delivered its products and services without any incident. As an example, we have partnered on projects with Total in the North Sea and offshore West Africa, with BP in the Gulf of Mexico, as well as with Petrobras (see page 23) in deep-water offshore Brazil, where the Group also recently built its largest pipe fully integrated production unit, from mining to finishing, through rolling... that is almost exclusively dedicated to the oil and gas market. Vallourec is also present in all the world’s largest oil hubs: Paris - often forgotten - Houston, Rio, Dubai, Aberdeen, Singapore, Perth... There, Vallourec’s teams not only work with operators but also with the numerous EPCs such as Technip and Subsea7, or regional contractors such as Swiber and Seatrucks.

“We are very aware of our involvement in offshore projects,” says Christophe Paillusseau. “We know that innovation will be one of the developmental keys in the most ambitious initiatives, for example, the ultra-deepwater sector. Therefore, we are working towards developing products and solutions to go even deeper, producing hydrocarbons in corrosive and increasingly challenging environments.”

Extended reach wells have already achieved remarkable milestones in terms of depth and reach. Wells like ExxonMobil’s OP-11 with a total measured depth of 40,502 feet and a horizontal departure of 37,648 feet are trendsetters. Ultra-deepwater wells with a total depth of up to 50,000 feet are soon to be the next frontier conquered.

But pushing the drilling envelope farther requires substantial upfront planning to manage many critical parameters including equivalent circulating density (ECD) management, hole-cleaning, casing wear, torque and drag, and critical tension loads at total depth (TD). As these parameters push product technology forward, drill string manufacturers will need to solidify their position as true partners in helping to design and provide the solutions needed to drill farther, faster. But while drillers today already expect safe, reliable and efficient drill string solutions, they are also calling for cost-effectiveness throughout the product lifecycle. This means that manufacturers cannot simply rely on new product technologies to succeed; but must also offer efficient and user-friendly solutions. A perfect example of this is the drill pipe connections that must boast superior performance values and ease of use but with lower repair rates and costs.

GREATER EFFICIENCY AND COST SAVINGS

And the offshore environment is not the only place where drilling is impacting product development. The U.S. unconventional market, for example, has had a tremendous impact on the expectations drillers have in terms of drill pipe life-cycle costs. The reality of drilling unconventional well profiles is that, in most cases, the life of drill pipe is significantly reduced due to premature tube wear, handling damage to double shoulder connections leading to excessive repair rates. All of which is associated with high repair costs and shortened product life-spans. Vallourec realized early on that the unconventional drilling market was going to require products delivering greater efficiency and cost savings, all the while addressing issues such as missection tube wear. The bottom line is that our products have to adapt and grow with the market. For a shale well in Poland, for example, we designed a custom solution that allowed for drilling and coring using the same drill string, eliminating the time and cost multiple changeover trips. So where can we expect the most exciting product evolutions in the coming years? Clearly the growing offshore market will continue to set new challenges for landing strings and drill pipe risers. Vallourec is also seeing clear demand for higher strength steel grade solutions for extended reach wells. These grades have specific steel chemistries and heat treatments that make drilling farther possible without increasing the weight of the drill string.

We have already introduced proprietary steel grades for Arctic drilling that combine high strength with high toughness guaranteed at the extreme low temperature of -60°C (-76°F). Additionally, a complete drill string solution for the sourest wells will make drilling in these environments safer and more efficient.

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“The Shale Revolution” was the name of the presentation given by Vallourec – in partnership with Encana – during the “Shale Gas World Europe 2012” event, which took place in Warsaw, Poland on November 27-29 last year. For the Vallourec representatives in attendance, this year’s event was significant, as much in terms of organization, frequency and quality of the presentations. The Group will definitely be participating next year in this now major event and will likely have a booth.

VALLOUREC AND SHALE PLAYS

Vallourec’s involvement in the remarkable development of oil and gas shale plays has been manifested through a variety of initiatives. The expectations of the operators have been met with the development of specific products responding to the demands of this unique application, in terms of tension, torque, bending capability and fatigue. In a matter of months our R&D facilities was able to design the VAM® SQ. VAM® SQ is a semi-flush premium connection available in 4”1/2 – 5”1/2 for the full string length with an enhanced torque and tension resistance (90%) compare to current semi-flush and tested per CAL II ISO 13679 – 2011. The company also has developed closer relationships with large shale plays operators on the other side of the Atlantic. To anticipate their needs, it has built a brand-new plant in Youngstown, Ohio, which has the capacity to meet domestic demand for smaller diameter pipe used in the shale plays. The first pipe has been produced and will be shipped in January 2013. Commercial production will ramp up through the year 2013, and will be complemented with heat treatment and testing, threading, storage, and services.

In Europe, which is also in the midst of the shale revolution, Vallourec enjoys the benefits of the premium products, experience in the U.S., with the same strategy of remaining close to our customers. We will be pleased to welcome you at our stand during the 4th annual Shale Gas World Europe conference on November 27-28, 2013 in Poland.

WEll INTEGRITY AND OCTG FOR SPECIAL CONDITIONS APPLICATION SUMMIT

On March 7 and 8, the “Well Integrity and OCTG for special conditions application Summit” undertaken by Vallourec was held with great success in Jiangsu Changzhou. Sponsored by Petroleum Tubular Goods Committee of Chinese Petroleum Society, the two-day summit provided a special focus on finding an economic and technical solution to improve our customers’ safety in their exploration and development in China. Topics such as well integrity, shale gas resources, the design of high pressure and high temperature and ISO13679 new version standard were on the table. The summit was attended by experts and technical directors, from Vallourec and outside our Group, such as Singapore Stuart Wright Company or the CNPC research institute of tubular goods. More than 60 delegates attended this conference from CNPC, Sinopec, CNOOC, Yanchang, Bib, Hooks and Total. Eventually, the delegates were pleased to visit the VAM Changzhou plant.

Never tell Annelise Le Gall that she is an adventurer, because in her mind she thinks the opposite… “I do everything I can to avoid risks, explains this 30-year old who has been an auditor at VAM® Services since 2010. Out of respect for my contacts, and for reasons of security, I cannot afford to get lost, fall ill, or let anything happen to me. So that I may be completely available and on time for my meetings, I carefully prepare my trips. My seven colleagues and I are fully trained and we have the assistance of our internal services who, for example, advise us regarding the current sanitary levels and security risks at each and every destination. Instead of calling me an adventurer, let’s just say that I am an organized globetrotter.”

VAM® polo shirts, pants, safety shoes, first aid kit… Even if it is not glamorous, Annelise’s traveling luggage is perfectly suited for the workshops in which she dedicates most of her time. The only thing that varies is the size of her luggage and that is dependent on the weather conditions where she will be traveling. Last year she spent 105 days traveling, half of her annual working time, and visited some forty licensees. “My trips rarely exceed two consecutive weeks, and I spend one or two days with all the licensees during an audit, Annelise shares. The tasks take a bit longer when this involves, as an example, training a new network member on our quality system or qualifying a licensee for a new connection.”

At the conclusion of an audit, Annelise organizes an evaluation meeting in which a score is presented to the licensee. “This is also the time to mutually address the corrective measures which allows our partners to improve their performance, says Annelise. We are not here to impose sanctions; the goal is to progress together.”

Along with being good-natured and a focused listener, Annelise also knows how to exercise the proper authority to place a licensee under review or to even withdraw their qualifications on a conditional basis. As an accredited professional in equipment inspection and verification, for her there is no ambiguity: a connection is within the tolerances, or it is not. She follows a similar process when she indulges in her passion for playing the “French horn” in an orchestra in Northern France: a note is right, or it is not...
Because you work in the most extreme conditions around the world, a global support network is a necessity. Wherever you are, our experts are a phone call away. We won’t let you down. Capitalizing on our tradition of innovation and performance, VAM®21 sets new standards for reliability and resistance. So far, the only calls we’ve had about VAM®21 are to order more.

Have you got our number?