Focus

Unconventional Oil & Gas: the quiet revolution that changed the world of energy

Solutions
Shaped pipes: custom made for every one of your projects

The tech files
Advanced technology and high performance for shale

On the market
A full scope of tubular solutions to support Moho Nord project
Dear customers, partners and readers,

I am pleased to welcome you to Connection magazine #10. The Oil & Gas market is in a much better place, stabilizing after a decade of rollercoaster price cycles and uncertainty. We expect 2018 to be a good year. The industry has gotten leaner and drilling is seeking to be more efficient, based on a threshold at about $50 a barrel, with Offshore and Onshore rigs finding renewed viability.

In the wake of this new momentum, the revolution is coming from North America, with the emergence of unconventional Oil & Gas. Unconventional, with its formidable hydrocarbon reserves, has shifted the rules and equilibrium of a long established leadership in the energy market. In the North America region, the United States has become a swing producer on the worldwide market. Once considered unexploitable, unconventional hydrocarbons (tight oil and tight gas) have become accessible in unfathomable proportions. After a period of pioneering and probing, extraction has vastly improved, and is now both more productive and less wasteful. At an age of maturity, drilling entails longer laterals that require extreme torque capabilities of all OCTG equipment, to withstand the greater mechanical and physical constraints of horizontal drilling, while improving productivity.

Innovation and technical challenges are in our DNA! Vallourec endeavors to bring more performance and efficiency while increasing well integrity, wherever and whenever possible. In record time, we have developed and delivered a full offer of new, high-performance products and services to the market. Our solutions include non-standard pipes and casing, high torque VAM® connections and accessories, all supported by our renowned VAM® Field Service. We cover the whole spectrum of customer needs, from the steel mill to the rig floor, as well as expertise for installation, maintenance and repairs, with great customer proximity and intimacy throughout North America.

We also aim at providing operators with safer products, guaranteeing the integrity of their well, whilst reducing our environmental footprint with optimized supply chain and transport solutions. Vallourec has mobilized all its teams and resources, including R&D, innovation and manufacturing, to deliver safer, better and more competitive products. Vallourec yearns to remain the most trusted partner of our customers. We hope you enjoy the many articles in Connection magazine #10, focused on unconventional Oil & Gas and great prospects for the future.

Happy reading!

Nicolas de Coignac,
Senior Vice President, North America.

www.connection-mag.com  www.vallourec.com

Over 130 years ago, the Group’s founders were already pioneering innovative technologies that would revolutionize the tube industry. Since then, Vallourec continues to open new technological and geographical frontiers. Driven by passion and commitment, more than 20,000 employees offer more than tubes: they provide cutting-edge products and tailored solutions. Always more reliable, always more competitive. Vallourec contributes to making all your projects possible, wherever you need us. Whenever you need smart tubular solutions. vallourec.com
Serimax delivers welding in major TANAP and TAP projects

Serimax, the Vallourec welding subsidiary, provided almost 42,000 welds in Trans Anatolian Pipeline (TANAP) and Trans Adriatic Pipeline (TAP), mammoth projects that span from the Caspian to the Adriatic Sea. Serimax delivered access 3 countries that included Turkey (24,700 welds), Albania (8,000 welds) and Greece (9,000 welds).

OFFICE OPENS IN ALGERIA FOR INCREASED CUSTOMER PROXIMITY

Vallourec is strengthening its footprint with a new office in Algiers (Algeria) in Africa. Together with its offices in Cairo (Egypt), Nairobi (Kenya), Port-Certil (Gabon), Johannesburg (South Africa), Lagos and Port Harcourt (Nigeria) and Luanda (Angola), Vallourec now has seven sites assuring local solutions for Oil & Gas projects in Africa.

Since commencing business in Africa, Vallourec has deepened relations with its customers, as well as with local operators, distributors and industry players, particularly for the Sub-Saharan markets. The new office addition in the North of Africa will reinforce the proximity with the Algerian operators and help the group to serve the growing demand.

Being committed to supporting projects and development throughout Africa can only be possible by building and nurturing long term and long-lasting partnerships, which is why Vallourec strives to be closer to its customers in Algeria.

STRENGTHENED SUPPORT NETWORK IN BRAZIL WITH VAM® SERVICES CENTER

VAM® Services manages a network of over 200 VAM® Licensees, providing technical support, training, documentation and gauges, as well as conducting regular technical audits to ensure that VAM® connections are manufactured to the same quality standards all over the world. Building on our strong local position in Brazil, the new VAM® Services centre will strengthen our network and support its development throughout South America. João Perez, Commercial and Downstream Operations Director of VSB stated: “We see some exciting opportunities in each market to grow our services offer. We are developing the content of offer to meet the specific requirements of each local market in South America.”

EVENTS

In 2018, Vallourec will be hosting a series of webcasts at WorldOil.com The first webcast will address Engineered Tubular Solutions for Shale Plays, February 28, 2018 9 a.m. CST / 3 p.m. GMT

Other topics will include OCTG for Geothermal Projects (April); Sour service grades for extreme sour service environments (June); Global Solutions from our service hub in Brazil (September).

VISIT US AT...

- IADC/SPE Drilling Conference & Exhibition 6-8 March 2018 Fort Worth, Texas, USA
- North Africa Petroleum Exhibition & Conference 26-29 March 2018 Oran, Algeria
- Saloum Industrie 27 March 2018 Vieux Pont, France
Focus

Unconventional Oil & Gas: the quiet revolution that changed the world of energy

In just under ten years, unconventional development has revolutionized the world of energy, shaking the rules, the balance of power, and shifting the established dependencies in worldwide markets.

In the early days of the new millennium, a grim perspective loomed of rapidly diminishing hydrocarbon reserves; visions of quickly vanishing supplies had the world alarmed. Commercial development of shale gas started to take off in North America around 2005-2007, with the combined application of horizontal drilling and hydraulic fracturing to release gas trapped in tight sediment rock (shale formations), previously considered to be un-exploitable...

The prospect of new Oil & Gas resources and high dollars per barrel prices encouraged technical improvements and investment. The reserves discovered were beyond “conventional” imagination: the extent and massiveness of available shale reserves, boosted estimates of world supplies and diminished the levels of import dependence of North America, altering economic and strategic balance in the world of energy.

The first boom was in 2011-2014, mainly in the United States, and created a sudden surge in Oil & Gas supply in the market that contributed to bringing prices down sharply. The market reactions, while rendering energy more affordable, ironically destabilized the whole industry, stalling more expensive projects, rendering complex offshore and even some onshore projects unviable. The shale players were challenged, with low $/barrel prices making the production model in some areas uneconomic. The challenges became technical and financial: how to recover reserves and render them exploitable at lower costs; how to better extract Oil & Gas where the first inefficient shale techniques only recovered about 20% of the reservoir potential.

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Nicolas de Coignac, Senior Vice President, North America, explains: “The crisis had a global impact on costs and in order to survive, the break-even point of Oil & Gas operators needed to go down, drilling had to be more efficient, extraction had to be more productive.”

Jason D’Souza, Executive Vice President OCTG Sales, North America.

Because there are specific risks linked to the very nature of fracturing techniques, Vallourec believes in being a leader for high quality solutions for Oil & Gas extraction. By delivering increased performance and higher safety assurance in the well construction process, Vallourec works alongside all the major players in the US, developing products and services better adapted to the challenges of unconventional development. The main difficulty is that you don’t just pump out the hydrocarbon from a reservoir. You have to extract it from hard sediment rock strata, in less accessible, often slim horizontal layers. At first, performance was weak, with a low portion of the oil or gas content being extracted due to minimal reservoir contact in the well bore. In time, thanks to a better understanding of the reservoirs, operators began to increase the horizontal reach of the wells. This came at a cost: horizontal drilling created new challenges for the well tubulars. Pipe and connections were quickly pushed beyond their original specification. All OCTG supplies had to be dramatically improved.

Improved and optimized solutions

Vallourec supports the booming market with a full range of products, including API, semi-premium, premium pipe grades, and an enhanced range of VAM® connections. Jason D’Souza, Executive Vice President of OCTG Sales, North America, states: “Vallourec engineers and R&D teams went back to the drawing board and further optimized steel, threading practices, and developed new couplings, and flush connections. Thanks to the experience of our teams, in our research centers, plants, and in the field; our solutions were quickly operational, allowing longer laterals, optimized non-standard diameters of casing (often outside API standards), tubing, connections, and accessories, with much higher torque capabilities. Trials and field tests soon confirmed Vallourec’s solutions had better reach, higher torque and allowed more reservoir area to be stimulated. In the field, these solutions were pushed beyond their original specification.”

Deepwater markets

Vallourec has pushed the limits of pipe and connections to a whole new level, with optimal diameters, extreme torque capability and unmatched sealability, for increased productivity and safety in all unconventional wells.

Nicolas de Coignac, Senior Vice President, North America.

Within the unconventional market itself, it’s important to note that all wells and rigs don’t have the same potential and profitability levels. They can differ vastly from one another, from one region to another, in terms of geology, extraction potential, technical challenges and economic breakeven point. In contrast to offshore projects, which have a long planning and production horizon, unconventional wells can be drilled, completed and produced within several months. It’s a fast-moving market, defined by reactivity and adaptability. Furthermore, the activity level of rigs drilling can be quite volatile; new rigs are very versatile and operations can be rapidly moved from one place to another. Drilling activity is ramped up and down depending on macro supply and demand. More than ever, customers need a full solution model that is very reactive to provide tubular products, accessories and services.

The Permian basin: mammoth reserves in the United States

The Permian Basin is a massive onshore production area, approximately 250 miles wide and 300 miles long, in West Texas and Southeast New Mexico. It is the largest, and one of the oldest petroleum-producing basin in the United States. Since the first pioneers in 1921, the area has produced a cumulative...
28.9 billion barrels of oil and 2.5 trillion m³ of gas. Currently, nearly 2 million barrels of oil a day are being pumped from the basin. New surveys suggest there is an estimated remaining reserve of 43 billion barrels of oil and 509 billion m³ of gas; however, some experts claim reserves may be far beyond those figures. The Permian Basin has two primary petroleum producing regions, the Midland Basin and the Delaware Basin, both highly profitable, with extraordinary oil and natural gas reserves. There are about 300 Oil & Gas operators in the Permian Basin, with considerable variations in size and scope - very large players like Chevron, to large independents like Pioneer, and local operators like Clique’s Oil Corporation. Illustrate the variety of customer and user needs. With recent improvements, drilling in the Permian is expected to rise and was already 56%, higher in 2017 than in 2016. With vertically stacked plays in the Permian, operators can drill one well and reach reserves from each of the stacked layers, like a tiramisu, with interconnecting layers. This geologic bonanza gives operators a strong incentive to drill in the Permian since reserve replacement is a key determinant of the operator’s profitability and future value.

Enhanced products and outstanding service

Because the exploration and production of unconventional hydrocarbons has grown beyond expectation, there is a significant increase in the need for OCTG and connections with enhanced specifications and performance levels. The greater technical challenges and large number of wells, as well as the use of horizontal drilling techniques, have increased the demand for non-standard diameter tubes and a wider range of optimized premium connections. These demands stimulated the development of an extended range of VAM connections. VAM TOP HT, VAM® 21 HT, VAM® HTTC, and VAM® EDGE SF, were all developed and used in response to this need. New surveys suggest there is a large number of wells, as well as the use of horizontal drilling techniques, have increased the demand for non-standard diameter tubes and a wider range of optimized premium connections. These demands stimulated the development of an extended range of VAM connections. VAM TOP HT, VAM® 21 HT, VAM® HTTC, and VAM® EDGE SF, were all developed and used in response to this need.

Fully integrated facility in the US delivers full range of solutions

Vallourec’s new FQM mill, located in Youngstown, Ohio, within the existing Vallourec Star facility, further expands the range of Vallourec products manufactu-red in North America. Youngstown offers a vast range of products and services necessary for hydrocarbon production, particularly for unconventional development markets. Youngstown is unique in the United States; the integrated site includes a nut mill, a mill specializing in medium diameter tubes (from 5 to 10 3/8 inches) and the new FQM mill, which specializes in the manufacture of small diameter tubes (2 3/8 to 7 inches). It also incorporates heat-treating and annealing to final grade, final inspection, and threading to specification. Once pipe leaves the mill, we assist in the installation on the rig floor with our VAM® Field Service, and coordinate returns, maintenance and repairs. Jason D’Souza details: “It’s a fantastic market! I must say our investment in Youngstown was most opportune. Vallourec’s advantage is being present across the full supply chain with the right combination of connections. Our mill in Youngstown delivers the right range of products for the North American market, with API standard pipe, non-standard pipe as well as proprietary VAM® connections. As an example of our adaptability, we now provide specially developed 6-inch casing that is outside API standards, but are optimal for unconventional development and help our customers considerably increase production levels. Wells need just the right diameter sized tube: if it’s too small, there’s not enough flow, and if it’s too big, it’s too expensive.”

Vallourec has fortified its position in the US. We have always believed in unconventional development. There’s a significant change in the way we work with customers. Operations are quick, continuous and lower cost. If a customer needs us to be reactive and consistent; the number of rigs and their locations change quickly because they follow the market. This means we’ve become disciplined to new levels of flexibility and adaptability. Thanks to our complete solution model and distribution partners, we can provide everything in short lead times. This is how we strengthened our position, with a full supply chain with greater proximity to the customer, and a perfect combination of pipe and connections for their rigs and wells. Our flexibility is key to this success and we are proud to be the leaders in providing the most advanced solutions in North America” Services are provided by Vallourec USA, with our remodeled VAM® Field Service teams, in Louisiana, Oklahoma, Pennsylvania and three locations in Texas. The offices support the growing number of VAM® customers in the Permian Basin, where VAM® SG, VAM TOP HT, and DNIC®-5 PLUS tubular connections are being used. Vallourec USA’s local presence benefits companies by providing timely response for local running support to its customers. The 1,600sq-ft facility handles complete sets of VAM® Field Service running tools and provides a base of operations for the field expertise required in the expanding Permian Market. The market has shifted from a single well project basis to a continuous drilling operation, much like a manufacturing environment. Customers look for robust solutions and long term reliability. With short lead times, Vallourec is working through distributors to ensure a smooth, continuous flow of products sourced to rigs.

Digital solutions with advanced data analytics

The future of unconventional development is linked to overcoming new hazards technical barriers and remaining cost inefficiencies. Jason D’Souza confirms: "When you look at the recent improvements, you feel you’re nearly perfect, but there’s still so much room for improvement, with amazing progress yet to come. There are still large, amounts of undiscovered hydrocarbons underground and one day, we’ll get it. As we move into the future, we’ll see an increase of digital solutions, with advanced data analytics. We will learn how to optimize drilling beyond current levels. One of the projects we’re working on at Vallourec is digital data systems, placed directly on the pipe and connections, with key information accessible for providers and users. Better identification means better business management, in the field and in decision making groups! Digital improvements will involve information on the pipe and products: length, status, depth, etc., as well as important customer information, like reject rate, running speed, reservoir information, sand production and placement, and the spacing of wells. Much of this information has the potential to considerably increase the efficiency of every well.”

Nicolas de Cognac concludes: “Unconventional players have become swing producers in a very short time. This means more investment will go into unconventional development. In a more mature market, production will be narrowly linked to demand and barrel price. If demand declines, operators will take their foot off the pedal almost overnight. It’s of the utmost importance for Vallourec, beyond products and services, to be responsive and flexible. Everyone in our organization needs to be fully dedicated to the customer: reactivity and efficiency are at the essence! The development of unconventional reserves is a great opportunity for all. It has changed the way we work together and do business. It has reinforced cooperation with our customers, licensees and distributors. It has enhanced our product development and accelerated our time-to-market. We will work relentlessly to reduce costs and improve Vallourec’s commitment to its customers and partners, because it’s the best way to support the market. Together, we can build a safer and more productive future for Oil & Gas.”

Eric Shuster,
President VAM® USA

**VAM USA** provides its customers with field services, 24 hours a day, 7 days a week. The key to our success is working together with our customers, licensees and distribution networks to supply expertise, running support, and tooling to reduce non-productive-time, optimize running operations, and bring value over the life of their projects.

Vincent Lasnier
President & CEO
Vallourec
Making our tubes “Intelligent” thanks to Open Innovation

How do we help our customers benefit from the latest digital technology? With our first ever “Open Innovation Challenge”, Vallourec is inviting new actors with expertise in digital technologies to work with us. Together, we can develop intelligent tubes.

Intelligent tubes are the future of our industry. Developments such as high-performance sensors, low data transmission networks, big data, energy harvesting are innovative technologies that open up new opportunities for intelligent tubes. Intelligent tubes could be designed to record and transmit information: whether it be about fluids in contact with the tubes (flow rate, pressure or temperature) or related to any changes in the tubes themselves (cracks, deterioration or changes in wall thickness) over the whole lifetime of the product.

This Open Innovation Challenge helped Vallourec identify the best start-ups, laboratories and companies with expertise in these different technologies, to work with to develop solutions adapted to the Group’s markets.

“Through our Open Innovation Challenge, Vallourec is demonstrating its commitment to developing win-win partnerships with agile, leading-edge companies on new digital technologies. Our goal is to anticipate and take advantage of these technologies to offer differentiating solutions for our customers and consolidate Vallourec’s leadership over the long term”, explained Sylvie Dubois-Decool.

The Challenge was launched in September and Vallourec received over 40 project submissions from all continents. In November, the best ideas were presented to a jury constituted of Board members and representatives of each Region and Product Line. Vallourec will partner with the winning teams over the next year to develop joint solutions adapted to our markets while reinforcing our offer. “By joining forces with top players in the domain of micro sensors and digital, a new field for us, we can meet the needs of our customers as closely and as rapidly as possible”, concluded Sylvie Dubois-Decool.

Sylvie Dubois-Decool, Director of Innovation.

“We are launching our first ever Open Innovation Challenge, to help our customers benefit from the latest digital technologies. The goal: to help our customers benefit from the latest digital technologies.”

Vallourec is embracing Open Innovation to seize the vast opportunities offered by new technologies, opening its offer towards the future. Sylvie Dubois-Decool, Director of Innovation.

Advanced technology and high performance for shale

A challenge has been set. For unconventional Oil & Gas formations (such as shale) to be competitive on the global market, operators now demand that OCTG premium connection manufacturers address longer laterals, increased torque requirements, higher load limits, and enhanced fatigue performance while still being cost effective. Vallourec has responded to this challenge with an array of VAM® premium connections to address the shale operator’s specific concerns.

UNCONVENTIONAL WELL DESIGNS

Horizontal drilling and hydraulic fracturing techniques have made shale hydrocarbons accessible. The well designs for these unconventional shale formations typically consist of 13 ¼” surface casing, 9 ⅝” surface casing, 7 ⅝” intermediate casing in some regions, and 4 ½ - 5 ½” production casing. The wells have a vertical section dependent on resource depth followed recently increasing horizontal section. Some horizontal sections are approaching 10,000 ft or even more! The build rate in the curve is generally targeted at 10°/100 ft, with the actual build usually peaking at a max of 20°/100 ft. Operators have determined that API connections, while offering tension and pressure capability, are insufficient for handling dynamic loading, torque, and bending. The well designs for these horizontal wells require the pipe and connection be exposed to high torque, bending, compression and tension loading, pressure cycling fatigue during the fracturing, all followed by a production phase.
It has been documented in technical industry publications that API connections, as well as incorrectly selected premium connections, have failed to meet the constraints of these applications. One of the main challenges in horizontal or Extended Reach Drilling (ERD) is the drag friction force. This is due to the string weight during its deployment in the deviated and horizontal well bore sections. In order to cope with this friction to reach total depth, one technical solution employed by the operators is rotating the string to bottom. The longer the horizontal lateral encountered, the higher the torque requirement to overcome the increased friction. In addition, increased torque aids in improving the cementing quality, by rotating during the cementation phase. As high torques are requested on ERD for many of the same reasons, the pipe and connections need to withstand the high torque while maintaining the connection’s mechanical and sealability performance.

When an intermediate casing string is required for a stable well bore, operators have successfully used VAM® HTF-NR. VAM® HTF-NR is a great solution for this application as it is a flush premium connection with two metal to metal seals. A dovetail thread design gives it high torque while providing maximum clearance for slim hole wells.

For the production casing, a semi-flush connection is often used in the bend and the lateral section of the well. Many operators prefer to use integral connections in the bend and in the lateral, due to the slim OD profile providing an easier installation process. The smooth OD profile of integral connections allows the string to easily slide into the lateral sections due to reduced contact with the well bore. In turn, less torque is required which reduces the reciprocating axial load and minimizes the chances of the pipe getting stuck.

A stronger connection may be required in the vertical portion of the well to achieve tension loads caused by the weight of the string and compression loads from the setting down weight during installation. In some shale formations, a threaded and coupled (T&C) solution is required in order to have a connection that is as strong as the pipe body while providing the operator with necessary safety factors for tension and compression loads. The same high torque requirements exist for T&C connections in the unconventional formations. In conditions where high torque is required with only liquid sealability, such as for oil, wells, Vallourec offers the DWC/C semi-premium connection series. DWC/C is the economical T&C solution for high torque and when well conditions are not as severe. Where high torque and gas sealability is required, the VAM® 21 HT premium connection offers performance ratings as strong as the pipe body while operating at Maximum Torque with Sealability (MTS). VAM® HTTC is the ultimate T&C solution for extending extreme torque limits to enable the rotation string through the bend and into the long horizontal section. VAM® HTTC keeps its full performance ratings even at its MTS.

**VAM® CONNECTION APPLICATIONS**

**High torque**

- Liquid sealability
- Performance: 100% tension 100% compression +10% IP
- Testing: API 5C5: 2017 CAL IV
- Applications: production casing, drilling with casing

**Gas sealability**

- Performance: 100% tension 100% compression +10% IP
- Testing: API 5C5: 2017 CAL IV
- Applications: production casing, drilling with casing

**Applications:**

- Production casing, drilling with casing
- Production liners, ERD (10,000 ft+)
- Integral and T&C connection options.

**Vallourec connection comparison for unconventional Oil & Gas**

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**HIGH TORQUE AND EXTREME CONNECTION FLEXIBILITY AND ADAPTABILITY**

Operators in the unconventional Oil & Gas formations require that operations be flexible and adaptable. With the VAM® connection portfolio, operators can respond to market fluctuations that are found with fracturing-field operations. It is common for frac operation costs to rise proportionally with the increase of frac pressures. To increase frac fluid volume on a smaller ID tubular, the fluid must flow faster or at higher pressure. A small OD tubular will require higher frac pressures than a larger OD tubular and will usually require a higher frac operation cost. The opposite would be true for a large OD tubular. An operator can have the flexibility to switch from a 4 1/2" 15.10# tubular with a T&C connection to a 5 1/2" 20# tubular with a semi-flush connection in order to reduce frac pressure, and thus cost. Operators are also looking to optimize the well designs to be more efficient. For example, 6" 24.1# pipe is becoming a trend in shale operations and Vallourec has pioneered this adaptation through the expansion of the VAM® 21 HT premium connections. VOC offers products in that specific size and others. VAM® accommodates flexibility by having several torque integral and T&C connection options.
Reliability is essential in unconventional play operations. Operators require connections that are dependable throughout the life of the well. Many of the VAM® connections have endured a fit-for-purpose test program based on the latest international standards (API RP 5C5) or more extreme testing. As fracturing technology evolves, connections are being subjected to higher frac pressures, and a greater number of high-density frac stages. Fatigue is also a major consideration, particularly if the string is rotated during cementing. A connection may be submitted to as many as 100,000 cycles in the dogleg section of the well during the installation. VAM®’s fit-for-purpose tests have focused on simulating the rotation of the string and multiple severe frac cycles, followed by the combined loads that would be encountered during the gas production cycle. For example, VAM® EDGE SF was successfully qualified through fatigue testing followed by two frac tests which focused on 20 high pressure liquid cycles combined with high tension. The fatigued connection then successfully passed a gas sealability test following the API RP 5C5: 2017 CAL II qualification procedure. In specific cases, more reliability and sealability performance is required. VAM® has addressed this by qualifying the VAM® HTTC connection to the latest and most severe industry standard, API RP 5C5: 2017 CAL IV.

Vallourec brings higher performance solutions to unconventional plays at competitive pricing

Vallourec has responded and is continuing to meet the challenges of the unconventional Oil & Gas formations by offering a full suite of connections that have been specifically designed for the unique demands, economics, and performance requirements that are encountered in the shale plays. VAM® connections are ensuring that operators are able to push the boundaries of these unconventional developments.
Innovative field joint coating solution

Onshore line pipe operations involve welding pipes together to form a pipeline. The field joint coating covers the gap where two coated line pipe sections meet and are welded together, in other words: "where there's a weld, there's field joint coating". Serimax Field Joint Coating (FJC) has developed an innovative and revolutionary solution – Orbiter™ which has been tried and tested in the field.

Manual coating application in the field has been the typical process for coating welded pipe joints. Often the client is anxious that field joint coating will cause a delay to the project, slowing down the welding operations and they demand faster solutions with greater process traceability and lower costs. Time is of the essence in welding operations and the field joint has to be implemented as fast as possible for the laying rate to be optimal. In the field, project execution requires significant coordination between both the welding and coating contractors, to avoid bottlenecks and prevent any slowdown. The industry has been waiting for a solution that would work well across the full range of pipe diameters, with reduced manning while delivering high quality performance. Serimax Field Joint Coating took up the challenge.

Light, fast, automated, revolutionary

Adapting the field proven Serimax bug and band technology, the Serimax FJC design team, led by Andrew Millins, Engineering Manager, designed Orbiter™, a two-component liquid coating system. The technology not only reduced capital costs, but also importantly resulted in faster process speeds, reduced manning and lower solvent usage. Orbiter™ is a robust, lightweight, automated spray machine with process monitoring and data recording. Shrinking the use of mechanised lifting equipment, it makes for a fast and safe option for coating landline field joints with multi-component liquid systems. Its speed, reliability, ergonomics and efficiency make it revolutionary in the small world of FJC.

Proof is in the field

Theory is one thing, but it’s out in the field, in real life, you see the quality of field equipment. Prior to its release to market, the machines were extensively tested, using Serimax FJC technologists and operators before being demonstrated to respected industry consultants. Orbiter™ has since proven its worth on 250 km of pipeline, running from the Caspian Sea through Azerbaijan and Georgia to Turkey. Serimax’s Orbiter™ first real life challenge was in Georgia, Caucasus. The environment was as tough as it gets: difficult access and arduous terrain, wet and snowy conditions as well as strong winds. In addition to the unfavorable time of year, the teams only had a very short period to mobilize equipment and materials in the country, with a meager 4 weeks’ notice. Beating the odds, over 4,000 field joints were coated in the Azeri section, having coated over 20,000 field joints with a very low repair rate. The Azeri section allowed Serimax FJC to prove itself in one of the most challenging environments for field joint coating. All the while delivering high quality performance. Orbiter Field Joint Coating took up the challenge.

Orbiter™ benefits

- High productivity
- Precise, fast location of on-pipe equipment aids faster cycle times
- Integrated control
- Consistently even and repeatable application using fewer operators
- Zero mechanical lifting
- Light on-pipe equipment with no crane required
- 3-in-1 solution
- 1 band module common to 3 processes
- Ideal for difficult terrains
- Band manually clamped to the pipe
- Environmentally tolerant
- Can be used in winds up to 35 km/h and habitat compiles
- Traceability
- Provides monitoring and data acquisition of process parameters

Meeting and exceeding customer expectation

The new coating technology has ensured a significant reduction in personnel required on a project. For example, on high throughput main-line coating of 24-inch pipes with liquid epoxy systems, it’s possible to halve the head count. Removing the reliance on vehicles with mechanical lifting systems, makes it easier and cheaper to supply equipment in many regions of the world where access would have been a major headache. Furthermore, in terms of speed, with the innovative Orbiter™ system, it is now possible to outpace any welding crew, without significant change to the equipment profile. It’s just a matter of balancing the manning level to the target output and number of vehicles used.

With proven field performance, Serimax FJC is supporting its customers by offering innovative coating solutions tailored to their various needs. Our Orbiter™ range is delivering the speed, reliability, repeatability and overall competitiveness required for demanding field joint applications.

Our endeavor is to keep improving our solutions further in order to maintain our position as leaders in advanced welding and project services!

Organization and Project Management

Andrew Millins, Project Manager tells: "The delivery of a project in Azerbaijan (UK), where we pack and check every item required from disposable gloves and screwdrivers through to containerised coating units for project use, the next step is sourcing and training field labor to assist with the project. Once on site we then set the equipment up, perform safety analysis and start the work. Our supervisors perform daily site reports to keep our management team in the loop."

Managing projects and logistics overseas can be as challenging as the in-field operations, due to restrictions on importing, manning and team work with language barriers and local ethics or beliefs. Running projects smoothly with diplomacy, understanding and efficiency is just as essential. Serimax has the experience and know-how to handle the most complex aspects of project management surrounding Field Joint Coating, as it has with welding services, for many years.

Orbiter™ is a light, fast, automated spray machine with process monitoring and data recording.

Joe Field joint coated pipes in the Caucasus projects running through Georgia and Azerbaijan.
Shaped Pipes: made for every one of your projects

Shaped Pipes are an innovative, cost-effective solution to replace hard to weld forgings with ready integrated accessories in offshore pipe lengths.

Typically, line pipes have a constant outer diameter (OD), inner diameter (ID) and wall thickness (WT) onto which various forged accessories are then welded: buckle arrestor, J-lay collar, anchor, spool-end, upset ends, offshore structures, etc. Shaped Pipes, instead, are designed with geometrical variations along the pipe length that already integrate these hard to weld components.

Today, Vallourec is capable of providing pipes in all shapes and sizes from its unique pipe forge. The Shaped Pipe initiative from Project Line Pipe in Aulnoye-Aymeries, France. Our innovative offer of Shaped Pipes provides the offshore line market with accessories already incorporated in the shaped pipe, in a single step. It’s more cost effective and is an idea born from collective team work, a passion for heavy industry, customer feedback is an idea born from collective team work, a passion for heavy industry, customer feedback and expertise in welding, processing and shipping.

Dr. Elina Thurel, R&D Director

Shaped Pipes benefits

* Ensured Welding Productivity
  * With similar chemistry to flow lines, Shaped Pipes enable an easy girth weld and removes the forgings to pipe weld.
  * Service ++
  * Can come automatically coated to suit your needs.
  * Cost Efficient
  * By integrating accessories, Shaped Pipes are cheaper than forgings + pipe pieces + associated weld costs.
  * Small quantities
  * Any quantity is possible and available to suit your needs.

Integrating short forged components into a 12.2 m offshore pipe drastically reduces the total cost for the client, as sourcing separate items, adapting them and welding them is more expensive and complex than a single incorporated solution. Receiving the pipes shaped with the buckle arrestor means that the pipes arrive at the client’s yard with the component already integrated, ready to be used.

A concrete example: the buckle arrestor

Its function is to stop the propagation of collapse during the laying of line pipes and for that, the wall thickness of the pipe is increased along certain sections where necessary. The standard process involves adding short, heavier forged components that are then welded to the pipes. This method can be twice as expensive as our Shaped Pipes solution. In Aulnoye-Aymeries, we integrate the buckle arrestor directly within the shaped pipe, in a single step. It’s more cost efficient and project friendly than any other solution.

Delivering global solutions across continents in due time

The Vallourec teams in Germany and Brazil worked together, commercially and technically, for the qualification and coordination process with Vallourec’s Global Solutions bringing value to the customer and help reduce operators’ total cost of ownership (TCO); no matter what the challenge may be. Project Sole was the first export order of the Project Line Pipe team to use the production route of the Brazilian plant in Jecaba with TSA coating. This new route will reinforce Vallourec’s offer of premium line pipe packages for the global market. Our objective is to optimize the Brazilian production route to serve the global market for line pipe projects”, concludes Christian Hahn, Pipe Project Sales Director for South America.

Global Solutions for the Sole offshore gas project in Australia

Vallourec successfully conducted an Offshore Line Pipe project for Subsea 7. The teams in Germany and Brazil managed the project, while manufacturing and services were conducted in the Brazilian Hub of Jecaba and Vitória.

Valleucrec extended its reach in Asia-Pacific by providing global solutions that included steel manufacturing, sour service grade line pipe, anticorrosive coating, shipping and coordination, all for a delivery to the Sole gas project, in Australia. The Sole gas field is located in the Gippsland Basin, 45km offshore Victoria, Australia, at water depths ranging between 120m and 130m. The field lies 65km away from the existing onshore Orbost gas plant and 35km from the Basker-Manta-Gummy (BMG) fields, which are held by Cooper Energy. Cooper Energy developed the field as a single, vertical subsea well with pipelines and umbilicals, tied back to Orbost gas processing plant. Subsea 7 was awarded the tie-back from the new field to the mainland Orbost gas plant, supplying the line pipe, spool and manifold, while installing the umbilical and commissioning the system. First gas is expected in late 2018.

Sole Project

From Jecaba:
  - 65 mm (9,500 tons) of seamless line pipe
  - X65 sour service grade (DNV OS-F101 requirements)
  - Dimensions (OD x WT):
    - 337.7 mm x 17.0 mm
    - 343.1 mm x 19.4 mm
    - 353.3 mm x 25.0 mm

From Vitória:
  - SLPP anti-corrosive coating
  - Anode installation
  - Storage, inspection and preparation
  - Schedule, shipping and delivery synchronization

Sole is the first export order of the Project Line Pipe team to use the production route of the Brazilian plant in Jecaba with TSA coating. This new route will reinforce Vallourec’s offer of premium line pipe packages for the global market. Our objective is to optimize the Brazilian production route to serve the global market for line pipe projects”, concludes Christian Hahn, Pipe Project Sales Director for South America.
Delivering state-of-the-art welding services for the Atoll Project in Egypt

Serimax, the Vallourec subsidiary and leader for onshore and offshore welding solutions, successfully completed its mission on Subsea 7’s offshore vessel, Seven Borealis, in the Atoll field, one of the massive gas reservoirs discovered off the coast of Egypt.

The Atoll Development project was awarded to Serimax in late 2016, following the successful delivery of the East Nile Delta project (600 welds). Welding qualifications for the new project began in Serimax’s workshops, in the north of Paris, in early February 2017, and lasted just under four months. Thanks to intensive testing and preparation before launching, Serimax was ready for the challenges on-board the state-of-the-art Seven Borealis pipelaying vessel. Serimax’s team completed over 4,000 welds (50 km of pipe line) with Subsea 7, using its world-renowned Saturnax 09 welding bug, which was first introduced on board the very same vessel, back in 2012. Through robust project management and operations joined with the vessel’s highly skilled teams, Serimax demonstrated its expertise of welding operations.

August and was completed by the end of September, with a repair rate of less than 0.2%, all on schedule. Serimax used its world-renowned Saturnax 09 welding bug, which was first introduced on board the very same vessel, back in 2012. Through robust project management and operations joined with the vessel’s highly skilled teams, Serimax demonstrated its expertise of welding operations.

Key tests at Serimax Center:
- Reliability
- Risk analysis
- Equipment preparation
- Welding procedures qualifications

Efficiency, flexibility and service
The outstanding performance throughout the welding project was the result of integrated teamwork. That means flawless synchronization between both companies, perfect preparation but also the dedication of everyone on-board, and constant cooperation for the back-office teams. Serimax’s offshore package provided a robust and flexible service, the fruit of years of welding experience and training. Serimax’s solutions encompassed the right equipment, skilled personnel, good practices, and the most rigorous qualification processes, to deliver consistently efficient welding operations with low repair rates and the highest level of safety.

What’s more, Serimax was commended for this operational achievement and a team member on-board was even granted a safety award after showing proactiveness and excellent safety initiatives.

"Thanks to you all and to the Serimax team for the work accomplished." - Néassim Chekroun, Subsea 7’s Project Management team.

Vallourec and Serimax strive to continually improve project performance and delivery, year after year, in operations, HSE, R&D, innovation and training.

CLEANWELL® delivers outstanding performance in the Zohr Project

In the south eastern Mediterranean Sea, 190 km off the Egyptian coast, on a drillship operating in water depth of 1,500 meters, Vallourec’s latest CLEANWELL® technology was successfully used by Petroleum in the Zohr gas field, for running corrosion resistant alloy (CRA) pipes.

The Zohr gas field is the largest ever natural gas discovery in the Mediterranean. To produce gas from the field, Petroleum uses corrosion resistant alloy (CRA) materials containing up to 26% chromium for the production tubing. The cost of CRA material is significantly higher than carbon steel material, and requires specific storage and handling conditions to avoid damages. CRA pipes are subject to galling, so they need to be run much more slowly than carbon steel pipes, to avoid rejects. Faced with these constraints, a technology that protects the pipe, reduces the risk of damage and speeds up running time can generate significant savings in the field.

Vallourec’s CLEANWELL® technology is a multifunctional coating developed by our teams to replace storage and running compounds (dope). Applied directly in our mills after machining VAM® connections, it reduces pipe handling operations, rig running time and environmental impact while improving rig safety for our customers. For CRA materials, CLEANWELL® provides the additional benefit of protecting the connection against galling to ensure faster, smoother and more efficient pipe installation, saving our customers time and money.

VAM® Field Services were on the rig to assist the running crew with the first running of CRA pipes using CLEANWELL®. David Crane, VAM Field Services Engineer, confirmed “Running CRA pipe with CLEANWELL® was fantastic compared to standard running compounds. Over 5,000 meters of 7” 28CR with VAM 21 CLEANWELL® connections were run into the wells with not a single reject. Back-outs showed no surface damage and we were able to make-up and brake-out with total confidence.”

VAM 21 with the latest CLEANWELL® technology has been fully tested to API 5C5 2017 CAL IV specifications to withstand the most challenging environments. CLEANWELL® technology replaces storage and running compounds which are hazardous to health and the environment.

"We were able to make-up the pipes with CLEANWELL® at more than twice the normal speed for CRA and we had absolutely no rejects." - David Crane, VAM Field Services Engineer.

* Belayim Petroleum Company (Petroleum), a joint venture of wholly owned Eni SPA subsidiary EIOC Production BV and Egyptian General Petroleum Corp.
A full scope of tubular solutions to support Moho Nord Project

Building on experience supporting Total’s operations in Angola, Nigeria, Gabon, and previous projects in Congo, Vallourec provided drill string engineering, high performance drill pipe, oil country tubular goods (OCTG), drill pipe risers, and welding services for the Moho Nord field, 75 km off Pointe-Noire, Republic of Congo.

Total planned the Moho Nord field to produce from two separate reservoirs. The Albian reservoir will be accessed by 17 dry tree wells on Total’s first tension leg platform (TLP) in Africa. The Miocene reservoir will be developed with 28 subsea wells, including Phase 1 Bis. All of the Moho Nord wells will produce to the Likouf floating production unit (FPU), which has two separate processing trains (handling H₂S and CO₂ along with oil, gas and water) and the capacity to export 100,000 BOPD via pipeline to Total’s Djéno onshore terminal. Dholing began in 2014 and first production came ashore in March 2017.

Drill String Engineering

To prepare for the project, Vallourec’s drilling experts began working with Total engineers in 2012 to design drill strings for the challenging wells that would be drilled from the TLP in 800 m of water, with departures as long as 3,000 m and measured depth of 7,500 m. Total engineers provided parameters for each planned well, including well architecture, trajectories, and mud properties to be used in each hole section. Vallourec engineers, with in-depth knowledge of drill string components and their application, used proprietary software to analyze torque, drag, tension, compression and well hydraulics to design the optimum drill string. Tapered strings with high strength mechanical properties would be required on most wells. Total provided the resulting specifications to the rig contractors, and Atlantis was selected for the rig on the TLP. Atlantis acquired the entire drill string from Vallourec. This included the VM-150 DP high-strength drill pipe with the field-proven VAM® Express connection. This connection provides torque capacity that averages 150% to 200% of API connections, improved hydraulic performance, and quick makeup for improved rig floor efficiency.

Oil Country Tubular Goods

The OCTG specifications for the Moho Nord project were very stringent on account of the reservoir conditions, requiring material to be both high strength, to support the well loads, and corrosion resistant (H₂S and CO₂). To confirm the high level of performance of connection and materials, Vallourec conducted specific laboratory tests at its dedicated Research Center in Aulnoye, France, including accelerated corrosion testing using fluids from the Albian and Miocene reservoirs. OCTG provided for the Moho Nord project was manufactured using VM 105 DP MS, the most stringent connection qualification procedure, VAM® 21. Qualified to API RP 5F5S: 2017, the most stringent connection qualification procedure, VAM® 21 is gas tight and is as strong as the pipe body under compression and tension. VAM® 21 is now the reference threaded and coupled connection for deep offshore projects. In addition to OCTG, Vallourec manufactured a variety of custom-designed accessories including pup joints and crossover subs for the project. Through innovative engineering, careful material selection, and in-house fabrication, Vallourec produced made-to-measure components that met the challenging specifications at significantly reduced cost for Total.

Drill Pipe Riser

Vallourec provided its high performance drill pipe riser, VAM® DPR HP, as part of Aker’s subsea package for the Miocene wells drilled in up to 1300 m of water. Drill pipe risers provide an efficient means of installing upper completion, subsea trees and other components as well as performing well interventions. The VAM® DPR HP drill pipe riser incorporates a proprietary double-shoulder connection design, with a gas-tight metal-to-metal seal, and is rated up to 10,000psi working pressure for safe operations on high-pressure wells. The Ø 150 OD VAM® DPR HP drill pipe riser delivered to the project is manufactured using VM 105 DP MS proprietary sour service grade. It provides a quick, cost-effective means to connect service risers to subsea assets to reliably install equipment and perform through-tubing or wireline operations. Total has already utilized the VAM® DPR HP drill pipe riser system on other deepwater fields including Usan and Egina in Nigeria.

Welding on pipelaying vessel

In addition to providing tubulars used in Moho Nord’s wells, Vallourec also contributed to the installation of the project pipelines. Working aboard the Technip FMC Global 1200 pipelaying vessel, Semmax, Vallourec’s pipe welding subsidiary, successfully performed approximately 20,000 welds on 225 km of line pipe. Total brought the Moho Nord field on line from PdD to first oil in less than four years. In the process, the operator leveraged Vallourec’s international scope of technical and manufacturing capabilities. To date, Vallourec has met all scheduled deadlines on the project without any safety incidents, and has kept its tradition of designing quality products, testing them in real life conditions, and providing Total the quality products that perform in very challenging conditions.
Patricia Niemi brings dedication, positivity and passion to Human Resources

Patricia works in Human Resources, handling employee relations, policy implementation and employment law compliance, for everything regarding Vallourec USA Corp employees and expats throughout North America.

Prior to earning her Bachelor’s degree in Management with a Human Resources Track from the University of Houston, she served in the Air Force for seven years as a Structural Journeymen. Patricia was stationed in Grand Forks, North Dakota as well as Ramstein, Germany. She was deployed to Oman during Operation Enduring Freedom, assigned to a team that built hardened shelters for pilots. Patricia’s military background provides a foundation for her sense of service, passion for traveling and love of other cultures.

A passion for people and perfection
After pursuing her degree, Patricia landed an internship with VAM® USA in 2013, during which she worked with different services in a transversal manner. This assignment allowed her to grow professionally, for instance assisting other HR departments at Vallourec Drilling and Vallourec Star Houston and Muskogee. Patricia says, “I enjoy creating structure in policies and procedures and guarantee transparency in answering information needs. It’s very gratifying to be able to streamline processes so our employees can get the help they need, when they need it. I know that unlike policies and procedures, the human aspect is not black and white, so I maintain flexibility and look at each situation on a case-by-case basis.”

Doing her part beyond the job
Assisting people and building morale is key to Patricia. But her compassion and dedication for others extends further: when Hurricane Harvey made landfall last August, disastrously impacting 180 of Vallourec’s 1,000 Houston-based employees and their families, she felt prompted to help and do her part. She was part of the initial team to actualize the fundraising efforts for the Vallourec Employee Disaster Recovery Fund.

Several mentors have motivated Patricia throughout her life and career. “My mother is a very strong, positive and independent woman who, at a young age, instilled in me to look at the positives in every experience.” She also points to Vallourec Trina Rauscher-Cooper, VP HR and Dinorah Colmenares, HR director as “an inspiration to come to work and give my very best.” Considering the scope of involvement Patricia leaves in her wake, she has managed to develop new skills by anticipating questions, finding solutions and taking inspired action. Patricia knows a Big Opportunity when she sees one. That’s why she chose Vallourec, to make it possible!
Thanks to its unique range of expertise, Vallourec provides fully integrated solutions, along with a commitment to lowering its customers’ Total Cost of Ownership. Its solutions include all the goods and services needed to enable each project, from conception to completion and beyond. Whether it is well design, supply chain management, yard management, field assistance, repairs, or training, Vallourec Global Solutions guides its customers through every step of the value chain by offering high added value solutions that allow cost savings for operators. With its highly skilled teams available 24/7, Vallourec contributes to making all your projects possible, wherever you need us, whenever you need smart tubular solutions, vallorec.com.