Velan View

Issue 3 Fall 2011

Welcome Velan ABV—Lucca, Italy

Also:

Velan and MRC Transmark: A winning combination
Testing for earthquakes
Oil and gas trends
Building quality into processes

Velan View

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VELAN

President's message:
Moving forward

Based on the theory of relativity, if you are standing still and everyone else is moving forward and passing you, then it looks to them like you are going backwards. Fortunately, that's not the case here at Velan as we continue to move forward with respect to our product line, our global reach, and our key people.

Our cover article in this issue profiles the newest addition to the Velan corporate family: Velan ABV. Earlier this year, we purchased 70% of the company and the Marianetti family retained 30%. Luca Marianetti will continue as President and CEO of Velan ABV, which is located just outside the beautiful town of Lucca in Tuscany. Their excellent range of products is entirely complementary to our valve range and broadens the scope of our offering to the energy markets.

Geographically, we've not only added a manufacturing presence in Italy, we've also expanded our footprint by opening a new support office in Coimbatore, India, and purchasing land to build a manufacturing plant on the outskirts of the city. We also hired Ramesh Babu as Managing Director of Velan Valves India. Ramesh has a Master's in Engineering and is also a certified Black Belt in Lean processes. With 20 years of experience in the valve industry, he will lead our much stronger presence in this rapidly expanding market.

I am happy to welcome back Wolfgang Maar to the position of Executive Vice President International Sales and Overseas Operations. Wolfgang was the President of our German and UK companies before leaving to a competitor in Houston. With almost 30 years' experience in the valve industry, Wolfgang has the kind of talent we need to help grow our global business. He has recently moved to Montreal with his wife, Angela, and his two kids, Kevin and Michael.

In this issue

We're proud to profile Zenith Supply's Sheldon Marstine, a long-time Velan distributor with a pretty unique business concept. In addition, Grant Davis of Ashland Chemical gives his perspective on his relationship with Velan. We also talk with Neil Wagstaff, Executive Vice President—International Operations of MRC and CEO of MRC Transmark. In this article, we discuss how, two years after acquiring Transmark, MRC has grown to become the first truly global distributor for Velan with offices in 15 countries worldwide. And it's still growing.

The oil and gas industry is a particularly dynamic market, and John Spears, President of Spears and Associates, shares his take on the top 10 trends in the oil and gas industry. What's more, Velan's own Craig Bekins writes about his insights on the state of the current mining industry.

I think this is a content-rich issue of the magazine and hope you find something of particular interest to you.

I wish you health and success in all your endeavors, especially the ones involving Velan valves!

Tom Velan
President and CEO

Introducing Velan ABV

Velan ABV's President and CEO, Luca Marianetti, with Tom Velan, President and CEO of Velan.

Italian valve experts offer fully customized, innovative products

In April of this year, Velan made the largest acquisition in its history when it brought an Italian company under its corporate umbrella: ABV. The company is now 70% owned by Velan Inc. while the Marianetti family retains 30% ownership. The new company operates under the Velan ABV name and has annual revenues of $50 million. Over the years, some of ABV's biggest customers have included Aramco, BP, Conoco, Total, Peru LNG, PDVSA, ENI, and Exxon Mobil.

"This is a great opportunity for both companies since ABV's excellent range of products totally complements Velan's existing range while broadening our offering in the energy market," says Tom Velan, President and CEO of Velan. "Velan can help to realize the global market potential for ABV's specialized valves and actuators."

"We were also interested in ABV because it is a very dynamic company with a substantial number of young, highly trained engineers and other experts in the field who have proven they can consistently create innovative new designs for demanding applications. ABV's founders and staff are very forward thinking when it comes to valve design."

Rob Velan, Vice President of Marketing, was also heavily involved in helping negotiate the acquisition. He adds: "We chose ABV because they also share many attributes with Velan: They are a solid, family-run company with a combination of

Left to right: Alessio Gori, Financial Controller; Luca Marianetti, President and CEO; Caludio Pii, Project Manager (standing); Michele Costa, Actuators and Control Systems; and Nicola di Iorio, Operations Manager.

fairly conservative business practices and innovative, proven products. Velan was determined to have ABV's management team continue to run the company after the acquisition. By retaining the 30% ownership in the company, the Marianetti family has shown that it is committed to the business."

The ABV philosophy

At the heart of ABV's identity and a key element of its success is the business philosophy of its President and CEO, Luca Marianetti, who says: "Tomorrow's success depends on the innovation of today."

That philosophy is deeply engrained in all that the company does, from its R&D affiliation with local universities to its extensive product line based on giving customers an all-in-one package of valves complete with in-house designed and manufactured actuators and control systems. The company provides these tailor-made packages to customers who face some of the toughest applications in the energy field today.

"On our side, I wanted our company to have an even larger presence because I'm passionate about this business," Luca says. "By working with Velan, we are expanding our scope and making our brand even stronger. Velan is a well-known name around the world and a well-established company with a long history," Luca explains. Also, "It was a logical partnership because we are both family-run companies and we work for the same goal—providing top-quality solutions for our customers worldwide," he adds.

"The reason I love this business and what makes it interesting is the daily challenge of providing something that clearly differentiates us from our competitors. I am always looking ahead and seeking creative new ways to meet our customers' needs," Luca says.

How it all began

Though its formal relationship with Velan is a new one, ABV itself has been around for well over a decade and benefits from a well-established reputation. The Marianetti family had already gotten their entrepreneurial feet wet by operating two companies—one manufacturing valves and one actuators—for a number of years before acquiring ABV in 2000, then located in Milan.

With the Marianetti's purchase of ABV, a new era of innovation for the company began. First, they moved the headquarters further south near the historic walled city of Lucca, Italy. Then they launched a program of organic expansion that included diversifying the product line, pursuing important industry certifications, and developing a broader global reach. The company now employs more than 120 people and is in the process of a major expansion of its manufacturing facilities, adding 5,000 square meters (more than 50,000 square feet) to its operations.

As it has from day one, the company mainly targets the oil and gas industries for offshore and subsea applications. It also has expanded into power generation, geothermal processes, and liquefied natural gas (LNG).

Over the years, the company has grown its product range to include pipeline ball valves, emergency shut-down valves, high-integrity pressure protection systems, subsea ball valves, control ball valves, diverter valves, modular double block and bleed valves, slab gate valves, choke valves, and nozzle check valves. The company also designs and manufactures pneumatic, hydraulic, and gas-hydraulic actuators.

A Velan ABV engineer testing a control panel.

Subsea valves ready to be shipped.

But what it prides itself on most is the capability to offer its customers a complete valve and actuation package, a one-stop-shopping approach to fluid control. "We are not interested in manufacturing commodity valves," Luca says. "Our goal is to provide the complete package, and we work very closely with a number of very large EPCs (engineering, procurement, and construction companies) to bring in new orders. That's our sales strategy in a nutshell."

Top-of-the-line talent

There is another way the companies are alike: both understand the importance of top-notch R&D and testing as well as finding and cultivating top-level talent.

For Velan ABV that translates into developing a close relationship with the University of Pisa, one of the oldest schools in Europe and an organization that is renowned for its excellent research facilities and ability to produce highly skilled mechanical engineers. Velan ABV works with the research staff on special projects such as a range of applications demanding very compact designs that are exceptionally reliable as well as valves built to handle very severe control services.

"We have also designed valves for deep water service that are completely different from the standard valves because of the particular environment in which they must operate. I'm proud of the fact that we have not only designed the valves, we have also designed and manufactured in-house the subsea actuators and the ROV override, thereby creating a complete package," Luca says.

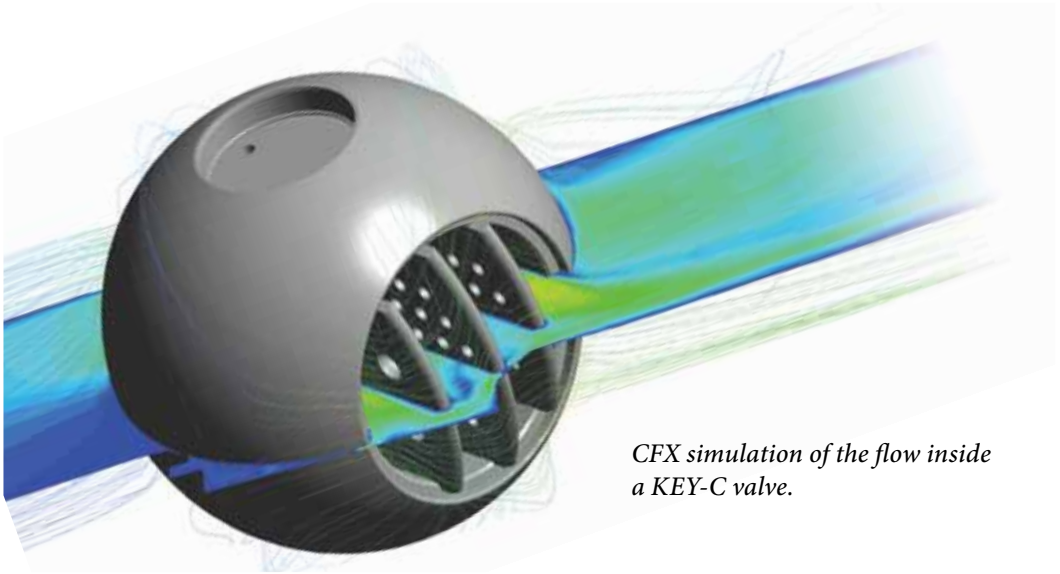
"Working with the university makes sense for many reasons, not the least of which is that we strengthen our own internal expertise through the process," Luca explains.

"It also gives our customers the reassurance that we're on top of advances in the field for such things as materials, coatings, and R&D and testing processes. Our reputation for quality and design is already very good, and this puts muscle behind our efforts so we can develop even more products that are tailor made for very specific applications," he says.

A strong R&D team

Velan ABV uses both computer simulations and other testing facilities including its own hyperbaric chamber, which effectively simulates deep water conditions.

According to Diego Babbini, a sales engineer at Velan ABV, "I believe the strength of our testing and R&D team is one of our key selling features. We're always at work on the development of



CFX simulation of the flow inside a KEY-C valve.

new products, continuously improving our designs. We work on sizing and optimization issues to satisfy a wide range of operating environments, and perform CFD (computational fluid dynamics) simulations to test out the worst possible working conditions. We even take into account such details as the potential noise levels that workers might face in severe service applications. We are very thorough."

That expertise is vital for a company that faces the challenges presented by working with difficult applications and corrosive materials.

Outside of the office

And what does the ever-energetic Luca do to keep busy in his life outside the valve/actuator world? Well aside from being an avid helicopter pilot, he points to two things: working on the family's farm where they produce their own olive oil, and adapting to fatherhood: Luca's first child, Carlo, named after Luca's father, was born last October. "I have an eleven-month-old child, so I spend a lot of time babysitting," he jokes. **|V V|**

Velan and ABV joined forces to announce the acquisition at the Offshore Technology Conference in Houston, May 2011. They had signed the contract in Italy three days before.

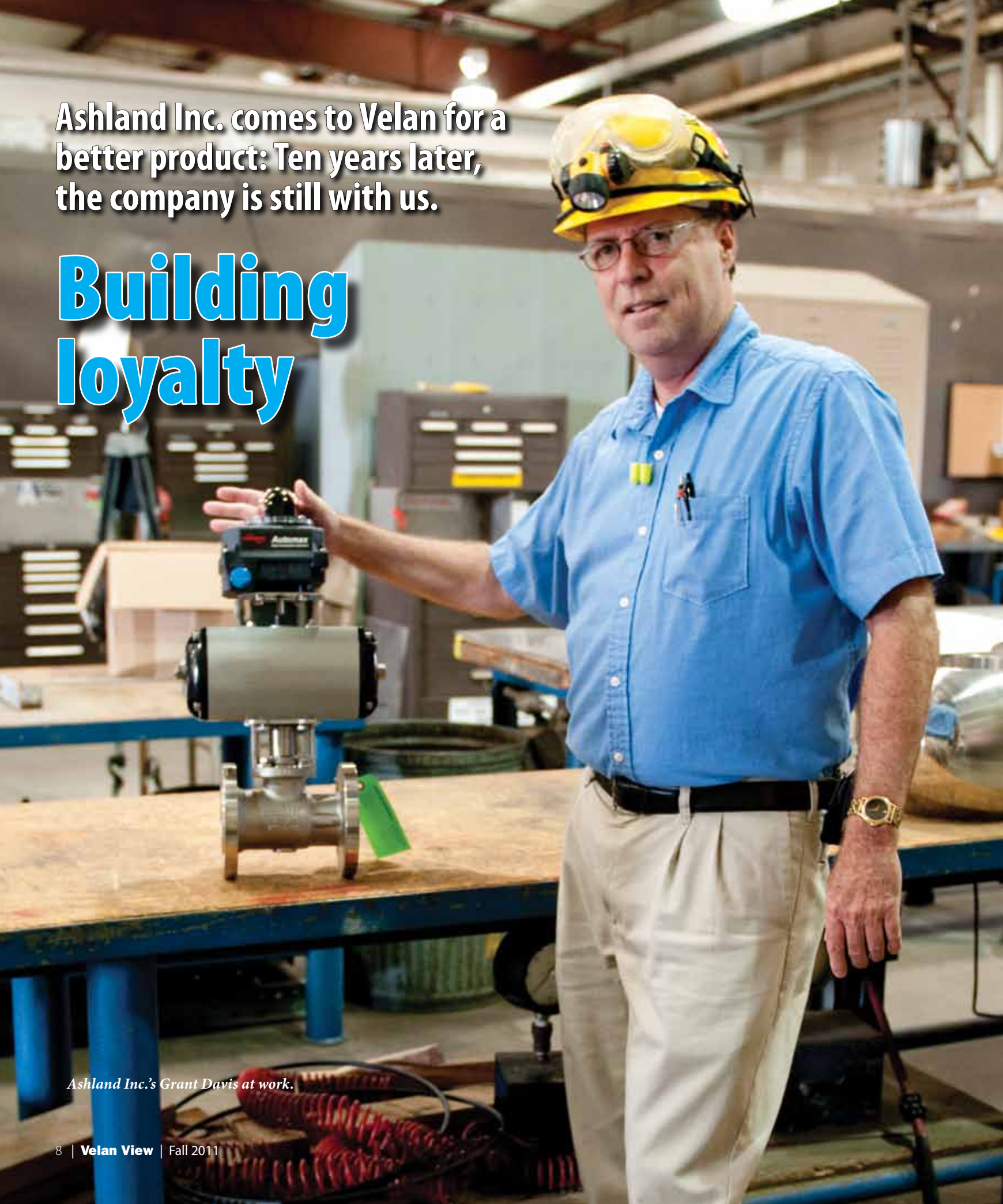
The challenges of going subsea

"About a quarter of our business is in subsea applications," Luca says. "In broad strokes, there are two types of subsea applications: shallow water, which is relatively easy to deal with because you can refer to the national API standards as clear guidelines for designing the equipment, and deep water. For deep water, customizing the valve package is much more important because you face unique temperatures and pressures. We've designed systems that need to operate reliably kilometers underwater."

"With subsea conditions you need to find materials that can handle corrosive service in the sea—mainly the challenges presented by the effects of hydrogen sulfide (H_2S), carbon dioxide (CO_2), and chlorides," adds Nicola Lucchesi, Manager of Velan ABV's R&D engineering team. "Newer subsea operations also often use chemicals that minimize paraffin, asphaltene, hydrates, and scale formation; they must also be able to inhibit corrosion. It's a balancing act since these chemicals can negatively affect both metallic and non-metallic materials, and the problem is compounded when materials have to handle produced and annular fluids as well as the injected chemicals. Also, with subsea systems, the effects of hydrogen embrittlement from the cathodic protection system—a well-known technique for controlling the corrosion of a metal surface by making it the cathode of an electrochemical cell—have to be taken into account. That's why it's especially challenging to pick the right materials for the job," he concludes.

Ashland Inc. comes to Velan for a better product: Ten years later, the company is still with us.

Building loyalty



Ashland Inc.'s Grant Davis at work.

It's logical that when a company is dissatisfied with a product, it would switch gears and look for a new solution—in this case moving from one well-known valve company to starting anew with Velan. And when that newly chosen manufacturer and its distributor also provide the right service, a long-time relationship can blossom. That's exactly what happened with Velan and Ashland Inc., a specialty chemical company.

Pre-assembly of a Velan ball valve on-site.

"The reason I now use Velan Memory-seal™ ball valves is that we benefit from a high-quality solution and both Velan and their distributor Carotek treat us with excellent customer service. Because the Velan product has been so reliable, I've had very few concerns. And when I do have a question, I do not want to talk to a lot of people—I want one reliable point of contact. I talk to one person at Velan or one person at Carotek," says Grant Davis, Electrical and Instrumentation Maintenance Engineer for an Ashland manufacturing facility in Hopewell, Virginia.

The story of how the relationship began is a fascinating one.

A trip to the Granby, Quebec, plant

Ashland (which acquired Hercules Incorporated two years ago) first started using Velan valves after Grant and another employee of the former Hercules, Howard Jones, visited Canada to see the facilities a decade ago.

"At the time, I was dealing with another major valve maker that had changed its business model. As a result of the changes, we were no longer getting very good response from the company. Then the product itself—ball valves—began to fail," Grant explains.

Grant knew it was time for a major change and so, once again, he was in the market for an extremely reliable, low-leakage ball valve.

"Distributor Carotek and Velan's John Flynn, Regional Sales Manager, visited my office with information on a new valve line that was completely unique in the way the valve was built—it was seated under tension instead of compression so it could be self adjusting," he explains. "We agreed that a visit to the plant where the valves were made was in order. When I got there, I was blown away: I had never seen that many ball valves in one place in my life."

But what happened next is what convinced Grant to make the change.

"We actually pulled a top-entry valve off the shelf at random and Velan's R&D guys proceeded to do this incredible test. The valve met zero leakage using methane. While in the lab, Velan was testing the ball valve and they had made a fixture that enabled them to pull a vacuum. The valve was being tested to the new TA Luft requirements. They pulled off the top parts of the valve, put an adapter on it and put it on a stand, then pulled a vacuum on it to test it down to parts per million," Grant explains.

While the testing method itself impressed Grant, what really amazed him were the results. Because Ashland uses chemicals, some of which are volatile, he was seeking a proven and reliable low-emissions product.

"But the random test showed no leakage at all! So the tester, Bernard Gelineau, then proceeded to do a series of additional tests where he purposely made the

"When the valve was made to fail, the alarms of course went off in the lab, and we had to exhaust the area. It was pretty dramatic and it certainly demonstrated that the R&D group was on top of safety procedures. But the real point was that it clearly demonstrated to Grant that this valve, installed properly, did what it was supposed to do: It did not leak."

—John Flynn

Velan's John Flynn strategizing with Ashland's Grant Davis.

valve fail just so we could see what that would look like. And then he made a few other adjustments and tested it again, and again we got zero leakage," Grant said.

The additional testing was done because, "while it's impressive to have zero emissions, testing on a brand new valve is not the same as testing one that's been actuated 500 times," John explains. "We needed to show Grant that the valve would show no emissions when the product was running through it," he adds.

The lab purposely used methane because of its high volatility (like some of Ashland's chemicals) and the testers evacuated the lab except for key personnel.

"When the valve was made to fail, the alarms of course went off in the lab, and we had to exhaust the area. It was pretty dramatic and it certainly demonstrated that the R&D group was on top of safety procedures. But the real point was that it clearly demonstrated to Grant that this valve, installed properly, did what it was supposed to do: It did not leak," John explains.

Grant's job

That test may have started the relationship off on the right foot, but what's kept it going is the valve's continued reliability. The Ashland plant produces water-soluble polymer and cellulous derivatives, which according to Grant are "used for anything in the world that needs to be thick and smooth—ice cream, syrup, molasses, toothpaste. If it weren't for our chemicals, those products would all have the consistency of sandpaper," he explains.

Grant's job is to ensure any equipment and instrumentation within the plant works the way it's been specified and to resolve any problems that might arise.

"I work on anything within the plant from control valves to distributive control systems. Right now, for example, we are doing a lot of new project work so I'm part of a team reviewing the design, reviewing the specifications, making approvals, reviewing the installation, ensuring everything is up to code and Good Manufacturing Practices (GMPs).

"Whenever one of the area's electric or instrumentation guys have an especially challenging issue, I provide additional support to resolve the problem," he says. Although he now has one other peer doing the same thing he does, his job is also about to expand as Ashland has invested millions in a major expansion of the plant.

However, the job is right up his alley.

"What's really neat about what I do is that I work on many different things every single day. I am not pigeonholed into staying in the office or on an outside job site for eight hours every day."

He also likes the fact his job entails keeping up with the latest in technology, which in

the chemical industry has changed tremendously during his 28 years in the business.

"When I first started in this industry, there was no such thing as a control system—all the controls were pneumatic, not automated or electric. But the technology just keeps getting faster and smaller and more efficient.

"I'm a technically oriented person—that's why I get up in the morning. I like the fact I have to stay on the leading edge of equipment and automation. It's a constant challenge."

Alex Rose, Carotek's Account Manager for the Instrumentation and Valve Divisions since 2004, has become very familiar with Grant's engineering prowess. "For many years with Hercules and now Ashland, Grant has been successfully driving equipment specifications at the plant in very demanding applications that can involve any combination of high temperatures and pressures, corrosives, abrasives, and highly reactive chemicals. He is one of the most thorough and technically competent customers I have called on in my career and expects you to know your products and your trade from top to bottom. Products that don't measure up and companies that fall short on support usually don't last long at the plant. Being a solutions-oriented salesman, I've enjoyed rising to the challenges, and I'm glad to have Velan as part of the solution."

For Velan, that means that as long as its valves remain as reliable as they've been this last decade, the trio of Ashland/Velan/Carotek will remain solid.

"Just recently, I did a plant-wide survey of the different areas maintained by our electric and instrumentation groups to ask them about their experience with the Velan valve as far as failures go. The bottom line was this: The valves perform extremely well provided, of course, they're properly applied. That simple fact combined with the service I get is why these valves are now our plant standard," Grant said.

According to Alex, "As Carotek is a multi-state manufacturer's rep and distributor with full valve automation capabilities, having a substantial Velan stock in our corporate headquarters has been a big help in providing the quick service and turn-around the Ashland plant requires." **|VV|**

Carotek representative Alex Rose inspects a part.

For Grant Davis, the sky's the limit

Many people who are really passionate about what they do for a living have hobbies that carry over from what they do during the average workday.

For Grant Davis, that passion is for technology.

"I'm a technical guy, so I love to build things," he says.

John Flynn, who has been to Grant's home, says: "I saw an expansion to his home he built and I can tell you that it looks like something out of *Better Homes and Gardens* magazine. Everything is state of the art, including the movie theater he put in himself," John says.

However, this passion has an even more unique outlet: Grant's hobby is building remote-control airplanes from scratch.

"You get to do this very intricate work to build these things, which is a skill set you develop over time. I can attest to that because I've crashed quite a few planes," he jokes.

"But the really neat thing is that after you've built this piece of technology with your own hands, you get to go out and use a completely different skill set: you get to fly it. The feeling when you're successful is terrific," he says.

Zenith Supply

A large, specialized stock; a staff with incredible productivity

As a long-time Velan distributor, Zenith Supply, in Pittsburgh, Pennsylvania, has a unique business model that has been tremendously successful for the company: stock a very broad selection of products and put your muscle behind one winning horse.

"We do not sell anything to the end users; we do not sell to contractors. We sell strictly to other distribution channels," explains Sheldon Marstine, President of Zenith. What's more: "We sell only one product line—Velan. And as you can see, we have millions and millions of dollars invested in inventory."

This model has served the company well for the more than 25 years that Velan and Zenith have been in business together. It also won the company two Joe Casey Awards (an award Velan presents for outstanding performance).

Like any model, however, it works because it was placed on a very solid base (the company has a long history), and it is filled in with quality components (the right staff and the right product).

Zenith's base

Zenith's rich history stretches back to Sheldon's father, Jack Marstine, who in 1946 started a plumbing repair parts business. For years, Sheldon's mother was the bookkeeper, making it truly a family-run business.

"My father founded Zenith Plumbing Specialty Company with about $7,000 in his pocket. We had a very small office and a storage room, and my father spent a lot of his time on the road," Sheldon says.

Sheldon began working for the company when he was just 13.

"I would go down to the office after school, wrap and pack the orders and take them to the post office on a streetcar. Everything in those days went parcel post, and I didn't have a driver's license yet," he recalls.

By 1952, the company had moved to a large building. Sheldon served two years in the army and when he got out in about 1956, he approached his father with the idea of expanding out of the plumbing supply line.

"I was interested in the investment end of this business and my father, who was a very driven guy, always listened to my ideas," Sheldon says.

Sheldon began selling a line of bronze and iron valves from a company in New York that eventually went out of business. Zenith also started stocking steam traps and Sheldon started calling on what he labels "light" industry: breweries, bakeries, laundries, and a few hospitals.

The first big customer break from the valve side of the business came in the early 1960s when one of the largest research facilities in the country, which was owned by Westinghouse Research Labs, needed a very quick order for temperature regulators, and Zenith was able to fill the order from its own stock.

"We got the regulators out to them the very next morning after we heard what they needed, and they then asked if I wanted to bid on a blanket contract for valves and fittings," Sheldon says.

That sequence of events—finding out about a need, then being the company with the right stock to fill the order in a short

time frame—has been a key element of the company's mantra since then.

Velan entered the picture soon after Sheldon made another major decision about direction for the company: selling to other distributors instead of selling direct to users.

"During the very bad recession of the early 1980s, I lost a lot of business, like everybody did.

"I did some soul searching and realized that when it comes to fulfilling valve orders, one of the worst problems in the business at the time was finding a good supply in a short amount of time," he says. "I thought to myself, there have to be other distributors with similar problems."

Sheldon says he wrote A.K. Velan, the founder of the company, a three-page letter in 1982 that outlined what he wanted to do, which was to sell Velan valves to other distributors. He began with an initial order that year for F11 pressure seal valves, not yet knowing what stock was critical. But he learned quickly and began stocking a wide expanse while the business grew and grew.

Today, Velan's Paul Lee, Vice President, U.S. Sales (Eastern Division), says that "Zenith has a unique capability, which is to almost always bid a project out of current inventory. I don't think anyone else in the business can say that. Sheldon is selling all over the world and selling a wide variety of product with all sorts of materials and pressure ranges, and most of it is in stock."

The keys to success

Sheldon attributes Zenith's success to its own hard-won and long-lasting reputation, to Velan's product line, and to his staff.

"There's a common denominator in any business today that is important to that business: Integrity. You have to be honest when you cannot make a delivery in a particular time frame," he says.

"From that integrity, you build up trust with your customers, which in turn builds up your reputation," Sheldon explains.

He also strongly believes that the second component of achieving success is offering the right product.

"I chose the Velan line for a simple reason: I felt it was the best quality product in the world with the widest range of offerings. In the distribution business, there are three elements in the equation of what makes a good product line. The top level is quality, the second level is delivery time, and the third is price.

> ***"I would go down to the office after school, wrap and pack the orders and take them to the post office on a streetcar. Everything in those days went parcel post, and I didn't have a driver's license yet."***
>
> **—Sheldon Marstine**

"You can have the lowest price in the world, but if you cannot deliver a valve on time and you are buying poor quality, you don't have a good business deal," he says.

Sheldon's father, Jack Marstine, in a rare moment of leisure.

The other key to Zenith's success is the company's employees. Zenith has a very small staff: just nine people with five in the office and four in the warehouse. "Yet our level of productivity is very high—they are capable of doing some amazing things," Sheldon explains. He gives this example: The company found out about a fire in a refinery at about 3 p.m. one afternoon, got a call inquiring about supply stock for API 600 stainless steel valves, which it had on hand; received an order by 4:30 that afternoon; got the order pulled, put on pallets, and ready for delivery about an hour after that, and it was ready for pick up by 9:30 p.m. that same night. The valves were in place by the next morning.

Helen Marstine, Sheldon's mother, was the bookkeeper for Zenith Plumbing Specialty Company for years.

"This is what each member of my staff can do—the work of 10 other people," Sheldon notes with pride. And that staff is obviously happy with their employer. Sheldon's bookkeeper, for example, Arlene Dyga, has been with the company 40 years. Dave Fischer, Sheldon's right-hand man, has been with the company close to 30 years. The newest member of his staff has been with him for 16 years.

"We are truly a family in this company," Sheldon says.

That family is successful not only because it has worked together for so long, but because employees know the product, and they know that with almost all requests, the right product is likely to be on the shelves.

"We have valves here in our stock that nobody has on stock—nobody on this planet, and probably nobody in this whole solar system," Sheldon jokes. **|V V|**

A proud Sheldon in full uniform, mid 1950s.

Sheldon Marstine, President of Zenith, with Ivan Velan, Executive Vice President of Velan.

Velan and MRC Transmark

A winning combination

When McJunkin Red Man (MRC) acquired Transmark two years ago and formed the international division MRC Transmark, MRC became the largest valve distributor in the world.

Neil Wagstaff, Executive Vice President—International Operations of MRC and Chief Executive Officer of MRC Transmark.

The company is now truly the first global distributor with offices in 15 countries worldwide, and it's still growing.

What that means to all of the companies MRC Transmark represents is a better position for bidding out to some of the largest international companies in the world, companies that have operations all over the globe.

"Our vision at MRC and MRC Transmark is to be the largest piping, valves, and fittings (PVF) company in the world and add value to our customers. We strive to become the supplier of choice," says Neil Wagstaff.

To get there, however, means forming partnerships with companies that can provide the quality products that today's large global customers need. The story of how the winning partnership between MRC Transmark and Velan came to be is an illustration of how that can work.

The beginning

Velan and MRC Transmark's history began more than a decade ago; like most stories about successful business deals, it began with human relationships.

In this case, it was the relationship between people at Velan and Neil, who headed up Heaton Valves and later Transmark before taking the helm at MRC Transmark.

More acquisitions for MRC

Mcjunkin Red Man Corporation (MRC) recently signed an agreement to acquire **Stainless Pipe and Fittings Australia Pty Ltd** (SPF), as part of its strategic vision to be the world's premier piping, valves, and fittings (PVF) distribution company to the energy and industrial markets.

Operating as MRC SPF, the company was originally founded in 1996, and is the largest distributor of stainless steel piping products in the southern hemisphere. Headquartered in Perth, Western Australia, SPF has seven locations across Australia as well as Korea, Italy, the U.K., and U.A.E. SPF is a leading project supply specialist with proven capabilities supplying the oil and gas, mining and mineral processing, chemical and petrochemical, and water treatment and desalination industries.

SPF's 430,000-square-foot facility based in Perth would become MRC's foremost piping, fittings, and flanges (PFF) stocking and distribution center for Australasia. This facility is equipped with state-of-the-art materials handling facilities, including the ability to facilitate project laydowns and provide bulk supply provisions.

Complementing the Perth facility are two additional stocking locations in Australia as well as strategically placed stockholdings in the Jebel Ali Free Zone, U.A.E., and in the U.K.

Acquiring SPF would increase MRC's global PFF stockholding in stainless steel to a value in excess of $50 million, with global stainless PFF sales of more than $300 million. The $4 billion MRC group currently has over 400 global service locations and $850 million of PVF stock located around the globe.

The acquisition would complement MRC's 2009 purchase of **Transmark Fcx (MRC Transmark)**, the leading valve distributor in the eastern hemisphere. The synergies between SPF and MRC Transmark would create value for both companies providing a complete PVF capability in the eastern hemisphere and supporting MRC's drive to be the global supplier of choice.

Andrew Lane, Chairman, President, and Chief Executive Officer commented, "This acquisition furthers our vision to be the world's premier PVF distribution company to the energy and industrial markets. SPF's PFF capabilities would allow MRC to expand on our valve platform to have a complete global PVF supply capability. We are excited to expand our presence in Australia and with major EPC projects globally. We are also very pleased to be adding Graham Yarker and Jeff Nicholas to the MRC management team and all of SPF's 145 employees to MRC on the closing of this acquisition."

The global executive MRC team. Left to right: Andy Lane, MRC Chairman, President, and CEO; Neil Wagstaff, MRC EVP—International Operations and CEO of MRC Transmark; Scott Hutchinson, MRC EVP—North American Operations; Rory Isaac, MRC EVP—Business Development; Gary Ittner, MRC EVP and CAO; and Jim Underhill, MRC EVP and CFO.

Neil met Mike Zivic, Velan's Vice President of International Sales, at an ACHEMA show in Frankfurt, Germany, in the mid 1990s. Neil, who spent the earliest years of his career working for a valve manufacturing company in the U.K., had just "jumped ship," as he puts it, to the distribution side of valves via Heaton Valves.

The reason he went into distribution was: "I could see the writing on the wall. Valve manufacturing in the U.K. was declining because of the cost. Distribution, however, was increasing as more and more valves were being imported," he says.

He could also see that some of the large global customers were seeking a way to get the best products from one source.

"A customer such as a major petrochemical company will have offices of buyers, offices of expeditors, offices full of warehouse people. All of these people were acquiring products from five to 10 different manufacturers and another 10 or so distributors," Neil explains.

"Customers were saying they wanted one agreement, one company to deal with instead of multiple vendors, one place to get the valves they needed. They wanted to be free to focus on their business models, such as finding oil and producing chemicals for the petrochemical company, instead of spending time buying piping, valves, and fittings," Neil adds.

Meeting at ACHEMA 1996

At the time of the ACHEMA show, Neil had begun searching for a company to provide Heaton with quality valves. In the year following that show, he would travel to Montreal to meet with Mike Zivic, as well as Tom and A.K. Velan. Meanwhile, Heaton was purchased by Transmark, which was based in the Netherlands at the time, but did a large amount of business in the U.K. Neil was named CEO of the company.

> ***"From that first meeting at ACHEMA and those first meetings in Montreal, I have always dealt with Mike Zivic, as well as Tom and A.K. Velan, and that's still whom I make deals with today."***
>
> **—Neil Wagstaff**

By 1998, Neil and Transmark were ready to sign a deal with Velan, and he can pinpoint exactly when it was because he was in Montreal the weekend of A.K. Velan's 80th birthday party in February.

"I had selected Velan as the company to work with because I believed they were

the best valve manufacturer in the world. I went to A.K., Tom, and Mike and told them Transmark wanted their business," he says.

He pursued the company because: "I knew Velan has great design of product, great quality, and many approvals, which is one of the reasons I latched onto the company."

The first deal was for distribution in the U.K. and "from that point on, I went about putting Velan into every single refinery and petrochemical plant in the U.K.," Neil says.

Two companies on the grow

As Transmark began to spread via acquisition of other distributors across Europe and then parts of Asia, the relationship grew with it. The acquisition of Transmark by the giant North American distributor MRC in 2009 means the possibilities are now global in scope.

From Velan's perspective: "Velan and MRC Transmark are a winning combination because Velan's success rests on quality, but also depends on how developed its distribution network is," says Mike Zivic. "When we started doing business with Transmark, we were starting in the U.K. from the ground up. Transmark and Neil were very customer-focused, very service-oriented. Neil himself is a driven professional and he's very, very good at his job. In a very short period of time, our sales over there went up and up," he says.

At the same time that Transmark was growing in Europe, McJunkin Red Man was growing in North America, and when the company went shopping for a distributor that could expand its reach into Europe, "it was a natural fit between Transmark and MRC," Mike continues.

Although the acquisition presents huge possibilities, one factor hasn't changed.

"I still do my business with the people I dealt with from day one. From that first meeting at ACHEMA and those first meetings in Montreal, I have always dealt with Mike Zivic, as well as Tom and A.K. Velan, and that's still whom I make deals with today," Neil says. **|V V|**

Neil Wagstaff with Richard Baars (MRC Transmark Director of Business Development, Almere, Holland) in front of a Robinson R44 helicopter.

Up, up, and away

With a schedule that has him flying all over the world making million-dollar deals with huge international clients, it's hard to imagine Neil having any downtime. But like everyone, Neil has a hobby.

"If someone had asked me when I was a young child what I wanted to be when I grew up, I would have said a pilot," Neil admits.

Though he didn't pursue that career path, it hasn't stopped him from flying.

"I started with fixed-wing aircraft," Neil says. However, that wasn't quite challenging enough and Neil soon decided he also wanted to become a helicopter pilot. By 2003, he had obtained his license.

"Unlike with fixed wings, helicopters don't need a runway," Neil explains. "You can land them on top of a hotel or in someone's back garden, which makes them much more exciting. It's generally believed that they are harder to learn than flying a plane, but easier to fly. So when I get a chance to do something just for fun, it usually involves a helicopter," he says.

Bird's eye view of Bradford, U.K.

John Spears, president of Spears and Associates, has been studying the oil and gas industry for over 40 years. He is a frequent speaker and writer on the topic and has been a featured expert at the Valve Manufacturers Association's annual Market Outlook Workshop for many years. *Velan View* asked John to outline what he considered the top trends affecting the industry today.

Ten trends in the oil and gas industry

By John Spears

Global oil demand can grow at $100 per barrel.

Although oil consumption in the U.S., Europe, and Japan has been trending lower since 2007, global oil demand has recovered sharply since mid-2009 due to growth in emerging markets such as China, India, and the Middle East. While high oil prices have spurred energy conservation in mature economies, emerging markets are becoming more energy intensive in spite of oil selling for over $100 per barrel as increased industrialization/urbanization more than offsets conservation efforts. Continued growth in oil demand, with oil production at an all-time high, sets the stage for a sustained period of high (over $100 per barrel) oil prices, as long as another financial crisis does not impair economic activity.

Gas use will continue to boom.

While everyone's attention has been fixed on developments in the oil market, global natural gas consumption has quietly grown at twice the rate of oil demand over the past decade. Natural gas—the cleanest of the fossil fuels—will play a major role in meeting the growing global need for clean, safe, and reliable energy.

LNG (liquefied natural gas) trade has globalized the gas market. The number of countries importing or exporting LNG has increased significantly in recent years, and production of LNG has increased by a factor of five in the last five years. This increased availability of LNG has strengthened the case for gas as a secure and reliable fuel.

The next 10 mbpd and 60 bcfd of production will be harder to find and produce.

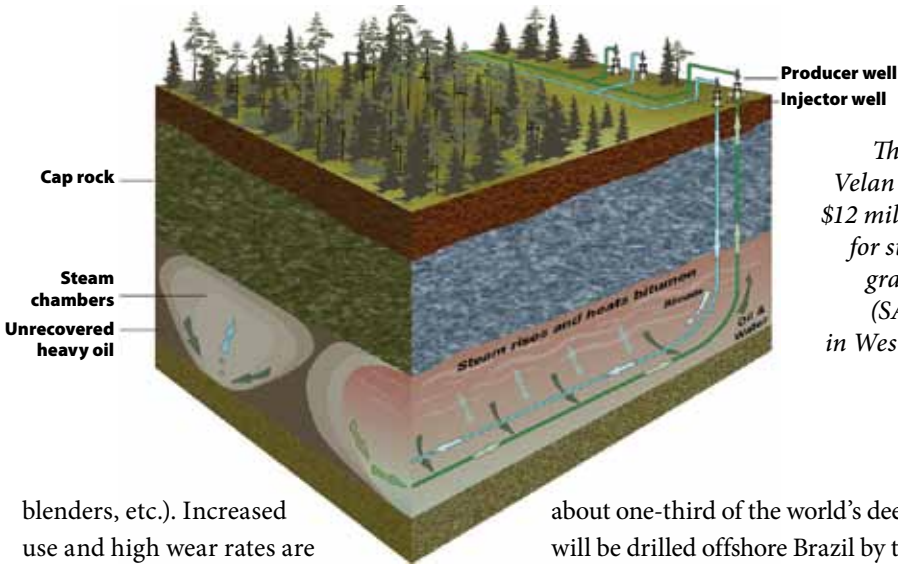
In order to accommodate expected demand growth over the coming decade, the global petroleum industry will need to add 10 mbpd (million barrels per day) of oil and 60 bcfd (billion cubic feet per day) of gas to its current production capacity. The incremental production will increasingly come from deepwater discoveries, heavy oil/oil

sands reserves, deeper reservoirs, "tight" oil formations, and shale gas. About half of the incremental production is expected to come from non-OPEC sources.

Horizontal drilling is changing the exploration and production (E&P) industry. Drilling horizontally once the wellbore reaches the target formation allows greater exposure to the reservoir and increases production potential, allowing a single well to efficiently produce more acreage. Some lateral wellbores are now more than two miles long, up from a few hundred feet a decade ago. (The record for the lateral displacement of an extended reach well is currently over 30,000'; some industry experts expect to be able to drill a 60,000' lateral offset within 10 years time.) Once drilling is complete, the formation is fractured (fracked) using hydraulic pressure applied by pumps temporarily positioned at the wellsite.

Directional drilling technology was commercialized in the early 1980s; hydraulic fracturing became commercial in the mid-1940s. These two well-known technologies were finally combined less than 10 years ago (starting around 2004 to pursue gas shales; in 2009 to pursue tight oil reservoirs) allowing marginal deposits to be unlocked. In response, horizontal drilling activity has increased almost nine-fold since 2004.

With the increase in horizontal drilling have come changes in the way drilling operations are conducted and the type of equipment used. E&P companies have adopted a factory-type approach to drilling to achieve economies of scale, using dozens of rigs to drill hundreds of wells per year in a single field. Drilling rigs have become larger (to drill deeper), more automated (to drill more efficiently), and more modular (to move more quickly from one location to the next). Operators are doing "frac" jobs as soon as wells are drilled (rather than long after production had begun) in order to maximize initial output. Frac jobs are larger, requiring more and larger surface equipment (pumps,



This year alone, Velan has won over $12 million in orders for steam-assisted gravity drainage (SAGD) projects in Western Canada.

blenders, etc.). Increased use and high wear rates are generating increased spending for equipment maintenance and repair.

Premium will be put on safety post-Deepwater Horizon (Macondo).
One after-effect of the 2010 Deepwater Horizon blowout in the Gulf of Mexico is the increased premium being put on safety, especially for operations in high-risk and/or environmentally sensitive areas. This is expected to have an impact across the entire product development process—including research and development, testing, qualification, and manufacturing—for both U.S. and foreign markets.

Upstream expertise will increasingly move away from North America/Europe.
Oilfield equipment and service firms are increasingly establishing research, design, engineering, manufacturing, and training operations in locations apart from their traditional bases in North America and Europe. Not only has demand in some countries/regions grown large enough to support stand-alone facilities (helping satisfy local content requirements in equipment sourcing), but such moves also provide an opportunity for equipment and service firms to forge close ties with local operators (often national oil companies) in the form of joint efforts to address specific technological/operational challenges in the local market. An example of this is in Brazil, where Petrobras's planned field development will mean that about one-third of the world's deepwater wells will be drilled offshore Brazil by the end of this decade. With Brazil leading the way in terms of deepwater demand and technology development, we expect to soon see products/services first developed for use in the Brazilian offshore market make their way into other deepwater markets around the world.

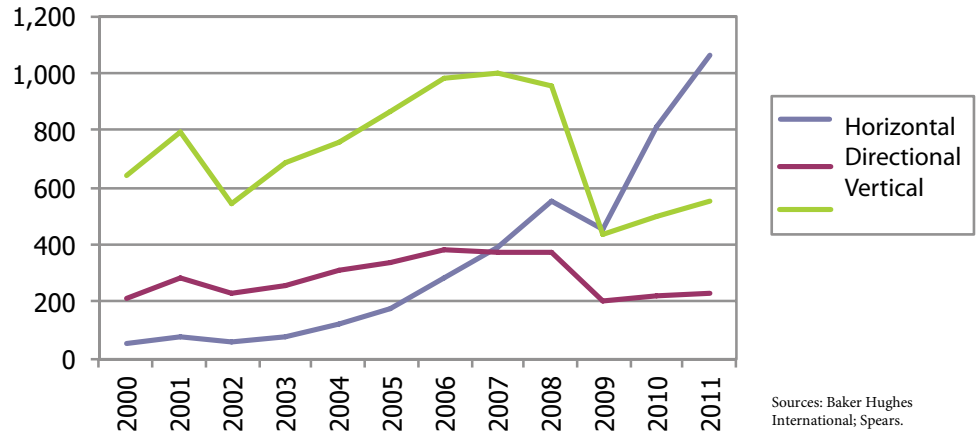
Refining will be a challenging business.
Except for Asia, the refining industry has too much capacity at a time when it faces an extended period of low-demand growth. As a result, the refining industry's tough operating environment is expected to continue for several more years as it deals with low operating margins, more stringent environmental standards, and enhanced fuel emission standards. In addition, regional product supply/demand imbalances are arising from low-cost natural gas replacing fuel oil for power generation, and resid fuel oil surpluses exist due to rising transportation fuel use in markets lacking sufficient deep-processing capacity.

In this environment, improved efficiency and increased operational flexibility will be key to maintaining viability in the refining sector. This will place an emphasis on: (1) higher capacity facilities (with an attendant requirement for larger equipment); (2) increased yield by extracting more products from the waste stream of the main process (with an increased use of gasification technology); and (3) increased use of "severe service" equipment (products that can handle erosive, corrosive, high temperature, and/or high pressure fluids) due to the increased use of lower-grade feedstocks and more contaminated process residue.

To improve their profitability, refiners are expected to increasingly seek out low-cost crudes while at the same time trying to produce more high-value end products. This means refiners will handle and produce increasing amounts of sulfur, as many low-cost crudes have high sulfur content and many high-value end products have very low sulfur content.

Tighter environmental regulations will drive capital and operating decisions.
It is commonly accepted that ever-tighter environmental regulations have become a permanent feature in all sectors of the petroleum industry. Regulations are expected to drive the industry efforts to minimize the footprint of both upstream and downstream

U.S. average active drilling rigs, by type of wellbore



Sources: Baker Hughes International; Spears.

activities—in terms of emissions, water/land use, waste disposal, etc. We expect that going forward the impact of stricter environmental regulations will be especially acute on capital expenditure decisions in the refining/processing sector.

From the industry's perspective, the most important regulations are those having an impact on oil and gas demand and supply. For example, some regulations, such as those inhibiting the use of coal in power plant applications, will tend to lift demand for natural gas, while other regulations, such as those mandating ethanol production, will tend to suppress oil demand. Another proposal is to score transportation fuels on the greenhouse gas (GHG) emissions that take place from the point of origin of the feedstock through the transportation and refining operations and including the emissions that occur when the product is used.

This "well-to-wheel" approach is designed to encourage refiners/processors to: (1) seek out low GHG supply sources (heavy oil/oil sands tend to produce high amounts of GHGs compared to other types of crude oil); (2) lower the GHG emissions in their operations (for example through improved energy efficiency and leak detection); and (3) produce end products with lower GHG emissions.

Terminals are becoming a strategic asset to refiners.

Long considered only a "wide spot on the road" to most refiners, terminals are emerging as an important strategic asset in an industry dealing with an ever-more-complex array of refined products. Importantly, refiners are expected to shift more of their blending operations to terminals, driving demand for controls, meters, manifolds, and related equipment.

Low-cost U.S. gas supplies are redirecting HPI spending.

In the U.S. market, crude oil and natural gas prices are decoupled; the prices of these commodities move independently of each other in response to separate demand/supply conditions. In contrast, in overseas markets the price of gas in long-term supply contracts is typically linked to oil prices, which have roughly doubled since mid-2009. Due to the rapid growth in U.S. shale gas production, the U.S. natural gas market has been in an oversupply situation for the past three years, and the wellhead price of gas is little changed from what it was in 2009. As a result, the U.S. has become the world's low-cost gas supplier with prices about half the level of those paid by consumers in Europe and the Far East. With further increases expected in U.S. shale gas production, the U.S. is forecast to maintain its status as a low-cost gas supplier for the foreseeable future.

In addition, U.S. output of natural gas liquids (NGLs, such as ethane, butane, propane, and natural gasoline) is expected to grow substantially over the next decade as E&P companies develop more "wet gas" reservoirs and the increased use of advanced gas processing technology allows midstream companies to extract more liquids from the gas stream.

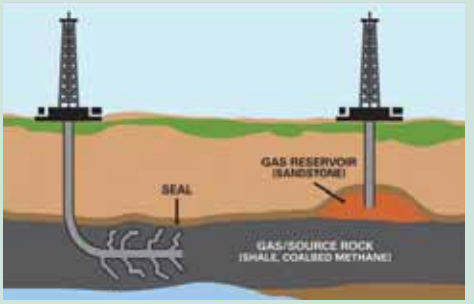
In response, the hydrocarbon processing industry (HPI) has begun to shift production back to the U.S. and Canada, reversing a trend away from North America that started about 10 years ago (prior to the discovery of shale gas reserves) when foreign markets emerged as the source of low-cost gas. With North American petchem output on the upswing, capital spending in the North American hydrocarbon processing sector has begun to grow and is expected to continue to increase.

A continued recovery in economic activity is expected to drive steady oil and gas demand growth and increased expenditure for drilling, transportation, refining, and processing over the foreseeable future. **|VV|**

About the author

Spears and Associates, Inc., has been serving the oilfield since 1965. Its president, John Spears, can be reached at www.spearsresearch.com.

The battle over fracking



Along with the growth in hydraulic fracturing ("fracking") of horizontal shale wells has come increased controversy over the potential danger of this procedure to health, safety, and the environment. However, at this time a ban on fracking, or a harsher regulatory framework as some have proposed that would inhibit the use of fracking, does not appear to be on the horizon.

The only pending bill in the U.S. Congress that specifically addresses fracking would require oil service firms to disclose the ingredients in their frac fluid, and even this bill has gone nowhere. In fact, some operators and oil service firms have already begun to voluntarily disclose the frac chemicals they use. There is currently no serious discussion at the federal level to impose meaningful restrictions on fracking, and that will almost certainly remain the case until the EPA study on fracking safety is completed in 2012.

The EPA is conducting case studies into drilling sites that have been blamed for drinking water contamination in recent years. The probe will encompass three case studies in the Marcellus Shale in Pennsylvania, along with one each in the Barnett Shale in Texas, the Haynesville Shale in Louisiana, the Raton tight gas basin in Colorado, and the Bakken Shale in North Dakota. The last such EPA study, in 2004, concluded—consistent with long-standing industry views—that properly performed frac jobs pose no environmental risks to water supplies or otherwise.

At the state level, the only states where fracking has caused serious controversy are New York and Pennsylvania, which have put some legislative restrictions in place, although other states are reviewing their policies regarding fracking. However, even New York is now moving away from its shale drilling moratorium and has proposed rules that will allow fracking, albeit within limits.

The use of fracking makes shale drilling economically attractive, and growth in drilling creates jobs while increasing shale oil and gas production generates tax revenue. Thus, even legislators who might be concerned about fracking safety have to consider that within the economic context.

Velan is shaking it up

Seismic testing at Wyle Laboratories.

When you're making a valve as crucial as one that will go into a nuclear power plant, a tremendously important step in the process is ensuring the valve will perform as expected—even under extraordinary circumstances. That reality was brought into clear focus for the world after the recent woes in Japan's nuclear industry caused by the March earthquake and tsunami.

For Velan, which has been involved in the nuclear industry since the 1950s, testing is already a deeply ingrained part of serving the industry. Still, as the challenges in the field get tougher, the tests become more complicated and the planning and preparation for doing that testing becomes more exacting.

Take a recent test done at one of the largest seismic test facilities in the world, Wyle Laboratories' facility in Huntsville, Alabama, for example. A crew of Velan employees were on hand as a 600 class, 18" parallel-slide main steam isolation valve with a gas-hydraulic actuator was put through a series of shaker table tests to prove that it can withstand an earthquake of specified intensity.

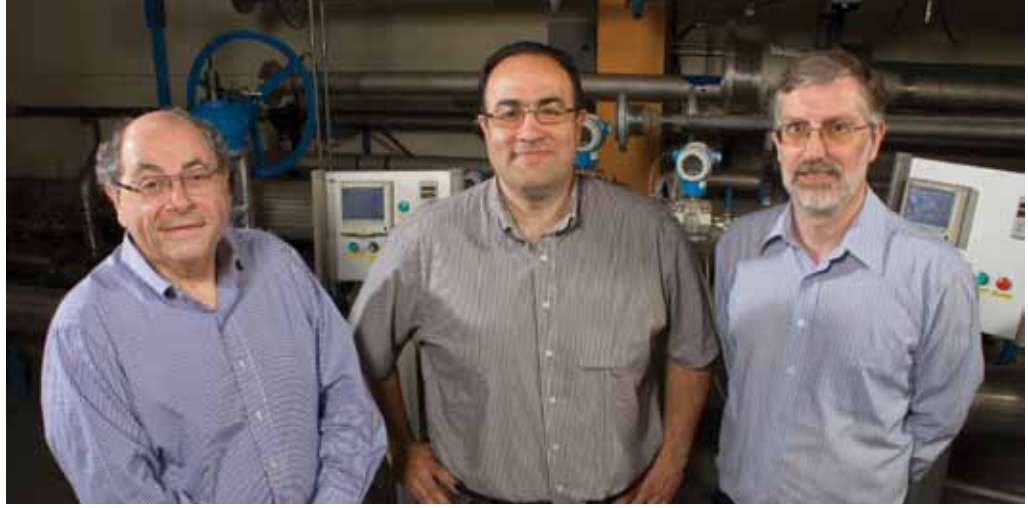
The crew and their staff spent more than three months preparing for the test at their manufacturing facility. It took seven days to set the test up at Wyle Laboratories and another four to run it.

And when it was done, "We were elated. There is no better word to describe how it felt," says Stan Isbitsky, Corporate Manager, Analytical Engineering, one of the Velan engineers involved in the design and testing of the product. Part of that elation was because of the test results.

"The results from the test were remarkably close to our analytical predictions," says Paul Major, Manager of Design, who was on-site to witness the test.

And part of the elation came from how smoothly the whole process went.

"There was just one minor anomaly during testing but that didn't slow down the process. The Wyle Laboratories staff themselves remarked on how quickly everything came together. We had allocated up to four weeks for getting through the long test procedure but we were in and out in just two," adds Vahe Najarian, Corporate Manager of Research and Development, who managed the testing for Velan.



Left to right: Velan's Stan Isbitsky, Vahe Najarian, and Paul Major.

Test 1: Resonance search

In the first part of the test, the valve is subjected to low-level sinusoidal vibration, one direction at a time, to detect its resonant frequencies. The input vibration is gradually increased from 1 hertz to 50 hertz and the valve response is measured. "We were looking for the natural frequencies of vibration of the valve-actuator assembly. The objective is to obtain high natural frequencies far removed from the frequencies of earthquake vibration so the equipment will not resonate during an earthquake," Vahe explains.

"Imagine if you will a truck passing by and a bookcase rattling as a result," Stan explains. "The truck would be the earthquake or the driving frequency, and the bookcase would have a natural frequency that is being measured. The idea behind this type of testing is that you want the piece of equipment—the bookcase—at a potentially higher frequency than the driving frequency of the earthquake. You want that bookcase to be able to vibrate without falling apart," he says. "The further the natural frequency is from the driving frequency, the less damage will be done."

Test 2: Earthquake simulation

The second part of the test is earthquake simulation, seismic testing, which is more vigorous because it's testing what would happen during an actual earthquake. Seismic testing itself also has two levels—Operating Basis Earthquake (OBE) and Safe Shutdown Earthquake (SSE).

The difference between the two is intensity. An OBE test is less severe "with about half the acceleration of an SSE test," Stan explains. It simulates what would happen in a "standard" earthquake. The SSE simulates what would happen in a "catastrophic" event. For the series of tests at Wyle Laboratories, the Velan valve assembly went through 10 OBEs and two SSEs.

"What we're checking in these tests is that no physical damage has occurred to the valve or actuator and that the valve operates as it was intended before, during, and after either of these seismic tests," Vahe explains. "During each simulated seismic event, we have to shut the valve and it must close in between three and five seconds," he says.

Working with the best team

Velan went to Wyle Laboratories to do this testing because of the lab's reputation and their specialized equipment. Founded in 1949, Wyle offers engineering, scientific, and technical services to the Department of Defense, NASA, and a variety of commercial customers primarily in the aerospace industry.

"Wyle Laboratories used their high-force biaxial shaker table to meet our requirements, as well as the client's general requirements," Stan says. "This table measures roughly 20' by 18', has a maximum payload of 60,000 pounds, and can shake a massive test specimen both vertically and horizontally simultaneously."

This is one of the few shaker tables in the world that could accommodate Velan's valve assembly. The valve and its actuator, when assembled, stood over 12' high and weighed more than 22,000 pounds. Simply put: This is not your average testing machine.

The right equipment was critical to this particular test not only because the testers needed to simulate an earthquake at various intensities: they also had to ensure the safety of all those in attendance. Representatives from Velan and team members from the client company, the actuator maker, and Wyle's own staff were directly overlooking the table as they conducted the tests and monitored the devices. What's more, although the valve itself was pressurized with water, the actuator was charged with nitrogen to 3,000 psi. All necessary precautions were considered and addressed in preparation for the test.

Results meet expectations

Those present from Velan's team already had a pretty good idea of what the results would be since each part of the assembly had been analyzed or tested before the whole thing was put together. The valve, for example, had been through an extensive series of computer simulations at Velan during the design process, and physical tests were performed in Velan's manufacturing facility during and after construction. The actuator had already gone through rigorous tests from its own manufacturer. Nonetheless, the fact that the test results aligned so well with predictions pleased everyone involved.

"The most rewarding part of all we went through to get this test up and running is that, in the end, we are doing this to ensure that the equipment that goes into a nuclear plant will be safe. This testing confirmed that we are right on target," Vahe says. **|VV|**

Velan makes a strong statement at a recent nuclear event in China.

Looking to the future of power generation:

Taishan 1 and 2 in China

Velan France continues its strong growth in the highly demanding and competitive Chinese nuclear market. *Velan View* interviewed Michel Monier, Velan's Corporate Director, Nuclear-China, about the direction Velan France is taking and the significance of one particular project—Taishan.

VV: Michel, before we focus on the Taishan project, how did Velan first get involved in providing nuclear valves for GEN3 pressurized water reactors (PWRs)?

Velan has a long and proven track record in designing and manufacturing nuclear-classified valves: In fact, we've been doing it for well over 40 years. Having said that, GEN3 reactors are a whole new power source requiring new technologies and features, new valve designs—all built to greatly enhanced safety criteria.

As a leading nuclear valve supplier, Velan management made a conscious decision toward the end of the 1990s to invest significantly in R&D to prepare for the future of nuclear power. This is interesting when you bear in mind that there were almost no new nuclear projects ongoing in the world at the time, so this was somewhat of a leap of faith. In hindsight, this was definitely a smart

move and an investment in the future of the company.

So, Velan France's R&D department first developed the advanced valve design in 1996, and then spent the next five years or so having highly technical collaborations with reactor designers to build prototypes and subject them to rigorous testing to ensure they passed qualification tests.

VV: Are there different requirements for the GEN3 PWRs?
The list is long, but we can focus on a few key points: First off, forged bodies are requested for level 1 and 2 valves and the end result is higher quality valves as compared to cast bodies offered by our competitors. Bellows seal globe valves up to NPS16" (DN 400) are used extensively to completely eliminate any possibility of valve emissions. And of course the cost of maintenance and ease-of-site servicing must be taken into account during the design stage since accessibility to nuclear island valves in a nuclear power plant is often limited.

Also, cobalt-free hardfacing is mandatory for all valves that must deal with radioactive fluids. What's more, there is no use of pneumatic actuators, only electric actuators, so the valves must be built to withstand the stall torque of actuators in case of "torque switch failure." You also have to take into account the reality that fluids often have particles in them; in addition, some of the valves have to perform more than one function and must be able to function properly during severe accident situations where there may be high levels of radiation and environmental temperatures. Nuclear-classified valves must be qualified to standard and specific accidental conditions before commissioning of the nuclear power plant (NPP).

VV: What type of valves did you develop to meet these new requirements?
We not only developed new valves, we also created new processes and new conceptual designs resulting in a highly advanced line. For example, we now have qualified new hardfacing materials such as NOREM 02A—a solid-solution strengthened austenitic hardfacing material that deals with safety issues associated with the use of cobalt alloys in nuclear power station coolant. This new material was developed through a collaboration between Velan, CEA (France's Commissariat à l'énergie atomique), EPRI (Electric Power Research Institute), and AREVA (the French public multinational industrial conglomerate). It is now a standard for nuclear valves.

Regarding maintenance, we have a full line of low-maintenance globe valves that we call RAMA™. With this design, you can quickly replace the seat of globe valves without any grinding or welding, which of course drastically reduces maintenance costs.

We have also implemented a new torque-absorbing device to avoid overstressing the valve components in the event that the torque switches on the electric actuators malfunction.

In addition, angle-type bellows valves, three-way bellows valves, and stop check valves have been developed from NPS or nominal pipe size ¼" (DN 8) to NPS 16" (DN 400).

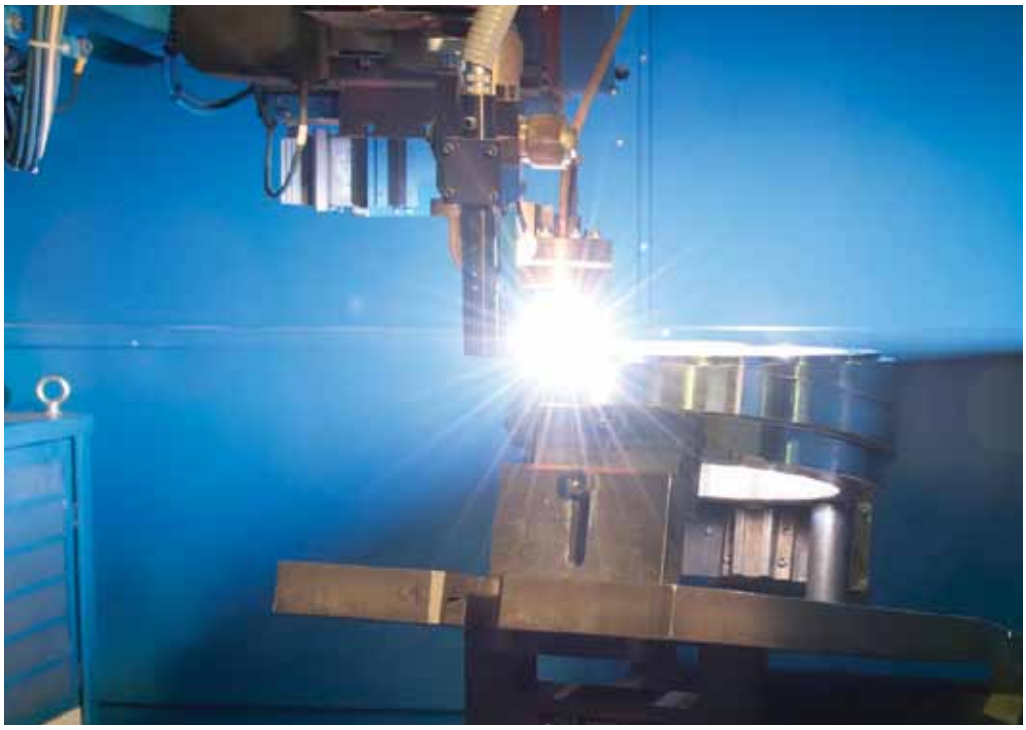
Most of these new products feature forged design without any welding, which is Velan's specialty. To sum up, our priority in designing these valves is to offer the lowest cost of ownership during the 60-year lifetime of these advanced reactors.

VV: This sounds like a demanding and time-consuming process. Is it?
Valve qualification always takes a long time, especially when you raise the bar on the criteria being demanded. Luckily, we anticipated the nuclear renaissance so we were very well positioned to meet the new industry demands. Our first qualification tests on loops were launched in 2003–2004, and we were therefore ready for the bids on the very first GEN3 EPR™ (Evolutionary Power Reactor) project in Finland in 2005 and French EPR™ in 2007. Having a jump start on getting our valves qualified is definitely one of our key success factors.

VV: Ok, now on to the Chinese Taishan EPR™ project. How did this come about?
Well, as mentioned, first Velan won contracts for a Finish EPR™ (Olkiluoto 3) and a French FA3 EPR™ (Flamanville 3), so we had proven experience in this area. However, our approach to the Chinese Taishan EPR™ project has been completely different and it's been more difficult for a lot of reasons, mainly due to the complexity of the project management, the usual cultural differences and different ways of doing business, and the sheer distance between Europe and Asia.

VV: What is different or challenging about working with Chinese engineering firms?
I personally made my very first trip to China in 1996 for the Qinshan nuclear power plant. Since then, Chinese nuclear engineering companies have grown dramatically and there are now numerous young teams of

Michel Monier, Velan's Corporate Director, Nuclear-China.



Cobalt-free hardfacing being fused onto a Velan valve.

engineers, and it is important to share your personal experience and knowledge with them. And they are learning the ropes very, very fast.

Another good rule of business is to be proactive: It is not uncommon to receive emails late in the evening and be asked to reply in the middle of the night. Furthermore, I find that regular face-to-face meetings with engineering teams are always more efficient than exchanging endless emails, so I am sharing my time these days between France and China. China is a country that never stops, and it is very challenging!

VV: What is Velan's scope of supply for Taishan?

It has taken about two years of intensive work to get us from the pre-qualification stage to the final contracts. Velan France has been selected to supply most of the safety classified valves inside the containment—such things as safety injection valves, motor-operated wedge gate and globe valves from NPS ¼" (DN 8) to NPS 20" (DN 500), bellows globe valves, swing check valves, lift check valves with modular maintenance, severe accident valves, classified instrumentation valves, and electric-operated control valves. In total, Velan will be supplying more than 4,000 valves for Taishan units 1 and 2. And all of these have been certified by the Chinese National Nuclear Safety Authority (NNSA) that awarded Velan the HAF604 Chinese Nuclear Certificate in 2008, making Velan one of the first foreign companies to win this approval.

VV: How does Velan manage such a big nuclear project?

This is not the first large nuclear project we've handled at Velan, but it is definitely one of the biggest at €50 million ($82 million). Velan globally has 350 nuclear projects under its belt—140 of which we've handled directly here in Velan France. We have never stopped working on nuclear. We also have a dedicated team focused on this project, managed by Christophe Larger, who has considerable experience working on projects in Europe.

In addition, Velan France will be working closely with Segault, another company within the Velan group that manufactures some of the valves we're supplying Taishan, so we have a single communication channel with the customer. This is especially important given the size and complexity of the project.

VV: Do you also have a local Chinese team?

Velan founder and former CEO A.K. Velan started direct relationships with China way

Part of the Velan Nuclear China office team. Left to right: Chen Dong, Nuclear Service Engineer; Michel Monier; and Shen Qing, Nuclear Valves Senior Engineer.

back in 1972. Since this time, our development in China has been continuously growing. In addition to an existing plant in Suzhou, China, that focuses on other industries, Velan now has a Nuclear China Office located in Beijing, where we're happy to have Sheng Qing, a recognized nuclear valve expert, as a key member of the team. In 2010 we also created a Chinese nuclear service team so we can offer quick and efficient nuclear on-site services. Our Chinese customers do obviously appreciate being able to get technical support from Velan in their own language. And finally, for any valve repairs, we also benefit from the support of our Velan China plant located in Suzhou. So we're increasingly strongly based in China when it comes to valves in general and to nuclear valves in particular.

VV: How would you describe the relationship between the China Nuclear Power Engineering Company (CNPEC) and Velan?
Over the past six years, Velan has been working with CNPEC and the China Guangdong Nuclear Power Group (CGNPC) for all CPR1000 projects (18 units) and now for the Taishan C-EPR™ (2 units). CNPEC is our first customer and we are a strategic supplier for CGNPC group: We have learned a great deal from one another and have developed a very good working relationship. In addition, the fit is good since the size and capacity of Velan matches very well with the size of the nuclear projects handled by CGNPC.

VV: Could the recent accident in Japan could jeopardize the Taishan project?
As mentioned, the Taishan project is based on the latest technology developed for GEN3 EPRs™. Safety levels have been significantly increased and are the highest in the world. For example, each EPR™ is equipped to mitigate the consequences of a severe accident similar to Fukushima. To help ensure this, Velan supplied special severe accident and safety injection valves, key components used to manage any post-accident situation.

Large-size bellows seal valves ready to be shipped to the Taishan EPR™ site.

VV: What are Velan's goals in the Chinese nuclear market?
Having supplied valves to 32 nuclear plants in China over the past five years, Velan is a key partner in the Chinese nuclear engineering community—and vice versa. We intend to continue to participate in the successful development of nuclear power in China and we are proud of the fact that our reliable and innovative valve technology represents a long-term investment with proven value for our customers.

With the support of the Velan Nuclear China Office, we are committed to providing technical support for the development of the Chinese advanced reactors that are either being built or are on the drawing board. We also intend to continue to develop our local

nuclear site services by creating a Chinese maintenance service center in the near future.

VV: In addition to providing valves to the Taishan nuclear island, is Velan also serving the balance of plant needs?
Yes. Velan North America has also been successful is securing large orders for the turbine island and balance of plant portion of the project and is supplying over 350 valves in sizes ranging from 1" to 36", including the largest pressure seal valves ever built by Velan, 36" class 900 motorized parallel slide valves. In the next issue of the *Velan View,* my colleague Joe Calabrese, Director, Marketing, will tell you more about that side of the project. **|VV|**

Large forged gate valves lined up for Taishan.

About the author

Having graduated as a mechanical engineer from the National Institute of Applied Sciences INSA Lyon-France, **Michel Monier** first joined Velan in 1980. He has focused on the nuclear industry his entire career, and currently also holds the position of Vice President of PFCE, an association for the promotion of Sino-French nuclear exchanges.

Taishan: Did you know?

Night time at the Taishan EPR site, currently under construction.

- The Taishan nuclear power plant is located in Chixi town, Taishan, Guangdong province. Taishan Nuclear Power Joint Venture Company Ltd. was established by China Guangdong Nuclear Power Holding Corporation (CGNPC) and the Electricité de France. CGNPC holds a 70% stake and Électricité de France holds 30%.
- It has the largest single-unit installed capacity in the world.
- The electricity generated from the two units of the first phase project to the power grid is capable of meeting the demand of a medium-sized city.
- The total investment in the first-phase project stood at 50.2 billion yuan ($7.84 billion), and the registered capital reached 16.74 billion yuan ($2.61 billion). The joint venture is the largest Sino-French clean energy enterprise and is also the Chinese-foreign joint venture with the highest amount of investment in the current Chinese electricity field.
- The project involves 11.85 million cubic meters of earth and stone. If trucks loaded with earth and stone for the project were lined up from Taishan, they would extend all the way to Beijing, a distance of over 560 km (approximately 350 miles).
- Four pressurized water reactor nuclear power units are scheduled to be built for the project, and a total of six electricity-generating units are planned for the future.
- Currently, the government has approved building two units in the first phase project. The two power-generating units have the world's largest single-unit installed capacity of 1.75 million kW.
- The project adopts the advanced third-generation EPR™ technology, which was jointly designed and developed by France's AREVA Group and Germany's Siemens company.
- Double-layer safety shells and four security design programs are adopted to ensure a higher security level after taking severe accident prevention and mitigation measures into full consideration.
- According to the project plans, the first unit will be put into operation and generate electricity to the power grid in December 2013, and the second unit is scheduled to be put into operation in October 2014. After the two units are built, they will generate about 26 billion kW/h of electricity to the power grid annually, and will yield an output of more than 12 billion yuan ($1.86 billion).

Note: EPR™ is registered brand of the AREVA Group.

Safety instrumented valves ready to be shipped.

Building quality company-wide

Clément Lévesque, Total Process Improvement Coordinator, Granby plant, Velan.

When Clément Lévesque was first asked to head up the Total Process Improvement (TPI) program in the company's Granby, Quebec, plant six years ago, he must have had a sense of déjà vu.

Originally hired by Velan 20 years ago to run a Total Quality Management (TQM) program, Clément is once again focusing his time and talents on making processes run as smoothly and safely as possible. Though TPI is a much more evolved concept than TQM was, both programs are company efforts at creating a culture of best practices in the company.

Clément explains the differences between the programs he was tasked with putting into place.

"TQM focused on the quality of our product within the shop environment," Clément says. "TPI is a Lean initiative that focuses on every aspect of the company. It takes quality many steps further, using a new way of thinking to find ways to increase our output and reduce the lead times on production," he explains. The initiative is also two-way: It asks that certain practices be changed to better the product and improve customer service, and it also finds ways to make the working conditions better for staff.

Implementing such sweeping programs as TPI requires someone at the helm who is detail oriented, has great training skills, and knows how to get the word out to employees.

That's because putting TPI in place requires the buy-in of every employee involved in the project it's being implemented in.

"All I'm really doing is coaching these employees: The good ideas come from them, not from me. Together, we define, we measure, we analyze, and then we implement new practices and new controls."

—Clément Lévesque

How it's done

The TPI program works because, once it's up and running, it's really a bottom-up process. But first, it's kicked off by a steering committee that pinpoints a particular area of study. "That committee and our TPI people look at where we are and what we'd like to achieve. Next we put together a team from within that area of the company to help us put together a plan for achieving our goals," Clément explains.

"I then go in and teach the team members the various tools available in Lean manufacturing practices and together we refine our goals, then go into a brainstorming session," he explains.

This is where the real work gets done, Clément says—putting creative heads together to come up with solutions. "All I'm really doing is coaching these employees: The good ideas come from them, not from me. Together, we define, we measure, we analyze, and then we implement new practices and new controls."

"Teamwork is crucial to this process," agrees Yvan Desautels, who as Coordinator of Production Technology at the Granby plant has worked with Clément on many TPI projects.

"For example, Clément, with his training, thinks in terms of implementing lean principles on production lines and placements within those lines or the plant. I think in terms of technical solutions to problems. As with all aspects of Lean, we come to a solution by consensus," Yvan adds.

Clément's training and background

When first asked to head up the TPI effort within the company, Clément took on additional training to earn his black belt certification in 2005 under the Six Sigma program at Quebec's Toptech Institute. However, his training goes much deeper than that specific certification.

It reaches as far back as his career does.

He joined Velan right out of college, after answering an ad in the newspaper and being hired by Rana Bose, who was then Vice President of Quality and Engineering and went on to have his own highly regarded career with the company.

"Rana, who retired about the same time as I was getting my black belt, was my guru throughout my time with this company," Clément says. At the time he hired Clément, Rana was looking to start the TQM program at the company's plant in Granby, so Clément's Francophone background definitely helped. "Rana taught me a lot about how to make these cultural changes within this outstanding company that I was lucky enough to be hired into," he says. "We are really a family at the Granby plant as we are within the larger company as well."

After Granby, Clément went on to implement TQM in other areas of the company, and after about four years, upper management saw that the program had been implemented successfully, and it was time for people to stand on their own with the principles that "coach" Clément had espoused.

But the company wasn't about to let him go. They kept Clément on as a special project planner for the next 10 years, and he worked in a variety of areas in the company where there was a need for his proven ability to get an important new process or project up and running. For example, Clément managed the project to achieve an important certification for HF (hydrogen fluoride) acid service valves.

"Nothing had been done at the time so we had to put it all together from scratch. We built the methods from the ground up under the pressure of knowing we had to go through an audit that many companies had to do two or three times before they successfully passed. Velan did it the first time," he says.

About two years ago, Velan once again put Clément's training ability to good use by giving him the opportunity to become an official representative of ASPME (Association for Health and Job Safety—Manufacturing of Metal and Electrical Products). He then was tasked with training people at all levels of the company on safety procedures such as handling of hazardous materials, rigging and lifting devices, and also fork lift operations.

"Obviously, I like to teach," he says. "And teaching my co-workers how to be safe is certainly a rewarding task."

It also helps to reinforce an ingredient that Clément says is vital to anyone trying to put together a company-wide program: Trust.

With Lean, for example, "You might think that with the broad reworking of processes that need to occur, people might get a bit nervous seeing Clément walk through a plant," says Yvan. "But that isn't the case at all. People have come to understand why he is here and what it means to the company."

Clément says that building that trust requires being straight with people about what's going on. "You have to be very honest with the people you're working with on these projects. You have to show them that the competition in any industrial field in the world today is very tough," Clément says. "The changes our own employees are making have to be made because the world itself is changing. And everybody has to commit to

these changes to make them work," Clément explains.

At the same time, "Employees recognize that I am looking into their own health and safety as well. They see that together, we can find ways to make the processes easier as well as more productive," he says.

One example of how that works is a kaizen Clément implemented. Kaizen is the Japanese word for improvement or change for the better and refers to philosophies or practices that focus upon continuous improvement of processes in manufacturing, engineering, and business management. Clément implemented a kaizen within Velan's sandblasting area, which was a bit of a bottleneck at times. He and his team solved this by implementing a combination of a "5S" to create a work environment that is clean, well organized, and efficient, as well as a KanBan or color-coded flooring system that provides self-evident signals to indicate what work is to be done and when.

As he explains, "Within the green areas of the floor, the implication is that the employee is able to cope with the workload alone. However, when they get to the orange areas, the workload level and specific tasks required mean the foreman must call another foreman to see whether the workload will keep going up—in which case he'd have to bring in an additional worker or two to help. And then, when it gets into the red area, there's no discussion: the worker must automatically be helped out. Finally, back in the green area, it's understood that he no longer needs a helper and can complete his work alone.

"This is one simple yet very effective way of getting the sandblasting done without overwhelming anyone or creating unsafe working conditions. When people see it works, and that it works to their advantage, they understand it's for the common good. That's when you've really got whole-hearted support from them," Clément concludes. **|VV|**

Who knew? Clément Lévesque, rock star!

As a specialist in production management, Lean principles and health and safety have become passions for Clément Lévesque. But when he was younger, he had a different passion and, unlike most of us, he pursued that passion for more than a decade before he switched to a more traditional career path.

"When I was just about 10 years old, I learned to play a guitar and I was very much into music. By the age of 14 or so, I already knew what I wanted to do: I wanted to be a guitar player."

—Clément Lévesque

Clément took private lessons from well-known jazz musician Sam Balderman, who taught at nearby St. Laurent College. Clément's original plan was to go to that college but instead he had the chance to form the rock band Lightning with friends, and the band hit the road—playing in clubs and events across Quebec and Ontario and finding a satisfying level of success.

However, "For nine years, that was my only way to make a living. If you got a contract, you got paid. If not. . . ."

He might have continued to perform and tour even longer if the economy hadn't suddenly crashed and with it, the entertainment business. Interest rates soared and clubs could no longer afford to pay much for a band the size of Lightning. Eventually the band split up.

At the time, "I already knew I wanted to get into something else as a career," Clément says.

He just didn't know exactly what, so he took a five-day job assessment test, which found that the "perfect" job for him was as a French teacher at a university. "Oh great, I thought. That means I might have the degrees I need by the time I'm 40," he jokes.

The second pick was production management and since he already had a brother in that field who was very happy with his job, he went back to school and got his degree, "and found out that making things run as smoothly and orderly as you can is a great job to have. And one I'm still passionate about every day."

Clément (left) relaxing with his Lightning band mates between gigs, circa 1985.

Mining

High solids require replaceable or high-performance valves

By Craig Bekins

Ore from the Goro Nickel Project in the South Pacific island of New Caledonia is processed at this remote plant using Velan valves.

Today, when we discuss the mining industry, it's hard not to picture a massive explosion ripping apart the side of a mountain, the remnants of which are then removed using the largest loaders and trucks imaginable. For the valve industry, however, the interesting processes happen after the ore has been separated.

To gain a "valve" perspective, we must first focus on the differences between mining materials for construction and mining for industrial uses. The majority of mines produce aggregates for the construction industry. As such, most of them have little or no application for industrial valves. A smaller number of mines are used to get materials for facilities that produce industrial products, so they seek coal, iron ore, copper, nickel, gold, and other resources.

There are many ways to process industrial minerals; regardless of which process is used, chances are you'll have to deal with a moderate-to-high level of solids. This requires either a low-cost design that can be replaced regularly or a very robust design that can withstand the rigors of solids-laden applications for an extended period of time.

Valve types used in mining

Valves with replaceable liners are relatively inexpensive to produce and repair and are commonly used in processes where the operating temperature is less than 190°C (375°F) and where the pressure is relatively low (class 300 maximum). Examples used in mineral processing are rubber-lined knife gate valves and butterfly valves, as well as sleeved plug valves. In these designs, a soft sacrificial material provides tight shutoff, but the resilient material is quickly worn by the erosive slurry passing through the valve, and it is not uncommon for valves of this type to be repaired or replaced on a weekly basis.

These valve types are also limited in that they cannot be used at high temperatures or at high pressure. Therefore, the use of severe service ball valves has increased significantly over the past 15 to 20 years.

Severe service ball valves, as the name implies, are used when increased temperature and/or pressure combine with erosive and possibly corrosive media to exceed the capabilities of other valve types. It is in these situations where we find some of the most interesting and challenging valve applications.

The first such application is transport of ore from the extraction site, which can be located high in the mountains, to either a shipping port or to a processing plant. The application involves mixing the ore with water to create a slurry that is carried through a high-pressure pipeline to its destination. These slurry pipelines can range in size from 6" to 24" in diameter and in some cases can be over 100 km (62 miles) long. In this application, valves are most commonly used to isolate the pumps that are tasked with keeping the slurry moving. In doing so, the valves are exposed to high pressure and a significant amount of solids. This requires specific features such as super-hard coatings on the interior surfaces of the valve to resist the erosive forces of the high flow or high differential pressure slurry and heavy-duty drive trains to ensure that the valve does not seize despite the high level of solids inherent in this application.

Slurry pipelines operate at ambient temperatures and have little to no corrosive media. Therefore, valves for this application can be made from carbon steel and other relatively standard materials. Valves in the slurry pipeline segment are typically automated with self-contained electrohydraulic actuators, which are ideal for this application's large output torque and likely installation in remote locations.

What's being mined

Once the ore is separated from the earth's crust and transported from the extraction pit, what happens next depends on what mineral is being processed. In the case of precious and semi-precious metals (gold, nickel, etc.), the desired mineral must be separated from other elements and impurities that make up the rock. In many cases, this can be accomplished by traditional methods such as smelting (pyrometallurgy); however, older smelting processes are expensive (energy intensive) and harmful to the environment.

This is what the inside of a valve in an HPAL application (the type of process used on laterite ore) can look like after 24 months in service.

This is what the inside of a valve can look like after it has been cleaned with high-pressure water before re-installation in an HPAL application.

These realities—and in the case of nickel, a shortage of suitable ore beds—have given rise to the use of hydrometallurgy and, more specifically, pressure leaching to extract and refine these minerals. Although the process was developed in the mid-20th century, it was not used on a large scale until the late 1980s. Since then, several multi-billion-dollar facilities have been built to use this efficient and environmentally responsible process, which is more akin to a chemical plant than a mine.

It is in the pressure-leaching circuit that we find one of the most demanding valve applications in mining. Here, severe service valves isolate not only pumps but also, more importantly, the autoclaves where the prepared and heated slurry begins the pressure-induced chemical reaction that turns rock into gold or nickel.

Pressure leaching is similar to the slurry transport application discussed earlier, but because of the high temperature and presence of corrosive elements, standard materials are not appropriate. In fact, at the front end of the autoclave, it is common to find various grades of duplex stainless steel. Once the "clave" itself is reached, we find titanium or Hastelloy® and nothing else. These are far from standard materials and require that valve designers pay close attention to all aspects of the design to ensure that the valve remains operational. It only takes one overlooked bushing in the wrong material to seize the valve and potentially shut down a multi-billion-dollar plant. For this reason, there are only a handful of valve companies entrusted to this duty.

In this article, we have highlighted just a few of the many valve applications that fall under the category of mining—many more exist, including valves used in steel production and coal conversion. In all cases, valves used in mining must be purpose-built and designed with the rigors of the application clearly in mind.

Given that valves are playing an increasing role in both the transport and processing of industrial minerals, the outlook for the valve industry in this area is relatively positive. However, this optimism must be tempered by the inherent volatility of the mining market as a whole, which will continue at a slower pace as the global economic recovery takes hold. Still, mining is poised to take advantage of the next boom cycle…and, of course, valves will be there doing their part. **|VV|**

About the author

Craig Bekins is Director, Autoclave Projects, and a valve specialist in the HPAL process with experience on major projects such as Murrin Murrin, Coral Bay Nickel, Goro, and more for Velan. You can reach Craig at +1 748 7743, ext. 5275, or email him at craig.bekins@velan.com.

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Velan's Ultraflex wedge

Velan has an innovative patented wedge design for large gate valves operating at very high temperatures and pressures. The Ultraflex wedge is used for valves that must perform at temperatures above 480°C (900°F) and pressure classes 2500 and higher.

By Stan Isbitsky

In high-temperature, high-pressure, high-cycling valve applications, there is a risk of thermal binding of conventional flexible wedge gate valves. In such applications, the valve could have a tendency to stick in the closed position due to differential thermal expansion caused by rapid and uneven cooling as well as by the rigidity of the wedge. Pressure-induced binding and the temperature-dependent behavior of valve materials further increase the possibility of a conventional wedge gate valve jamming in very high temperature service.

This article presents the Velan Ultraflex wedge concept, an alternative technology that mitigates the risk of thermal binding. Other alternatives are available, such as parallel slide gate valves, two-piece wedge designs, or conventional flexible wedges with by-pass or warm up lines and associated controls. However, the Ultraflex wedge concept offers a robust solution to the thermal binding problem that avoids the complexities of the alternative methods.

A wedge can be made less susceptible to thermal binding by reducing its stiffness. This usually entails decreasing the thickness of the part at the expense of its strength. The challenge is to find the right balance between wedge flexibility and strength.

Conducting a thermal binding test on a 12" class 2500 Ultraflex wedge gate valve.

Tailor-made for high-temperatures and pressures

The Velan Ultraflex wedge is an improved gate valve flexible wedge that is particularly suitable for high-temperature, high-pressure, and severe temperature-pressure cyclic service conditions. It has a novel folded topology that makes it far more flexible than earlier flexible wedge designs of similar proportions, without weakening the wedge blades and detracting from its pressure-retaining function.

Greater flexibility

One of its principal advantages is increased flexibility, which provides greater resistance to thermal- and pressure-induced binding. Velan R&D testing confirmed that a Velan 12" 2500 class valve equipped with an Ultraflex wedge took far less effort to open at approximately 538°C (1000°F) than the same valve with a standard wedge under identical test conditions. In fact, the Ultraflex wedge did not stick closed in any of our R&D tests.

In brief, the Ultraflex wedge:

- Retains adequate rigidity for positive shutoff at low differential pressure.
- Permits repeatable seating force when the valve is configured for position seating.
- Is a less complex construction than either a parallel slide gate or two-piece wedge.

Ultra versus conventional

The conventional flexible wedge may be envisaged as a pair of circular blades joined to a rigid circular hub.

During hard seating, the blades of a conventional wedge curve inward. The flexibility of the wedge can be increased by reducing the blade thickness or hub diameter, or by taking material away in other areas. This reduces the differential pressure that the wedge can support.

The Ultraflex wedge is different. It has two planar slots that define a central web, which bends like a wide beam. Most of the flexing action takes place in this web, away from the seating surfaces. The desired stiffness is obtained by optimizing the spacing and overlap of the two slots.

The Ultraflex wedge blades deflect inward during hard seating but remain nearly flat. They can be made as thick as necessary to withstand extreme differential pressure without making the wedge stiffer.

Development of the Ultraflex wedge

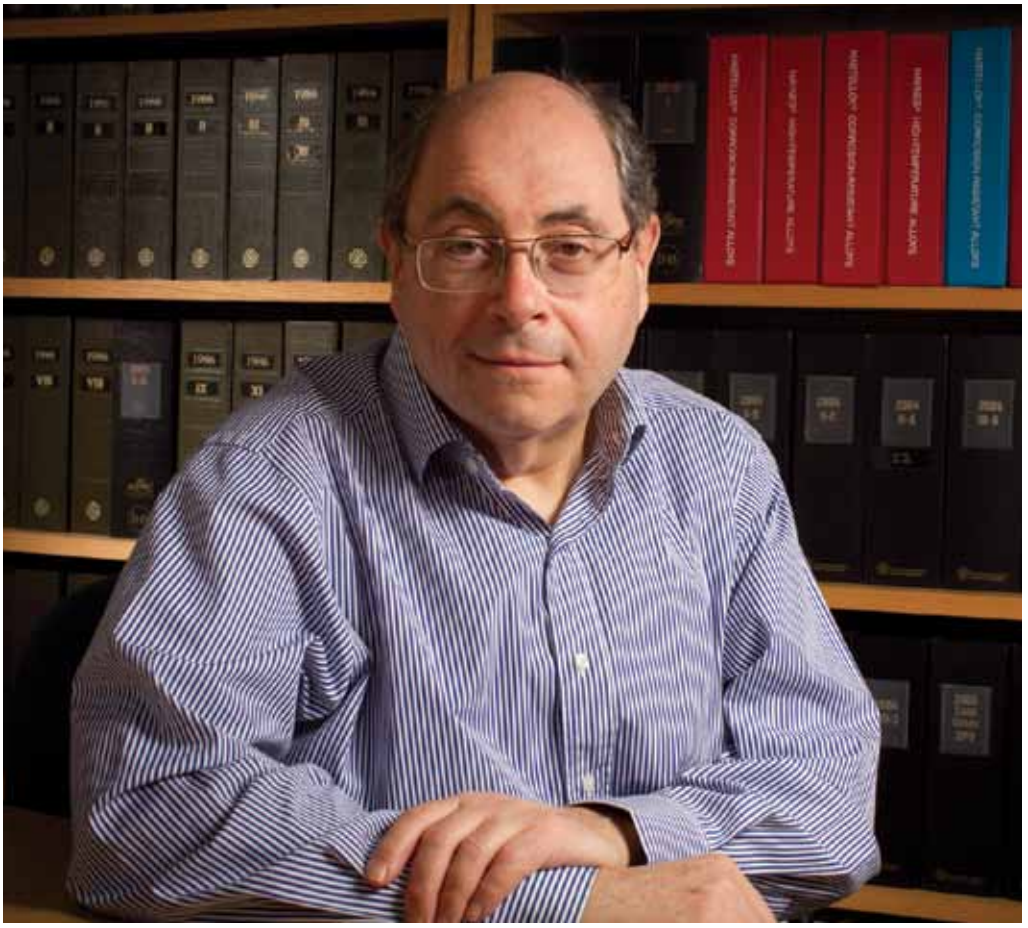
An application for a U.S. Patent was filed in 2003. The patent was granted in 2005, and we have been busy booking orders and manufacturing valves with Ultraflex wedges since then. Velan continues to make significant inroads into elevated temperature applications in fossil power plants, thanks to the outstanding design of the Ultraflex wedge. **|V V|**

"During hard seating, the blades of a conventional wedge curve inward. The flexibility of the wedge can be increased by reducing the blade thickness or hub diameter, or by taking material away in other areas. This reduces the differential pressure that the wedge can support."

—Stan Isbitsky

About the author

Stan Isbitsky is currently Corporate Manager, Analytical Engineering, for Velan. He was previously Manager, Stress Department. He holds a Bachelor of Engineering Degree, Mechanical, from McGill University. He is a valve specialist with four decades of experience in the design, seismic analysis, and qualification of valves for nuclear and conventional power, cryogenics, and other valve market segments and is a contributor to the Motor-operated Valve Users Group.



Stan Isbitsky, Corporate Manager, Analytical Engineering for Velan.