



Pigging Industry News

the newsletter of the Pigging Products & Services Association

THE PRESIDENT'S LETTER

By Terry Delasalle, Greene's Energy Group, LLC

Greetings everyone. My name is Terry Delasalle of Greene's Energy Group, LLC, and I am the new PPSA President for the coming year and here is my first newsletter. As I sit on a plane it is amazing how small our business world has become. We can be in Houston one day, Aberdeen the next then on to South East Asia. It seems like you run into people you know in this industry at every airport.

First I want to thank our past President, Basil Hostage for the time and service he put into our organization. Basil led us in some huge steps to expand PPSA and we'll continue those initiatives as we put them in place. Basil will continue as Past President for another year. We also welcome Mark Slaughter of Weatherford to the Board and must thank Alan Sweeney for his 4 years service, who Mark has replaced. I have learned a lot from Alan and Basil over the past two years. I'd like to add a thank you to Diane Cordell, our Secretary for all of her work and travels representing our organization.

We held our Annual General Meeting (AGM) on February 12th in Houston and we thank everyone who attended. Our 8th annual golf tournament was held at the Black Horse Golf Club on February 11th this year. Since then we have welcomed three new members to PPSA, Drinkwater Products, Exium

Technologies, Inc and S.I.G. Services LLC.

Mark your calendars for three important dates, November 20 in Aberdeen, UK for our annual PPSA Seminar. The Rio Pipeline 2013 Conference and Exposition on September 24-26 where we will be exhibiting and our Annual General Meeting on February 11, 2014 in Houston. Through these events we support our membership in a number of ways, providing greater visibility for our association and attracting new members. The quality of the papers being presented at the PPSA seminar gets better each year and shows we have a bright future.

At the AGM the Board decided to expand PPSA and offer new services to our members. We formed a committee to work on a N2 Safety Awareness Bulletin for the Pigging Industry. This will be downloadable free of charge from our website. We also have plans to add a Student Category and Forum as we hope to attract students to our industry. We are also creating an online training course based on the PPSA book, "An Introduction to Pipeline Pigging".

We continue to welcome technical enquiries and can provide help with sourcing pigs and related products and services. All enquiries are dealt

NEW Members

Full
Drinkwater Products, USA

S.I.G. Services LLC, USA

Associate
Exium Technologies Inc, USA

with as soon as they arrive and are sent to either our technical advisers or to our Full Members who will be happy to help you.

I look forward to the coming year as your President.

PPSA 2013 Golf tournament results

First Place:

Monty McDonough, Larry Legendre, Sean Streckfus, Brian Wagner

Second Place

Kevin Wheeler, Cameron Randall, Ricky Tamez, Ramon Mier

Third Place:

Dave Latto, Randy Nickle, Sharon Cummings, Jon Sadler

Closest to the hole: Mike Taylor
Longest drive: Randy Nickle



Terry Delasalle at the PPSA golf tournament

Pigs in Traditionally Impractical Pigging applications

Subsea chemical specialist **Aubin** is a market leader in novel gel technologies for use in oil and gas pipeline pigging. The Aberdeenshire company's Gel Pig and Pipeline Gel product ranges provide pipeline engineers with innovative ways of commissioning and maintaining pipelines that are not otherwise possible by conventional pigging techniques. Gel products are designed to be both environmentally acceptable and safe to handle.

Aubin Gel Pigs are similar in some ways to conventional pigs, but are made of semi-solid elastic gels that can provide useful properties in applications where conventional pigs are impractical. Examples include short radius bends, absence of conventional pigging facilities, large changes in pipeline diameter and damaged lines. Gel Pigs may be introduced into the line using a conventional launcher but, in lines lacking such facilities, an **Aubin** transport/launch canister may be used. In particularly unusual situations it may be possible to form the Gel Pig in-situ, using the pipeline itself as a mould to produce a cylindrical pig. Gel Pigs may exit the line via a conventional receiver or be extruded from a small opening such as a subsea check valve.

Aubin Gel Pigs have other unique features as they are essentially made of complex interwoven polymers in a bound liquid matrix. They can expand and contract through line restrictions to a far greater degree than traditional pigs but when excessive shear is applied, for example at a subsea check valve, the gel can be broken up and expelled, thus saving on the significant cost of installing a subsea pig receiver. Uniquely, Gel Pigs can be rapidly reduced to a water-like consistency by the application of a specially designed chemical breaker, a valued feature in comparison to a stuck traditional pig. Therefore, a pig may be effectively removed without any mechanical intervention.

Aubin Pipeline Gels are a family of pumpable, viscous gel fluids that can perform a wide range of functions and may be supplied in finished form or as concentrates for blending on site. They may be based on a wide variety of base fluids, including glycols, alcohol, hydrocarbons and water. The gels are normally pumped into the line through hoses and used in combination with **Aubin** Gel Pigs or traditional pigs.

Pipeline Gels have useful properties of debris suspension and removal from the line, along with reduced fluid by-pass and increased pig lubrication, which greatly increase the distance the pigs may

travel. These features are also very useful for ILI pigs. Pipeline Gels can be reduced to low viscosity fluids by the application of specific chemical breakers or dilution, useful when debris has to be removed from the gel for disposal.

Aubin's products have been used in a number of operations, including pipeline dewatering without a pig launcher or receiver present and in a multi-diameter pipeline.

Due to the inherent limitations of conventional pigs, **Aubin** Gel Pigs and Pipeline Gels are frequently used in unusual or very challenging applications. These have included flow assurance applications such as wax and gas hydrate treatment and removal, subsea spool protection against chloride and debris ingress in temporarily open-ended pipe. In addition, Gel Pigs and Pipeline Gels have been employed where the use of pigging was never even considered as a possibility, for example in town water supply applications and in marine tidal renewables when unexpected problems were encountered in turbine inlet piping.

Experience has proven that **Aubin** Gel Pigs and Pipeline Gels offer significant advantages in both traditional and innovative applications. Indeed, like its traditional pigging predecessor, this innovative technology is arguably becoming more conventional. ●

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Integrated Approach to Integrity Management of Stress-Corrosion Cracking in Pipelines

Pipeline failures due to Stress Corrosion Cracking (SCC) have been well documented and the types of SCC and associated risk factors are generally understood. However managing SCC remains one of the major challenges for operators in the pipeline industry. Systems are now available, based on high resolution Electro-Magnetic Acoustic Transducer (EMAT) technology, that deliver accurate information on SCC features as well as complementary information on external coating types and bonding conditions. As EMAT technology emits ultrasound waves without the need for a couplant medium between the sensors and the pipe wall, it constitutes a key part of an integrated integrity approach to SCC management for both liquid and gas pipelines.

A recent case study, which will be published and presented at the Rio Pipeline Conference & Exposition, September 2013, describes an integrated approach and the subsequent corrective steps taken by a North American gas pipeline operator, following an in-service failure of a 36" x 114 mile internally coated gas line (the cause of the failure was suspected to be High pH Stress Corrosion Cracking) and subsequent hydrotest (resulting in further hydrotest failures). The operator looked

towards the **ROSEN EMAT** (Electro-Magnetic Acoustic Transducer) tool as EMAT tools can detect linear anomalies such as SCC related features and they also provide complementary information on external coating types and bonding conditions. The eventual aim of the operator is to replace hydro-tests with in-line inspection.

In addition to the use of EMAT, a circumferentially orientated MFL tool (RoCorr-CMFL) was also employed to acquire complementary information on axially oriented volumetric features, such as mill-related features and particularly metal loss corrosion. Following prequalification of the tools and the subsequent in-line inspections, an engineering critical assessment (ECA) using the results of the inspections was then conducted by **MACAW Engineering**, to provide an account of the integrity of the pipeline and assist in ensuring future safe operation. The ECA included:

- Correlation of in-field verification work with ILI findings
- Fitness-for-Service (FFS) assessment of the ILI findings
- Estimation of SCC growth rates
- Future rehabilitation plan and

re-inspection interval recommendations.

The project highlighted that the EMAT based RoCD² tool is an effective means for the in-line inspection of either liquid or gas pipelines, regardless of the presence of an internal flow coating or not. It is not only applicable for crack inspection, but also for the assessment of the external coating condition with regards to disbondment. As opposed to conventional piezo based ultrasound, the system is capable of a continuous crack depth sizing (rather than into depth bins) and with this capability it supports integrity assessment methods according to API 579 or similar. When combined with circumferential MFL technology a more comprehensive assessment is possible including corrosion, mill, gouge and manufacturing features.

In addition, the EMAT and in-field verification results in the segment known to have suffered failures, demonstrated that SCC of subcritical dimensions could be identified (i.e. they had survived the hydrotest). More importantly for the operator, it also showed that there were few SCC colonies outside of the hydrotest area.



EMAT based RoCD² equipped with speed control valve (left) and the circumferential MFL tool RoCorr-CMFL (right) tools.

LOOKING AHEAD.

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Gauging of a Dual Diameter 10" Pipeline

The Problem

Gas from the Devenick gas field is transported to the East Brae platform through a specially insulated 10" pipe-in-pipe (PIP) with a 16" outer pipe with insulation material in the annulus. The PIP pipeline consists of a main 10" pipeline 33km long with a nominal ID of 249.1mm and a thick wall 10" section 217m long with a nominal ID of 219.1mm.

Because of the dual diameter nature of the pipeline, Technip were not able to use standard solid plate gauge pigs or smart gauge pigs, to gauge the line. As a result of their previous experience in developing flexible plate Smart Gauge Pig technology for Technip, **Pipeline Innovations Ltd (PIL)** was asked to explore possible solutions to the problem. The solution proposed by **PIL** was the Smart Caliper Tool.

The Smart Caliper Tool

The Smart Caliper Tool, was based on a multi-channel caliper pig with 8 caliper arms and with real time on-board processing of the data to compare the measured pipe diameters with the respective gauging diameters in each section of the pipeline. The pig included an integrated acoustic pinger, which transmitted different ping rates depending on whether the on-board software had detected a breach of either, both, or none of the gauge diameters. An acoustic receiver positioned on the subsea PLR, at the end of the run, detected the

gauge condition so that if no 'hits' had occurred, the pig could be left in the receiver for later recovery when support vessels were available.

For the Devenick line, the key parameters which were pre-set in the microprocessor before the run were the nominal pipe IDs (249mm and 219mm) and the respective gauge diameters for the main pipeline and the thick wall section (228mm and 197mm).



Loading of Smart Caliper into PLR

Operations

22 August 2011 - Two Smart Caliper pigs, and a cleaning pig, were back-loaded into the PLR in the Aker Qserv yard.

27th September - the PLR was mobilised to Evanton.

2nd October - the PLR was connected to the end of the 33.2km pipeline on board the Technip Pipelay vessel and deployed to the sea bed.

30th October - The pig was launched. On entering the pig receiver, the acoustic transmissions from the pigs were monitored by an acoustic transducer positioned external to the receiver and the

transmission sequence indicated that no gauge 'hits' had occurred in either the main pipeline or the fully rated section and therefore the pigs could be left for recovery at a later date.

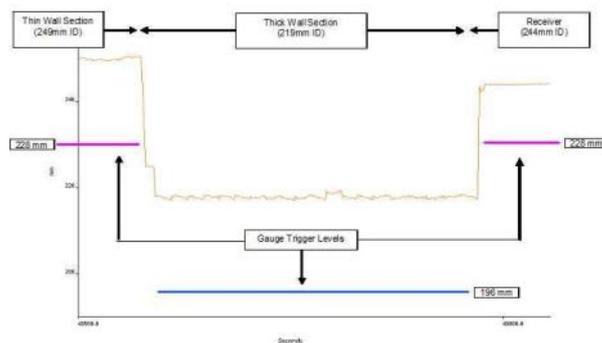
9th November - the pipeline was subjected to a hydrotest pressure of 395bar.

25th March 2012 - the pig receiver was disconnected from the line and recovered to the surface. The two pigs were returned to the Pipeline Innovations factory for data download and assessment of pig condition.

Conclusion

The gauging operations were completed successfully with the dual diameter gauging result being transmitted to a detector on the outside of the pig receiver.

When the pigs were eventually recovered, a full set of high quality caliper data was retrieved allowing confirmation of the gauging result to be made and providing a good baseline caliper survey which will be available to the pipeline operator for future use. A data sample showing the transition of the pig from thin wall to thick wall and then into the receiver is shown below:



Caliper Data - Mean Bore Plot

Jee Ltd Devises Solutions for Lifetime Extension

Jee Ltd, a leading subsea engineering and training firm, is dedicated to providing engineering expertise for a variety of disciplines. Recently, the company has devised solutions for pipeline lifetime extension (LTE) able to save operators substantial amounts of time and money and help preserve the environment.

As many offshore assets are reaching the end of their planned lives, there have been strong drivers to extend the operating lives of pipelines beyond their original design intent. Threats to pipelines include internal and external corrosion as well as fatigue. With a detailed knowledge and understanding of the condition of a pipeline and a re-assessment of future degradation based on that understanding, **Jee** engineers can add years of life to a pipeline.

Jee has carefully researched its LTE capabilities, which have proven success with numerous major offshore operators. **Jee** estimates that it has collectively extended the life of the pipelines they are working on by 246 years since 2008. With the estimated operating flow rates of these pipelines, this totals approximately \$86 billion of extended production over their increased lifespan.

With extensive expertise in pipeline integrity and repair, **Jee** has contributed to the development of the internationally recognised code ISO 12747. The company was a

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member of the working group and the main author of the code, which addresses LTE for rigid metallic pipelines.

Jee's LTE process is a two-stage approach to determine the length of time that a pipeline can continue in normal operation. This is accomplished through close collaboration between **Jee** engineers and clients, who must first prove to industry regulators that by extending the design life of their pipelines they are not exposing society or the environment to any considerable risk. The first stage is to determine the current integrity of the pipeline. Engineers thoroughly examine the pipeline's inspection records, integrity assessments and operational histories, gathering as much information as possible for a detailed report and to dictate the next steps. The potential for LTE is strongly influenced by the pipeline's current condition. In some cases, LTE will not be a viable option and decommissioning will be the only alternative.

However, if the pipeline is of suitable condition, a threat assessment is undertaken to determine the risks that the pipeline faces when operating during the extended period. The outcome of the threat assessment then determines which aspects of the pipeline should be further

inspected. It may be necessary to gather further data on aspects of the pipeline's integrity or condition. Once it is confirmed that a pipeline has remnant life, the second stage is to carry out the analyses that the threat assessment has identified to quantify the pipeline's remaining life, focusing on the likelihood of future corrosion and fatigue. Using advanced software systems and other assessments, including dropped object assessments, span assessments, riser analysis or flow assurance, **Jee's** engineers troubleshoot these issues.

The engineers consider a wide range of hazards the pipelines might face during their remaining years of life. Further complicating the variety of precautions to be taken are design codes, which have changed over the years. Codes from the original pipeline installation will need to be compared with current legislation, investigating differences as practices accepted in the past are not necessarily compliant with current codes.

With careful investigation and systematic research of an operator's pipeline history and integrity, **Jee** can determine the remnant life in a pipeline and assist operators with the next steps to LTE including updating records and certifications, remedial works and repairs. ●



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Fatal incident stresses importance of eliminating human error

By Netherlocks Safety Systems BV

A fatal incident on June 25th 2012 at a production facility of one of the globally leading oil companies in the United States proves the need for guaranteeing safe operations on pigging equipment.

During a preparation of a pipeline inspection using a pigging operation, a temporary pig launcher that was attached to a pipeline was over-pressurized and failed. The incident caused one fatality and the hospitalization of two individuals. Despite the fact that the job was carefully planned, a procedure was in place for the operation and safety measures were used, the 'trap valve' between the pig launcher and the pipeline had mistakenly been left closed. An experienced ILI inspection team assumed the pipeline valves to be in the proper position and began pumping from a nitrogen truck to purge the line. Apparently, a pressure gauge on the pig launcher was mistakenly read at zero when initial pressure was applied, which prompted the team to call for even more pressure. Eventually, as there was no pressure relief on the temporary pig launcher, it was pressurized beyond its burst pressure, resulting in an explosion (1).

Strict safety procedures apply to the oil and gas industry, but apparently these procedures alone are not enough to prevent accidents from

(1) Industry Safety alert by BP American Products Company

happening. As the accident shows, human errors form a critical factor that hugely influences the effectiveness of safety procedures. Even the best procedures cannot fully prevent mistakes and for this reason they do not sufficiently guarantee the safety of people and processes. This would be especially true for pigging operations, where the effects of mistakes can be disastrous. Routine tasks which involve working with dangerous pressure levels can have serious consequences when not carried out correctly.

One of the important lessons to be learned from this accident is (amongst others) that if a temporary pig launcher has the capacity to exceed safe operating limits, it should have similar protective measures as permanent installations have. Pressure relief valves can be regarded as such. But even with appropriate safety measures installed, human error cannot be completely eliminated. Therefore, mechanical interlocks are widely considered to be the most effective safety measure. They are applied at an increasing number of pigging installations throughout the world and form a standard safety measure for pigging operations at many of the leading oil and gas companies.

Mechanical interlocks eliminate commonly made mistakes on pigging operations. For example, they prevent a closure door from being opened, while pressure still remains inside the vessel, or the main process valve from opening, while the closure door is not properly closed. It can also protect operators from opening a closure

door, while a high concentration of H₂S or other toxins remain inside the vessel. Also they prevent a vent valve from opening, while the vessel is being pressurized. Mechanical interlocks (or better 'process interlocking') can be applied on various safety levels, dependent on the complexity of the pigging operation and to what extent a process can be defined as being critical. At different safety levels, process interlocking ensures that valves are operated in a predetermined sequence. At the highest safety level, the complete sequence of actions is guaranteed, step by step and according to the original procedure, including all valves (manual and MOV) and the closure door. This applies to complex sequences and critical high risk operations.

Recent developments in mechanical interlocking also made it possible to integrate interlocking products within sophisticated electro-mechanical and PLC controlled cabinets, combining mechanical and electronic safety measures into one single safety system. These solutions allow for communicating detailed instructions, monitoring the status of the procedure and operating part of the sequence from the control room.

Following the accident, mainly written procedures were mentioned with regard to improving safety. Additional measures to eliminate human error such as mechanical interlocking were not highlighted. This is truly a missed opportunity, as modern interlocking solutions are to be regarded as the ultimate additional safety measure. ●

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STATS Group's Pipeline Isolation on BP Marnock

STATS Group successfully isolated a 24" oil export line on BP's Marnock ETAP spur line located in the Central North Sea to allow the replacement of a 16" valve.

STATS deployed its 24" Remote Tecno Plug to isolate a pressure of 60 Bar providing safe working conditions to allow valve replacement activities. Once set the primary and secondary seal tests were carried out using full isolation pressure.

The pressure between the primary and secondary seals was monitored throughout the isolation, ensuring safety critical double block isolation. With the valve replaced and Tecno Plug continuing to maintain isolation, a 24" extended body in-line weld test tool was installed through the launcher to straddle the 16" tee. The test tool was set to carry out the reinstatement and leak test of the 16" branch and valve.

A flexibility on lead time to meet planned platform shutdown dates was imperative and **STATS** mobilised and completed the work scope in a seven week time frame, including a factory acceptance test in a purpose-built test fixture. ●

Quest Integrity Group's InVista™ Animation

Quest Integrity Group released a new animation for InVista, an ultrasonic in-line inspection (ILI) tool for difficult-to-inspect and unpiggable pipelines, at the PPIM 2013 conference. This fast-paced, informative animation encompasses the unique capabilities of the company's pipeline integrity management solutions.

The animation illustrates how the company's solutions address major pipeline operator challenges and introduces the InVista ILI technology that simultaneously collects both geometry and metal loss data for the entire asset. Additionally, it demonstrates the technology's operational simplicity and navigation capabilities that are unmatched in the pipeline industry. The company's experienced data analysts and assessment engineers review and analyze 100% of the data collected by InVista using the company's LifeQuest™ Pipeline software and provide a Level II API Fitness-for-Service assessment as part of the standard InVista service. This allows pipeline operators to better understand, prioritize, schedule and extend maintenance intervals based upon

confidence in the data quality and integrated engineering assessment deliverable. To view the animation, visit QuestIntegrity.com/InVista. ●

PII hosts Young Persons' Network at Headquarters

The technical site visit was developed as an opportunity to educate young employees from across Northern Gas Networks (NGN) business about the importance of pipeline safety. The day started with an overview of pipeline inspection and integrity services, followed by a detailed review of latest in-line inspection technology developed at the site. The 15 visitors from NGN were also given a guided tour of the workshop and site by the local commercial and operations team.

"Working with NGN to help educate their staff for the future fits perfectly with our own strategy" said Kevin Johnson, Europe and Africa regional manager, **PII**. He added "we are keen to employ and develop young people, through our ongoing internship and apprenticeship programmes. Introducing youthful innovation complements the heritage and domain knowledge we already have at this site." ●

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Atlas Copco Rental's Nitrogen Generator

In the oil and gas industry nitrogen is used extensively for the drilling, completion and work-over of oil and gas wells. It is also used for pipeline services. Nitrogen is a dry and inert gas that can be generated on-site at high pressures and low oxygen levels to safely prevent ignition of flammable gases or to protect equipment from corrosion.

Atlas Copco Rental's new Nitrogen Generator Membrane NGM2000 is ideal for applications such as flushing pipelines using nitrogen, cleaning and drying and also fire prevention in the oil and gas and marine industry. The NGM2000 uses high efficient membrane air separation to produce nitrogen. A bundle polymer fiber acts as a membrane that allows nitrogen to pass and other gases (like oxygen, water vapor and carbon dioxide) to permeate. Primary air compressors feed the membranes, which generate a nitrogen purity between 95% and 99 % and flows up to 5000 Nm³/h.

Components are mounted inside a functional 20ft, DNV 2.7.1 and EN12079 certified ISO container with a heavy duty 3 layer paint system and are suitable for arctic and desert conditions, on- or offshore. ●

TDW'S First High Temperature Stopple® Train Intervention

T.D. Williamson (TDW) completed its first STOPPLE® Train pipeline intervention on a high temperature line during what was also their first intervention of that type in Kazakhstan. The system was used to create a double block and bleed isolation to replace a leaking valve on a high temperature steam line at a key oil and gas processing plant. The valve was replaced in a confined space without shutting down the line or the plant, allowing production to continue.

The customer chose this method to prepare for scheduled line maintenance on a 6" 428°F (220°C) steam line to ensure that it would be safely isolated without shutting down production. Refinery operators prefer this approach because it requires minimal intrusion into the line, especially on high temperature lines that pose additional safety risks. It also took just half the time that two individual block and bleed isolations would require, resulting in reduced time and costs. A double block and bleed isolation was also necessary as there wasn't space to perform two individual isolation operations. ●

... and TDW's Smart-track™ offer to Market

TDW Offshore Services is offering its SmartTrack™ remote tracking and pressure-monitoring system for use in the global marketplace. Until now, this proprietary technology has been used exclusively by TDW to carry out pipeline pressure isolation operations in conjunction with its SmartPlug® system. ●

Online Group's visit from Energy Minister

Online Electronics Limited (OEL) was delighted to receive a visit from Energy Minister, Fergus Ewing, MSP, at their Aberdeen headquarters, Online House. The Minister was visiting OEL to obtain feedback on a recent SDI Trade Mission to Rio de Janeiro and Macaé, which was attended by Online Valve Ltd's (OVL) Operations Manager, James Padgham. Mr Ewing heard how Brazil is an exciting potential market for OVL and one where OEL has been trading for 15 years.

Mr Ewing congratulated OEL on receiving the Export Achievement Award at the SPE Offshore Achievement Awards 2013. ●



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