

Pigging Industry News

the newsletter of the Pigging Products & Services Association



The Secretary's Letter

by Gill Hornby

Executive Secretary, PPSA

THE WORLD may be in financial turmoil but PPSA has something to celebrate in 2010 – its 20th anniversary. It was in 1988 that Jim Cordell first came up with the idea of forming a pigging association and, after much discussion, PPSA was incorporated in May, 1990, with 19 members. Many of the founder members are still part of PPSA, some in different guises after take-overs but still forming the backbone of the organization. Since 1990, the Association has gone from strength to strength, and now has 90 members representing the pigging industry throughout the world.

The 20-year celebrations begin on 18th November at the 11th Annual Pigging Seminar and Exhibition in Aberdeen. A call for papers has gone out to members. The programme will be finalized in August and will be published on the web site, together with information on how to book a place. Jim Cordell, founder of the PPSA, has been invited to join us along with Chris Kershaw, first President, and Gary Smith, first Vice President. Gary, of course, is still very much involved in pigging with his company Inline Services. Jim and Chris are both retired but still take a great interest in the PPSA, and in the

industry generally. I am sure that those who know them will enjoy seeing them again and equally, Jim and Chris will be keen to see how the industry has progressed and its plans for the future.

In February, PPSA will be in Houston for its Annual General Meeting at the Pipeline Pigging and Integrity Management Conference (15-18th February) organized by Clarion Technical Conferences and Scientific Surveys Ltd, both of which were very early members under the leadership of BJ Lowe and John Tiratsoo, respectively.

Our golf tournament is scheduled for Monday, 15th February. We are looking for sponsors and players, so please make a note in your diary if you would like to take part.

The PPSA web site has been redesigned and is now published at www.ppsa-online.com. A new "Case Studies" page has been added which will grow as more studies are provided by the members. The web site is a must for anyone wanting information about pigging or technical advice. ●

New Members

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Industry news

Flexible piping inspection

THE INTRODUCTION of its *Neptune* system by **AGR Field Operations** is seen as ground-breaking, and is intended to revolutionize the subsea sector of the oil and gas industry. Over the last decade, the oil industry has seen a vast expansion in subsea infrastructure and the use of flexible piping in production. The layered structure of flexible piping has posed challenges to inspection industry for years, and AGR Field Operations and its partners have now developed methods that vastly improve technical safety, meet international requirements, and reduce the cost of such inspections.

The company says that the new application, developed over two years, has a 100% success rate, and will help prevent the failure of flexible risers and flexible flowlines, thereby minimizing lost production and associated environmental impact of leaks and spillage from offshore FPSO oil production facilities. The daily cost of lost production resulting from a riser failure has been estimated at between Euro1m and Euro3m.

Aberdeen-based **Flexlife**, which was established to create solutions to the most common failures in flexible risers, devised the patented solution to scan flexible risers *in situ* and detect annulus flooding anywhere along their length – the first time in the 40-year history of unbonded flexible pipe that this has been achieved – while AGR Field Operations has the inspection capability to deliver

the technology through its *Neptune* ROV-deployable system.

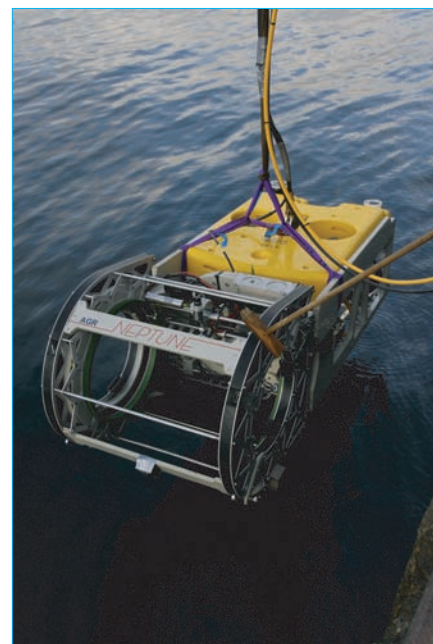
The company says that this is the first time that it has been possible to inspect any flexible pipe *in situ* without access to the end fittings. Potential failures can be identified and dealt with more quickly than previously. *Neptune* is claimed to be fast, reliable, and can go down to 5,000m. The technology is designed to go anywhere in any environment, and the potential cost savings and environmental benefits are immense. The inspection quality is provided by high-definition ultrasonic scanning to provide engineering information which will give improved accuracy to life-expectancy calculations. Data are transmitted to the surface via a fibre-optic cable or ethernet connection to match a client's ROV tooling.

AGR Field Operations, a division of the AGR Group, is a provider of a wide range of services to the oil and gas industry. The business focuses on the management systems, procedures, and state-of-the-art technologies to attain and maintain prescribed levels of technical integrity of oil and gas industry assets. ●

Precommissioning offshore Nigeria

ABERDEEN-BASED **BJ Services** has announced that its process and pipeline services group has successfully completed a major precommissioning operation offshore Nigeria for **Technip France** on behalf of **Star Deep Water Petroleum Ltd**, an affiliate of **Chevron Corporation**.

The work was associated with the development of the offshore Agbami field in the central Niger Delta. The oilfield is the largest



AGR's Neptune system being deployed on an ROV.

deepwater discovery in Nigeria, and is estimated potentially to hold recoverable reserves of 900 million barrels. The field is being developed using subsea wells tied-back to an FPSO in 1433m of water. Treated and stabilized crude oil is being periodically offloaded from the FPSO through a number of midwater offloading lines connected from its stern to a single-point mooring (SPM) offloading buoy, and multiple offloading hoses connected from SPM to a tanker moored to the buoy.

The scope of the precommissioning services was two-fold: one dedicated to the flowlines and another for the umbilicals. Working from the FPSO with ROV support, BJ's primary goal was to displace the raw seawater in the flexible risers and flowlines with filtered and treated seawater. This was achieved by using cleaning and gauging pig trains in the production and gas-injection loops.

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The water-injection risers and main flowlines were flooded while being laid. BJ provided engineering, procurement, flooding, cleaning, gauging, hydrotesting, and dewatering during this phase of the precommissioning programme.

For the umbilicals, BJ monitored pressure while they were in transit from Europe, and performed hydraulic and electrical testing following load-out, as well as before, during, and after installation.

The contract was awarded by Technip France in February, 2007. Before mobilizing, BJ's process and pipeline services group provided engineering and planning services from its global headquarters in Aberdeen. Offshore operations, which commenced in the spring of 2008, were carried out by staff and equipment from the company's base in Port Harcourt, Nigeria, and completed in nine months. ●

Indian precommissioning

BJ Services Co has completed a contract to provide pre-commissioning services for **Technip** on the MA-D6 oilfield in the Krishna Godavari Basin in the SE Bay of Bengal, offshore Kakinada, India. The scope of the project required the company to plan and manage several different phases, including initial engineering and project management services, designed to complete the work within a tight timeframe. Hydraulic and electrical testing of both dynamic and infield umbilicals was carried out during pre-installation, installation, overboarding, and post-installation phases of the operation. BJ's pipeline precommissioning specialists carried out cleaning, flooding, and pressure testing of the 8-in

production infield flowlines. In addition, the 6-in gas-injection riser was cleaned, flooded, pressure-tested and treated with mono ethylene glycol (MEG). The fast-track operation was carried out efficiently and completed on schedule.



BJ's spread used on the RGTEL project.

The MA-D6 is part of the larger KG-D6 oil- and gasfield that is situated in water depths of up to 1,200m, and the pipeline network gathers oil and gas from the Basin for export onshore to India. The system is extensive, involving a complicated network of gas and oil export pipelines and flowlines.

The company has also completed a major pipeline precommissioning and commissioning operation for **Reliance Gas Transportation Infrastructure Ltd (RGTEL)** on the 80m cum/d East-West gas pipeline (EWPL), which connects an onshore terminal at Gadimoga in Andhra Pradesh on the east coast of India with Bhadbhut in Gujarat in the west of the country. The Aberdeen-based company provided a range of services for the project, including swabbing, magnetic cleaning, caliper surveying, and vacuum drying, in addition to a range of commissioning gas-in works on the EWPL and associated facilities and spur pipelines. The primary segments of the pipeline network consist of nine 48-in diameter 130- to 162-km long sections, totalling 1,369km, and three spur pipeline segments that are 24in diameter and 30.5km length, 28in diameter and 27.7km length, and 30in diameter and 16.5km length.

During the project, which began on-site in March last year, gas was transported via a temporary 4-in diameter, 100m jumper, line from GAIL's Dahej-Vijaipur pipeline at Ankot gas station, and introduced through the temporary commissioning skid into the EWPL pipeline at CS-10 by an eight-man commissioning team from BJ Services. To ensure that procedures were carried out safely and efficiently, the company acquired two new 9,000cuft/min dry-air spreads, each consisting of three 3,000cuft/min air dryers and nine 1150cuft/min air compressors that were custom-designed and installed in protective 20-ft containers. ●

High-pressure hot tap on NSea gas line

TD Williamson SA (TDW) has performed a successful hot tap operation for **Acergy** on a gas pipeline in the North Sea. The work was undertaken to facilitate the tie-in of the Ettrick field gas-export pipeline operated by **Nexen Petroleum UK Ltd**, in order that gas can be exported to the onshore gas plant north of Aberdeen.

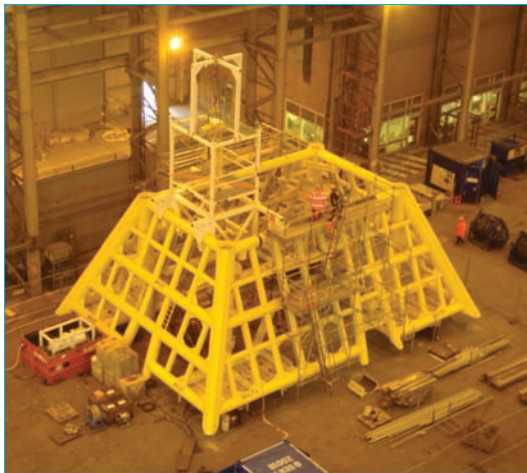
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The Ettrick field facility during fabrication, later the subject of a hot-tap operation by TDW.

What makes this hot tap project particularly impressive is that throughout the operation a prevailing pipeline operating pressure of 117bar was maintained, and that it was undertaken at approximately 94m sea depth. While the operation was completed in very little time, the planning and preparation was extensive.

As primary contractor for the project, Acergy was responsible for providing engineering, procurement, installation, and precommissioning of the hot tap assembly, and the temporary and permanent subsea structures. TDW was retained to engineer and supply all bespoke hot tap equipment. The custom-built equipment was subjected to rigorous endurance testing as part of the factory-based trials phase. ●

Pipeline repair for StatoilHydro

TDW Offshore Services AS has designed and delivered a customized pipeline repair solution for **StatoilHydro's** Kvitebjorn NSea oil- and gasfield, which resumed exporting liquids

and gas on 27 January, 2009. Production from the field was shut down in August, 2008, when a gas leak was discovered approximately 10km from the platform. Operator StatoilHydro contacted TDW Offshore Services to develop one of several alternative solutions to repair the gas pipeline between the platform and the Kollsnes processing plant near Bergen: the pipeline had been dragged out of position and damaged by a passing ship's anchor.

TDW Offshore Services was awarded a contract by StatoilHydro to assess the situation, and develop a solution to repair the subsea pipeline. Extensive testing – including an onshore installation of a special subsea clamp system onto a mock-up of the affected portion of the Kvitebjorn pipeline – was carried out at TDW's base in Stavanger. The purpose of the clamp would be to secure the pipe connector that was to be used in the event that it was not possible for it to obtain adequate holding power.

In the wake of Hurricane Katrina and the damage inflicted on



TDW's Kvitebjorn clamp suspended in the yard Stavanger.

pipeline systems in the Gulf of Mexico, there is a growing trend in the industry to thoroughly prepare for the possibility of natural disasters and potential pipeline disruption, especially subsea. "During recent years, the offshore industry has experienced several pipeline shutdowns caused by anchor drags or similar," said Rune Haddeland, Managing Director of TDW Offshore Services. "In such situations, our engineered solutions have proven to be highly beneficial for our clients."

The Kvitebjorn field began delivering natural gas in October, 2004. Rich gas and condensate (light oil) are piped to Kollsnes, near Bergen, and Mongstad, further north, respectively. Following processing at Kollsnes, the dry gas is exported to continental Europe. The separated NGL is transported by pipeline to the Vestprosess plant at Mongstad for fractionation into propane, butanes, and naphtha. Based on current plans, StatoilHydro expects to recover roughly 55bn cum of gas and 22m cum of condensate. ●

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The Kvitbjørn clamp positioned on a pipeline identical to Kvitbjørn pipeline.

Inspection of Keystone pipeline section

GE Oil & Gas' PII Pipeline Solutions group has completed its largest pipeline inspection project by helping **TransCanada** evaluate the condition of an 864-km section of a gas pipeline in Canada. The pipeline required inspection prior to being converted to carry crude oil as part of the Keystone oil pipeline.

TransCanada is converting its 34-in diameter Mainline gas pipeline between Burstall, Saskatchewan, and Carman, Manitoba, as part of its and **ConocoPhillips'** joint Keystone oil pipeline project. The project will allow crude oil to be transported to US Midwest markets at Wood River and Patoka, Illinois, and to Cushing, Oklahoma. The converted pipeline will transport liquids at an operating pressure of 6,067kPa, and to ensure optimal availability of the converted pipeline, TransCanada first had to make



GE's tool arriving and (inset) being prepared for launch, on the Keystone pipeline inspection project.

sure it was free of stress-corrosion cracking.

The PII Pipeline Solutions division operates one of the industry's most advanced ultrasonic pipeline inspection tools used for crack detection. Between October, 2008, and March this year, the company's field team performed crack-detection inspection runs in three segments of the natural gas pipeline of 294, 315, and 255km in length. The tools were run in batches of fluid and prior to deployment, TransCanada had to develop a special pipeline manifold to accommodate all the tools and ensure that no air was

left in the line. TransCanada's most serious challenge was the need to control the 3-km batches of fluid to ensure the ILI tools moved at the consistent speed needed for accurate data collection. ●

Pipeline Engineering's 40th birthday

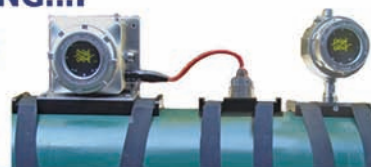
UK-BASED **Pipeline Engineering**, a well-known supplier of engineered solutions to the pipeline pigging and flow-assurance market, is celebrating its 40th year of service to the global oil and gas pipeline industry. Started in 1969 by Ken

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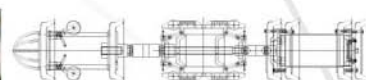


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Hemingway, the company was acquired by the Bullough Group in 1984. In 1997, the company was bought by Willy Watson, the current managing director, and Kit Maunsell, who is a non-executive director. The acquisition was supported by **Quester Venture Capital** who was subsequently bought-out in 2001 by the management and a number of small private investors. Since then, PE has grown on average 25% year-on-year, reaching a turnover this year of £20m, and has become a leading supplier of utility pigging equipment to the global market outside the USA.

In 2004, PE started its Engineered Solutions business unit which focuses on providing solutions to unique pigging problems, whether they are the design of special subsea pigging systems for deepwater flowlines or the cleaning of difficult pipelines. One of the unit's major advantages is that it has the facilities to design, prototype, carry out proving trials, and manufacture all on one site, supported by a qualified team of offshore service engineers, ready to deploy tools in the field. Run by Dave Bacon, who had previously worked for Halliburton on North Sea pipelines, this side of the operation has proved a great success, and been involved in some very challenging and exciting subsea projects for major operators around the world.

In 2006, the company opened a purpose-built new manufacturing facility and headquarters with state-of-the-art production equipment, with the aim of improving efficiency, quality, and delivery. Since then, PE has achieved the ISO29001 quality standard, ASME U and U2 Certificates and a number of other similar quality accreditations.

Over the years PE has invested in

R&D: innovative products it has developed include a multi-diameter 'paddle' pig, an automatic multiple pig launching system, a system for locating blockages and leaks in pipelines (*Acoustek*), a welding pig for subsea tie-ins, and a pig for slow flowing lines. ●

InPIPE's 25 years

INPIPE Products is celebrating the fact that it's been a leader in the supply of pipeline maintenance equipment for 25 years. The company was established in 1984 as a result of a lifelong devotion to the industry by its founder Ken Hemingway, and it now has grown to have the latest in-house design and manufacturing capabilities.

Over the last 25 years, the company has developed a well-founded reputation within a number of markets. Predominantly working in the oil and gas industries, it is also successfully operating in the water, petrochemical, pharmaceutical, and food industries. Developing markets for the company include South America, Algeria, Yemen, Libya, and Germany. ●

Pig signallers for Petronas

ONLINE Electronics' Singapore subsidiary **Online Electronics Asia Pacific Pte Ltd** has been awarded a contract to supply **Petronas**, Malaysia's national oil company, with non-intrusive pig signallers. The company, from its headquarters in Aberdeen, designs, manufactures, and operates pig-monitoring equipment, data communications, and logging systems for the global oil and gas industry, including a comprehensive range of ATEX certified equipment for use in hazardous areas.

The Petronas award follows a recent Petrochina contract for the company's pig signallers, and was secured through **Punj Lloyd**, the project's main contractor. The equipment will be installed on the Sabah-Sarawak pipeline. The Petrochina signallers are for the West-East pipeline project that runs from the NW Xinjiang Uygur Autonomous Region to Guangzhou. ●

GE awards customers

GE Oil & Gas' PII Pipeline Solutions business has presented awards to two of its customers following their pioneering use of its *MagneScan* MFL pipeline inspection technology. **Sarpom**, Exxon Mobil's affiliate refinery and pipeline company in Italy, and American operator **Jayhawk Pipeline**, were recognized for projects successfully completed in the first quarter of 2009. Representatives of Sarpom received the GE award in Cramlington, UK, while Jayhawk was presented with the award at GE's biannual N American pipeline conference in Austin.

The Sarpom inspection in Italy was from Trecate to Malpensa Intercontinental Airport (in the NW region) on a 6-in diameter, 33-km long, jet-fuel pipeline, last inspected in 2003. The inspection was successfully completed in under five hours, and was carried out with field support from **Tecma Pipeline Services**, GE's partner in Italy. Sarpom operates a network of 1150km of liquid pipelines in Italy. Giorgio Tencaioli, pipeline integrity supervisor for Sarpom Italia, said: "To inspect this seamless steel pipeline, partially built in the early 1960s, we had three priorities: we needed the combination of three tools in one, to reduce disruption to our

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operation; we also needed a very short arrangement of the system due to space restriction at the airport, and we wanted better corrosion assessment than was offered by previously available technology. We also had been waiting for a credible 6-in mapping capability.”

The first new *MagneScan* inspection project in North America was performed for the **National Co-operative Refinery Association** (NCRA) in the state of Kansas and consisted

of four sections of 6-in products pipeline, spanning a total length of 364km. A US company formed in 1943, NCRA operates an 85,000bbl/d refinery, located in McPherson, Kansas, as well the refined-products pipeline that runs from the refinery to Council Bluffs, Iowa. Jayhawk Pipeline which is 100% owned by NCRA, transports 125,000bbl/d of crude oil through 1280km of pipeline. **KAW Pipeline Co**, 67% owned by NCRA, transports approximately 30,000bbl/d of crude oil through 400km of pipeline.

Mark Graves, pipeline engineer at Jayhawk Pipeline, said: “The four 6-in pipeline segments were 78, 96, 93, and 97km respectively, and each run was completed in less than 24 hours in standard configuration. One of our requirements was related to the product speed inside the line, making the run time at the upper specification of the battery life of the tool. This was, therefore, an excellent testing ground for this new technology.” ●

Inspection of non-piggable pipelines - Part 1

by L J (“Hans”) Gruitroij, A Hak Industrial Services BV, Geldermalsen, Netherlands

PIPELINES HAVE been laid worldwide for many years and, more often than not, once operational, are left without any planned maintenance, and the internal condition of these pipelines remains unknown. The normal management approach has been to prioritize on a failure-consequence basis, selecting maintenance and inspection options on a failure mode-and-effect analysis.

Intelligent-pig inspection systems are important tools to manage the integrity of pipelines. An intelligent-pig survey enables the operator responsible for the integrity of the pipeline to assess the failure risk due to metal-loss corrosion using the findings of the inspection survey. However, not all pipelines can be inspected using intelligent-pig technology, due to the pipeline's origin. In addition the inspection results are not directly available during the inspection process and therefore important decisions cannot be

made until the inspection report has been issued in a later stage. This paper discusses specific applications for offshore pipelines.

Non-piggable pipelines

At the time many pipelines were laid, pigging and inspection services were not thought of. Pipes were laid to transport the product, and how the pipeline was constructed was of minor importance. This meant that the majority of older pipelines were built without launching/receiving facilities, and consisting of varying diameters, mitred bends, etc., making normal pigging techniques impossible. Modern-day pipelines are constructed using special design codes which include these launching/receiving facilities which allow ultrasonic and other inspection techniques to be utilized.

These codes are not commonly used for relatively-short ‘connection’ lines, such as

pipelines to storage tanks, which means that these lines, being of standard design were not-piggable. We have observed that many problems occur in these relatively-short pipelines, due to lack of protection. In addition the ownership of these pipelines is not clearly defined, and a lack of responsibility is apparent: this implies that the integrity programme for these pipelines is of less importance than the larger/longer transfer pipelines.

These connection lines are, in most cases, non-piggable because:

- pipeline dimensions (length, diameter and wall thickness, dual diameter)
- pipe material (SS, ductile, exotic materials, GRE, coatings, linings)
- bend restrictions (forged bends <1.5 D, one-cut mitre bends, mitre bends, field bends, back-to-back bends)
- offtakes (un-barred tees, barred tees, sphere, laterals)

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offset junctions (convergence angle, bores), diverters valves (in-line block valves, check valves)

relative position of features (pig-signalling)

- operation conditions (product, pressure, temperature, fluid velocity)
- no entrance point or single entry (availability of launchers and receivers)

Examples of such pipelines are:

- loading lines
- offshore pipelines
- off-plot pipelines
- on-plot piping/pipelines
- tankfarm connection lines
- connection piping in refineries
- furnace piping (180° 1-D bends)

In-line inspection tools

Intelligent-pig inspection systems are important tools to manage the integrity of pipelines. An intelligent-pig survey enables the operator responsible for the integrity of the pipeline to assess the failure risk due to metal-loss corrosion using the findings of the survey. However, as we have seen, not all pipelines can be inspected using standard intelligent-pig technology, and this is particularly the case offshore.

The PigLet tool and the full-service package

The *PigLet* consists of various modules, including: ultrasonic measuring head, electronics,

odometer, and battery packs. These modules can either be built-in to a bi-directional pig (for larger diameters), or can be used as single modules with discs for the inspection of smaller diameters.

The various modules are interconnected by flexible connectors, and are described in more detail below. The *PigLet* is pumped through the pipeline with product, just as an ordinary pig. ●

Part 2 of this article, in the next issue, looks at the components of the system and how they are employed in practice.

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Contact: Gill Hornby, Seminar Organiser, Pigging Products & Services Association
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