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Consultancy report highlights regulatory importance of proposed on-line monitoring JIP

A recently completed consultancy project, which provided a status update on using on-line monitoring for produced water discharge reporting, has highlighted the importance of a new Joint Industry Project (JIP) being developed by NEL to drive regulatory guidance and industry practice in this area.

“We put together the status report for one of Europe’s leading independent oil production companies,” says Principal Consultant, Dr Ming Yang, who explains that the research focused on applications for unmanned and subsea installations. “What we found strengthened our impression that on-line monitoring is an area that presents both regulatory and technology challenges. As a result, we are moving forward with our JIP proposal, as we see this as an important way to help regulators to strengthen the regulatory framework.”

Ming’s study found that, in the last 10 years, there has been significant progress in the development of online oil-in-water monitoring technologies that may be used for unmanned and subsea installations. Technologies that have the most potential for such applications include light scattering, microscopy imaging, Laser Induced Fluorescence and ultrasonic acoustic. However, Ming’s research also underlined the fact that there is currently no guidance for using an online continuous analyser for produced discharge reporting from an unmanned or subsea installations.

Ming is now initiating a JIP to develop such guidance and is looking for regulator and industry support and participation.

The main driver comes from the fact that there has been significant interest in developing unmanned installations, subsea separation and produced water re-injection or discharge systems. This is being done to maximise oil recoveries and to reduce production costs. For example, Statoil, has installed the world’s first full-scale subsea separation system at its Tordis field in the North Sea. Statoil estimates that the system’s installation will enable the company to achieve an additional total field oil recovery of 6%, which is equivalent to an extra 26 million bbl of oil.

For more information, contact Ming Yang, ming.yang@tuv-sud.co.uk

Standards development work to improve accuracy of key metering technology

Standards development work carried out under the UK National Flow Programme will deliver enhanced accuracy for a key measurement technology used in the oil and gas industry. The revised standard ISO/TR 15377:2018 was published in January and provides guidelines for the specification of orifice plates, nozzles and Venturi tubes beyond the scope of ISO 5167.

The research involved the revision of the existing standard, ISO/TR 15377:2007. It was carried out by Principal Consultant, Dr Michael Reader-Harris. The revision was necessary because research showed that the equation used in the standard to describe the behaviour of a particular type of equipment (orifice plates with drain holes) was unsatisfactory.

“The equations used to develop the old standard were based on engineering judgement rather than experimental data,” Michael explains. “To address this issue, we collected a robust set of data on the performance of orifice plates with drain holes. Equations based on our new data were then incorporated into the revised standard.”

Orifice plates with drain holes are used by operators to measure gas flows that are intermittently wet, for example when some liquid is introduced into a pipeline over a short period of time for cleaning. Drain holes let this liquid drain away.

“The new standard will reduce the uncertainty of measurements using these devices,” Michael says. “It will enable people to use this technology who have not used it before, as they thought that the standard wasn’t robust enough. There are many such devices in use, including a surprisingly large number in dry networks.”

Michael’s work involved calibrating meters in a single-phase fluid, using a comprehensive range of conditions and pipe dimensions (from 2-inch to 8-inch diameters).

“The project was more complicated than we expected,” Michael reports. “This was due to orientation issues and the relationship between the flows through the different holes in the devices. We investigated these effects thoroughly to find out exactly what was going on.”

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Research on small volume provers opens the door to potential industry benefits

Research for a global R&D organisation has highlighted a number of ways in which a key measurement proving technology can be enhanced. The project is set to generate further collaborative work and should lead to significant practical and financial benefits for the oil industry.

The project focused on small volume provers (SVP). It was undertaken for the Pipeline Research Council International (PRCI), which works with leading members of the energy pipeline industry around the world.

“The overall aim of the project was to identify best practice and areas where improvements could be made,” says Project Manager, Dr Linda Rowan. “The work included an industry review, a survey of PRCI members, an assessment of different proving methods and a gap analysis of the design and operation of SVPs. Users of over 400 proving systems were surveyed.”

SVPs are used to validate the performance of Coriolis and ultrasonic (USM) flow meters in hydrocarbon liquid pipeline transportation systems. Many oil companies are now using SVPs due to their cost-benefit advantages.

The research took place in NEL’s research facilities. Researchers highlighted, assessed and prioritised over 20 areas of concern relating to SVPs. Gaps in current knowledge about the technology were identified and recommendations on how to fill these gaps were made.

Following on from this project, PRCI is hosting a webinar for its members during which NEL will present the project’s findings. It is hoped that NEL’s Elevated Pressure and Temperature Facility will be used to ‘fill in’ the information gaps the project found.

Improvements to SVPs and other proving technology could have a number of significant benefits, including helping reduce system measurement uncertainty, improving overall pipeline balancing and reducing the minimum detection thresholds of leak detection systems. The proving market is estimated at $200m annually, so any improvements will have significant economic repercussions.

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Flow Programme Quarterly Report highlights technical and research progress

The latest Flow Programme Quarterly Report highlights significant technical developments, advances in research and progress in knowledge transfer. The report, for the Department of Business, Energy & Industrial Strategy (BEIS), provides a summary of progress on Flow Programme activities carried out from October 2017 to December 2017.

“The report shows that our research teams are moving forward strongly,” says Managing Director, Brian Millington. “Looking forward, it confirms that our work up till 2021 will be strongly aligned with the productivity and competitive pillars of the government’s Industrial Strategy.”

As highlighted in the report, NEL’s research portfolio has a wide range of applications that extend beyond its core focus of the oil and gas industry. For example, a project to improve metering for Liquified Natural Gas (LNG) and Liquefied BioGas (LBG) has secured key partner collaboration across industry. Research is also well advanced looking at the metrology challenges associated with Hydrogen vehicles.

The Quarterly Report underlines NEL’s progress in the area of standards, including the publication of TR 15377 which brings the results of previous Flow Programme research on the use of orifice plates with drain holes into standards. In addition, NEL has taken leadership of the first ever ISO committee to develop a standard for the use of multiphase flow meters. This will be a major landmark, leading to wider adoption of this technology by industry.

NEL is one of the lead organisations in the UK’s National Measurement System (NMS). As part of its NMS remit, NEL is responsible for the UK’s Flow Programme and the dissemination of progress updates and knowledge arising from the work undertaken.

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Career Profile

Dr Phil Mark
Head of Test and Calibration Services

What roles have you played at NEL?
I deal with all matters relating to the test and calibration work that is undertaken in our flow facilities, for both internal and external customers.
I am also responsible for customer engagement and the maintenance of our ISO 17025 accreditation.

Where were you prior to NEL?
Prior to joining NEL in April 2011, I spent 20 years with SGS, undertaking a role similar to the one I have now. Before starting with SGS, I undertook a DTI-funded research project through NEL, so things have come full circle.

What is your academic background?
I originally qualified as a Marine Engineer with Shell Tankers. I then gained a first class honours degree in Engineering from Liverpool University, graduating in 1985. I returned to Liverpool in 1988 to undertake a PhD researching the effect of multiphase flow on the performance of a turbine meter. This was awarded in 1991.

What are your main area(s) of expertise?
All aspects of flow metering and the overall measurement process. I also have significant experience in customer engagement.

What projects are you involved with?
I deal with a wide range of operators, service providers and meter manufacturers. A lot of my time is spent ensuring that we deliver our services as specified, often under challenging circumstances.

What most interests you about working at NEL?
The opportunity to work with some great people and on a wide variety of work. I can jump from a routine meter calibration to helping a manufacturer gain approval for a new meter. I particularly enjoy the challenge of developing new projects with new customers.

NEL, the flow measurement specialist, plays a key role in ensuring accurate flow measurement across a range of industries.

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