



Running over 2 days in early November, WWEM 2014 was an outstanding success, with sustained growth in every event since the first WWEM in 2005. "In comparison with the last WWEM in 2012, visitor numbers were up by 15% and even though the size of the exhibition was increased by 12% we were still unable to accommodate several potential exhibitors," reports organiser Marcus Pattison.



"I hope that every visitor to WWEM found what they were looking for, networked with key industry professionals and returned home tired but content in the knowledge that they had invested their time wisely. I look forward to helping them to do so again at WWEM 2016 on 2nd and 3rd November."

Author/Contact Details:
Marcus Pattison
WWEM Organiser
 Oak Court Business Centre
 Sandridge Park, Porters Wood
 St. Albans, Hertfordshire, AL3 6PH
 ENGLAND
 Tel: : +44 (0) 1727 858840
 Email: info@wwem.uk.com
 Web: www.wwem.uk.com

WWEM 2014 focused on Water, Wastewater and Environmental Monitoring, and is comprised of a wide range of activities that are designed to update and inform anyone in the water sector with a professional interest in testing and monitoring. "WWEM 2014 was different," explains Marcus Pattison, "previous WWEM events have included Conferences, Workshops and an Exhibition, but this year's show also included a number of specialist forums, seminars and a demonstration area, and I believe that this is the major reason for the event's continued growth. 30% of the exhibitors were so pleased that they re-booked during the show and it is clear that there will be an influx of new exhibitors from those companies that visited WWEM 2014 as delegates."

Conference: 'Regulation Updates for Process Operators'

The first day's conference provided delegates with the latest information on the regulations, technologies and methods that are required for testing and monitoring the environmental emissions of regulated processes. This included advice from Rick Gould on how to obtain a good score in the Environment Agency's Operator Monitoring Assessment (OMA) - a systematic tool for auditing the monitoring provisions required by legislation. Focusing on water quality monitoring, the Agency's Andrew Chappell outlined many of the challenges faced by those responsible for this task and explained how the MCERTS scheme has underpinned the quality of monitoring. He also provided an update on the development of a CEN standard (BS EN 16479:2014) for automatic samplers and water quality monitoring equipment, and explained that this could be superseded by an ISO standard.

MCERTS is operated on behalf of the Environment Agency by Sira, and the United Kingdom Accreditation Service (UKAS) accredits

Sira to undertake MCERTS product and personnel certification. Sira's Emily Alexander explained that whilst monitoring technology has advanced considerably, instrument performance has not always improved at the same rate, which underlines the need for independent testing and certification. Andy Godley from WRc then explained the testing procedure for instruments, both in the field and in the laboratory. Emphasising the need for robust traceable test programmes, Andy said: "Test plans should be agreed as early as possible and variations should be discussed as soon as they occur."

Finally, Nick Richardson from Siris Environmental outlined 'the Good, the Bad and the Ugly' of flow monitoring installations. His presentation featured photographs of good installations in addition to a broad selection of those that left room for improvement. The most common errors highlighted were: non-MCERTS compliant design; over-sized or under-sized installations; poorly designed access for maintenance; installations that are difficult to verify or calibrate, and installations at which the wrong system had been deployed (e.g. weir on inlet).

Laboratory Conference: Accreditation, Innovation and Communication

The second day's Conference was hosted by the BMTA (British Measurement and Testing Association) and was aimed primarily at managers and senior staff in environmental laboratories, but the techniques and quality procedures discussed were also of interest to staff in other types of laboratory. The presentations dealt with the methods of achieving quality and consistency in sampling and in laboratory measurements, and the speakers represented the national accreditation body, UKAS, large water companies and commercial laboratory-based organisations.



Speakers from UKAS explained that all accredited laboratories should participate in proficiency testing where such schemes are available and relevant to their scope of accreditation. They also provided an outline of TPS 47, the UKAS document on Participation in Proficiency Testing Schemes, which describes the evaluation of participant performance against pre-established criteria by means of inter-laboratory comparisons.

Hazel Davidson from Derwentside Environmental Testing Services (DETS) then explained some of the issues relating to good sampling technique and described how lower limits of detection can be achieved by improved techniques, advanced instrumentation and by using larger sample volumes.

Professor Clive Thompson and Paul Gribble from ALcontrol delivered a presentation entitled: 'Sampling and analysis in relation to the Priority Substances Directive 2012/39/EU' in which they explained that some of the environmental quality standards limits that have been set are unrealistically low, "almost to homeopathic levels!" they said. Highlighting the enormous cost incurred by testing for extremely low levels of a large number of compounds, the speakers called for more realistic regulations. "Regulators should liaise with analysts when setting limits, and a group of accredited laboratories should be established to work together to develop achievable standards (similar to MCERTS)."

Explaining the advantages of a new mobile sample tracking technology Kyle Norris from the Water Quality Sampling Team at Northumbrian Water, and Sam Goddard from CSols Ltd gave a presentation on 'Remote Sampler', a secure mobile data capture system. Each water sampling technician operates remotely with a handheld device linked through a central hub to a Laboratory Information Management System (LIMS). The system improves sample data quality by reducing transcription errors while allowing existing accredited sampling procedures to be followed.

South West Water, in collaboration with the University of Portsmouth and Natural Resources Wales, have developed methods using the Chemcatcher™ passive sampler to monitor for a range of acid herbicides including Mecoprop and MCPA, and the molluscicide Metaldehyde in surface waters. This subject was addressed by Lewis Jones, South West Water's Future Quality Obligations and R&D Manager, who outlined the development of a Chemcatcher-based sampling method for the monitoring of polar pesticides in water.

In the final presentation, Bob Poole from Thermo Fisher Scientific explained how today's laboratory software can be applied to deliver a fully automated, efficient and intelligent approach to sample receipt and scheduling, resource management, collecting, processing and acting upon results, and securely managing the vast amounts of data produced.

BMSS Seminar

A further laboratory seminar was organised by the Environmental and Food Analysis Special Interest Group, EFASIG, which is a special interest group of the British Mass Spectrometry Society (BMSS). Entitled 'The application of chromatography-mass spectrometry to environmental water analysis' the seminar ran in the afternoon of the first day at WWEM 2014. Nine speakers from academia, commercial laboratories, instrument manufacturers and industrial companies provided short presentations focusing on specific environmental analytical challenges.

Flow Forum and Apprentice Competition

Hosted by Oliver Grievson from the Water Industry Process Automation & Control Group, the morning of the first day saw Instrumentation Apprentices from Anglian Water, Thames Water and Welsh Water gather at the Flow Forum where they were given a variety of scenarios/challenges to complete. They were then sent off into the exhibition to talk to the plethora of suppliers that held the key to their questions.

Oliver Grievson then described the experiences that he had gained from a programme of 80 flow meter installations during 2012. This demonstrated that the main cost was with the installation of flow meters rather than the flow meters themselves. Following this a presentation by Simon Richardson of Siris Environmental demonstrated where installations have typically gone right and wrong. He highlighted the case of a flume at Coltishall Wastewater Treatment Works which was an 'ideal' installation, and also cited others where installations were less than ideal.

Eight different suppliers then gave presentations on traditional technologies such as ultrasonic and time of flight flow measurement to the newer technologies involving microwave, laser and radar. The eight presentations covered ultrasonic level, time of flight ultrasonic, Coriolis mass flow measurement, radar non-contact area velocity, radar level, area velocity, laser non-contact area velocity and microwave flow measurement.

An open question session finished off the Flow Forum with an opportunity to discuss the various technologies presented as well as any other burning issues concerning flow measurement. Summing up, host Oliver Grievson offered to set up a permanent flow forum if it was desired by the water industry as a whole.

The Instrumentation Apprentice Competition resumed in the afternoon, with the contestants set tasks by the three sponsors – ABB, Partech and Siemens. The apprentices were asked to: diagnose (pre-arranged) faults in an electro-magnetic flow meter; change the seal on a Turbitech turbidity monitor, and programme an ultra-sonic level meter over a V-notch which had been provided by Siris Environmental. The final task of the competition was the WRc hosted Question & Answer session, at which Andy Godley posed questions that tested both their technical and practical knowledge of instrumentation. The sponsors and supporting organisations then marked and assessed the performance of the teams and the winners were announced at the WWEM 2014 Gala Dinner. The Apprentice Competition was won by the Anglian Water team of Matthew Stephens and Harry Power with the team from Welsh Water, Will Williams and Alexander Smith, coming second. The remaining two teams from Thames Water (Darren Ewer and Kayne Chamber-Blucher) and Anglian Water (Harry Myers and Dominic Prime) shared third place.

Commenting after the event, winner Matthew Stephens explained that his apprenticeship with Anglian Water started with a year at college, followed by three years of block release. "I found the tasks very interesting," he said. "As a result of my training I found the practical tasks relatively simple, although the technical questions were more challenging. We came to WWEM not really knowing what to expect but it was great to see so much of the industry in one place, and a walk around the exhibition was a good learning experience."

A separate seminar was also run on PROFIBUS, a fieldbus communication technology, focusing on its application in the water, waste and environmental sectors, and Merck Millipore delivered a special session on the possible ban of the manufacture of COD tube/cell tests.

Smart Water Forum

This session began with a dissemination workshop from UKWIR. The study, which was completed by Jacobs, examined the trends in wastewater instrumentation, process automation & control and described the needs, trends and barriers that the UK water industry faces, including a resistance to the use of instrumentation. Oliver Grievson (Water Industry Process Automation & Control), who hosted the Forum, then gave a presentation on the future of instrumentation and its worth in AMP 6, giving examples of "Smart Solutions" that are available now.

Laurie Reynolds of Aquamatix described the Internet of Things and its place in the Water Industry, and how the way in which instrumentation data is currently captured and processed is set to change from a distributed network to a more dynamic way of working.

James Dunning from Syrinix then explained that in order for Smart Water innovations to be adopted by the industry, an improved financial approach needs to be taken. Providing a case study on pressure transients within the water distribution network, James explained that the cost of instrumentation is far outweighed by the losses that pressure transients can cause.

Tony Halker from Intellect Water then described the involvement of miniature sensors and sonde technology in the Smart Water4Europe Project. Tony explained that the measurement and visibility of water quality in the potable water distribution network, between the treatment plant and the customer's tap, is something the industry has sought for decades.

International Exhibition

The core WWEM exhibitors come back time after time, but as the importance of the event continues to grow, new companies from all over the world are drawn in with each show. This year, the exhibition was bigger than ever, featuring over 130 stands representing more than 250 of the world's leading providers of test and monitoring equipment and related services.

As a specialist event, the aisles of the WWEM exhibition are populated by visitors with a professional interest in testing or monitoring in the water sector, so feedback from the exhibitors was unanimously positive. "Great venue, well organised, well attended, great leads, what more can I say?" said Jeremy Smith from Aquamatic. Nigel Grimsley from OTT Hydrometry agreed: "WWEM 2014 was very good for us - we received some excellent leads and held some very interesting discussions with key players in the water and weather monitoring sectors. Our flow monitoring products, the new HL4 water quality monitoring system and the Pluvio2 raingauge were particularly popular with visitors."

Emphasising the importance of the event as an opportunity to meet the whole industry, Steve Tuck from PPM said: "WWEM is an ideal opportunity for knowledge transfer and networking amongst the water community."

From a laboratory equipment supplier's perspective, Natalie Barton from SEAL Analytical said: "We launched a new discrete analyser at WWEM so we were delighted to meet so many customers and prospects from commercial, utility and research labs."

Xylem Analytics launched three major new products at the show. Expressing his delight, General Manager Darren Hanson said: "WWEM 2014 was a particularly important event for us, and with a focus on water testing and monitoring almost every WWEM visitor was interested in at least one of



the new products. The new YSI ProDSS is the most advanced portable multiparameter instrument that we have ever developed and was the subject of a well-attended workshop, as was the new WTW UV-VIS sensor range. We also took advantage of the demonstration area to explain the advantages of the IQ SENSOR NET wastewater treatment plant monitoring system."

Over 80 Workshops!

The Workshops ran almost continuously throughout the 2 days and covered an enormous variety of subjects within the overall testing and monitoring theme. These included flow monitoring presentations covering technologies such as laser, ultrasonics, clamp-on, magnetic flow and integrated flow and pressure metering. Water quality workshops covered the measurement of almost every parameter of interest including TOC, turbidity, pH, conductivity, dissolved oxygen, nitrate, trace metals, organic loading and toxicity. These presentations included handheld instruments as well as continuous and remote monitors, and also addressed data collection techniques and data management software.

Many of the process monitoring workshops examined common operational issues such as chemical precipitation in wastewater treatment, flood defence and asset monitoring, real-time sewer and CSO monitoring, and leakage monitoring and management.

Two of the eight workshop rooms were dedicated to gas detection and monitoring and these presentations covered technologies such as PID, NDIR, electrochemical and pyroelectric sensors. Workplace exposure, instrument calibration and the creation and certification of calibration standards were among the themes of these workshops.

Laboratory analysis was a common theme of many workshops. For example, a presentation by CitySprint examined the challenges faced by sample couriers and another looked at AQC charting software. Laboratory accreditation was also addressed in addition to specialist subjects such as the preparation of inorganic standards, complete ion analysis, TOC, COD, total cyanide and toxicity testing. There were presentations on automated pH and turbidity testing in addition to seminars on lab robotics. One of the speakers also provided a comparison between online and laboratory analysis of TOC, ammonia and BOD. With US EPA approval for the Chloridiox™ Plus, Palintest delivered a workshop entitled '10 things you need to know about the monitoring of total residual oxidants'.

Instrumentation Demonstration Area

This year and for the first time, WWEM included a Supplier Instrumentation Demo area. WRC hosted this area which, over the 2 days, saw 25 companies provide demonstrations of their technology to those attending the exhibition. Everything from sample preparation technology through to toxic gas detection was demonstrated highlighting the breadth of technologies on show.

Leo Carswell, Head of Technology at WRC, comments: "WRC were delighted to be the first host the new 'Demo Lab' which has been a huge success and offered delegates the hands-on experience that is often lacking at exhibitions. The high quality of these demonstrations showed the passion and enthusiasm that suppliers have for their technologies."

British Water & WWEM 2014 Innovation Exchange

Running throughout the first day of WWEM 2014, this event brought together Water Companies, their partners, and representatives from other water-using industries with British Water members and non-members to identify technology needs and explore available and potential solutions. The day included concurrent workshops on Water Monitoring, Wastewater Monitoring, and Environmental Monitoring, led by British Water, Black & Veatch, and J.Murphy & Sons respectively. The participants included Affinity Water, Bristol Water, United Utilities, Yorkshire Water, Dŵr Cymru Welsh Water, Thames Water and many of the industry's key contractors.

Gala Dinner

Following a black-tie dinner, MCERTS instrument certificates were awarded to ABB, BioTector, Endress+Hauser, GE, HACH LANGE, Krohne, Mobrey, Nivus, Partech, PPM, Pulsar, Siemens, Sirco Controls, Teledyne ISCO and YSI. MCERTS inspector certificates were awarded to Aaron Hiden and Phil Rose from Critical Flow Systems, and to Simon Richardson from SIRIS Environmental Flow Surveys.

Tribute was made to the late Bob Cooper, who sadly died this year. A Director of Sira Certification, Bob was well known and highly respected in the water industry and will be sorely missed.

The WWEM Gala Dinner also included the presentation of the WRC Instrument User Group (IUG) Award for After Sales Service. The IUG is made up of 11 UK water companies and this award highlights exceptional after sales service from instrument suppliers. This year the award was won by Process Measurement and Analysis (PMA). Roger Powell, Sales Director at PMA comments "Having previously been runner-up, it was gratifying that our renewed efforts in customer support were rewarded with an outright win in 2014. Presentation of the award by Leo Carswell, Head of Technology at WRC, was icing on the cake. WWEM is the premier event of its type and receiving the IUG award at the gala dinner was extra special."

SWIG presented Zoe Ayres from the University of Warwick with first prize in the 2014 Early Career Researcher Competition, for her work on 'Heavy Metal Detection in Aqueous Environments', and CoGDEM's current Chairman Dr John Saffell presented past Chairman and founder member John Sonley with a certificate in recognition of his outstanding service to CoGDEM.

Reflecting on the success of WWEM 2014, organiser Marcus Pattison said: "In this internet age it can be difficult to prize people away from their desks and lab benches. However, it is important to remember that there are 3 ways in which people find new opportunities: active searching, opportunity creation and fortuitous discovery. People can actively search on the internet, but they only usually find what they are looking for, whereas visitors to WWEM events are creating opportunity; they are actively seeking and finding information that they need, and they are also creating opportunity for fortuitous discovery – finding something that they weren't necessarily looking for!

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Water Companies Get Pumped Up Over Scottish Academic Partnership

A research partnership between Scottish Water, the University of Strathclyde, and **CENSIS**, the Scottish Innovation Centre for Sensors and Imaging Systems, could lead to a breakthrough in how utilities monitor their assets. The University is collaborating with Scottish Water to develop a software solution which will help utilities identify signals generated from assets which could indicate potential breakdown events. Current comparable software either monitors assets and raises an alarm when a fault occurs in one or more of these, or provides generalised estimates of expected failures without taking into account the full effect of combining the available data streams.

This means that users can normally respond only after machines have stopped working, which results in maintenance work having to be reactive. This can place pressure on resources, decrease efficiency and result in a reliance on backup equipment.

In this project, the software will monitor data produced by several types of water infrastructure assets and meters, including but not limited to temperature, flow, and pressure levels, in order to detect any precursor signals which indicate that maintenance work should be considered.

Scottish Water says the technology will help the publicly-owned company to better serve its customers, realise efficiencies in how it delivers the service, be more proactive in its maintenance, and ensure that plant and equipment is meeting suppliers' performance specifications.

Robert White, Water Operations North Team Manager at Scottish Water, said: "Prevention is always better than cure, and this piece of technology is going to act as an early warning system for potentially tens of thousands of our assets across the country.

"Planned repairs are normally significantly cheaper than replacements of the equivalent machine. We operate and monitor a large number of diverse water and wastewater assets across Scotland, a considerable number of which are in remote locations, underlining the scale of our operation and the challenges we face in maintaining all of these assets.

"This software has the potential to make proactive maintenance a much easier task. We will be in a position to schedule maintenance for when and where it is really needed, which will minimise asset downtime. We can then plan our resources more effectively. At the same time, we'll be able to monitor the performance of all our assets to ensure each operates to their specifications."

To develop the software, Scottish Water will work with the University of Strathclyde's Centre for Intelligent Dynamic Communications (CIDCOM), Department of Electronic and Electrical Engineering, which has a strong background in data learning.

Dr Alison Cleary, a senior researcher in the Strathclyde group, said the technology could be spun out to other utilities and a wide variety of other sectors. The potential commercialisation of the software will also be explored as part of the project.

Dr Cleary said: "This is an exciting project for us which combines a hands-on approach with academic skills in data analysis. The initiative could have a much wider application than monitoring water pumps. It could be used by other utilities to monitor the data produced by generators and a variety of other types of devices.

"The software could be used by almost any business that uses a large number of machines which require maintenance. This is an exciting project that could lead to significant efficiencies and savings for businesses in many sectors."

CENSIS contributed £50,000 of funding towards the project, which will begin at the end of September. Its Chief Executive, Ian Reid, said the initiative demonstrated what could be achieved when the expertise of academia and businesses were combined.

Ian said: "This project between Scottish Water and the University of Strathclyde is a great example how the business and academic worlds can come together to the benefit of all.

"While this project is expected to have a benefit in the short term to an organisation which has an important role to play in the Scottish economy, the results could have a much broader global impact.

"With potential widespread application, this could save a lot of time and money that would normally be spent on repairing machinery. We're excited to see the results of this initiative and how it can be adapted to other uses."

For More Info, email: 32505pr@reply-direct.com