

Report on the PPCHEM/SWAN Power Cycle Instrumentation Seminar in Seoul, South Korea

In the third year since its introduction, the PPCHEM/SWAN Power Cycle Instrumentation Seminar Series continues its mission to expand the knowledge of cycle chemistry and the understanding of analytical instruments. This year the seminar series stopped over in Wadowice, Poland (May 12–13, 2014), Manila, Philippines (September 21–23, 2014), and Seoul, South Korea (September 24–26, 2014).

The events were held under the patronage of Waesseri GmbH, publisher of PPCHEM, and SWAN Analytical Instruments provided financial support.

This report focuses on the seminar held in Seoul – the two other seminars addressed the same topics, however the speakers and their presentations differed from place to place. All of the seminars consisted of the well-proven mixture of presentations given by technical experts and a hands-on session in which the participants worked with real instruments. The presentations were topically divided into two groups, the first having a more general focus on the context of power cycle instrumentation, and the second concentrating on analytical methods and instruments.

AGENDA

Context Session 1

The session was opened by Michael Rziha, chairman of the IAPWS power cycle chemistry working group, member of several VGB workgroups and – last but not least – a new member of PPCHEM's International Advisory Board. To provide the audience with a first introduction to the subject, he presented the different chemical regimes and their respective monitoring requirements as well as the different guidelines for monitoring parameters and critical values. Information about the different guidelines may be downloaded at [1]. As a member of the VGB committee, Michael also took a look at the revised guideline VGB-S-010-2011 (formerly VGB R450 L).

The second speaker, David Addison, principal consultant of Thermal Chemistry Ltd, and member of the IAPWS power cycle chemistry working group, spoke about the role of the chemist in the trouble-free operation of boilers

and heat recovery steam generators (HRSGs). The chemist's primary function is to prevent corrosion- and deposition-related failures in the power plant so that the plant is available to operate as and when required. At first glance this may be obvious, but there are several issues to be considered in order to establish a good chemistry control system.

The first morning session was concluded with a panel discussion to provide time for the seminar series' underlying motto: questions are essential to learning.

Instrument Session

The afternoon session was dedicated to online instrumentation, beginning with presentations on recent developments in cycle chemistry and corrosion trend monitoring. Dissolved hydrogen and its use as a diagnostic parameter for the assessment of the general formation of protective layers, iron monitoring with non-contact nephelometry, and developments regarding the monitoring of organics were explained and case studies were presented.

Direct, acid and degassed conductivity, pH, dissolved oxygen, sodium, silica, phosphate, and total organic carbon (TOC) were the parameters discussed in the second part of this session. Specialists gave an introduction to the analytical methods and the critical issues for each parameter with respect to operation, verification and calibration. The emphasis was on understanding the basic principles, typical sampling points, and guidelines, instead of focusing on specific brands.

The first day was concluded by Manuel Sigrist, head of Swan Systems Engineering and member of the VGB workgroup for sampling and instrumentation, whose presentation focused on the quality assurance for online water/steam analysers.

Context Session 2 and Instrument Session

The morning session of the second day refocused on the more general context of power cycle instrumentation. The session was opened by David Addison, who presented





two case studies to illustrate the potential cost to a plant of substandard sampling and analysis systems. Both cases showed that the most important precondition for an effective troubleshooting is the availability of good quality data. If the quality of the data is very poor, cycle chemistry troubleshooting becomes very difficult if not impossible.

Michael Rziha continued the morning session by providing an insight into the special instrumentation requirements during commissioning and start-up. Most guidelines do not distinguish between normal operation and commissioning. However, some issues are specific to commissioning, such as the higher load of undissolved solids and the frequent clogging of sample lines.

Manuel Sigrist concluded the morning session with a presentation on the new VGB guideline [2] for sampling, sample conditioning and online monitoring of water/steam chemistry parameters.

After the lunch break, Manuel presented an overview of good practice in sampling system design, focusing on key functions of sample conditioning (temperature protection, and handling of variable sample temperatures and pressures) and on the importance of modular process-oriented design for each measurement as well as for the overall system arrangement.

David Addison then reported on cooling water monitoring requirements. Keeping the cooling water system as clean

as possible is essential for an efficient heat exchange in the condenser/primary heat exchanger area of the system or in the cooling tower. Scale development, corrosion and bacteria/microbiological growth are the key factors to be monitored.

The differences between the water/steam cycle chemistry and the cooling water cycle chemistry also imply fundamentally different requirements in terms of sampling system design. To illustrate this aspect, Manuel Sigrist presented the challenges and specific design considerations for online sampling and monitoring systems in the main cooling water system.

After a short break, attention was again drawn to online instrumentation. Disinfectant monitoring and turbidity measurement completed the list of the introduced parameters.

Hands-On

The last session was dedicated to operation and maintenance. The participants worked in groups with real instruments under the guidance of experts. Quality assurance was the most important issue. "How do you know it's right?" was the most prominent question. Hopefully the session made many technicians feel more comfortable with their analysers.

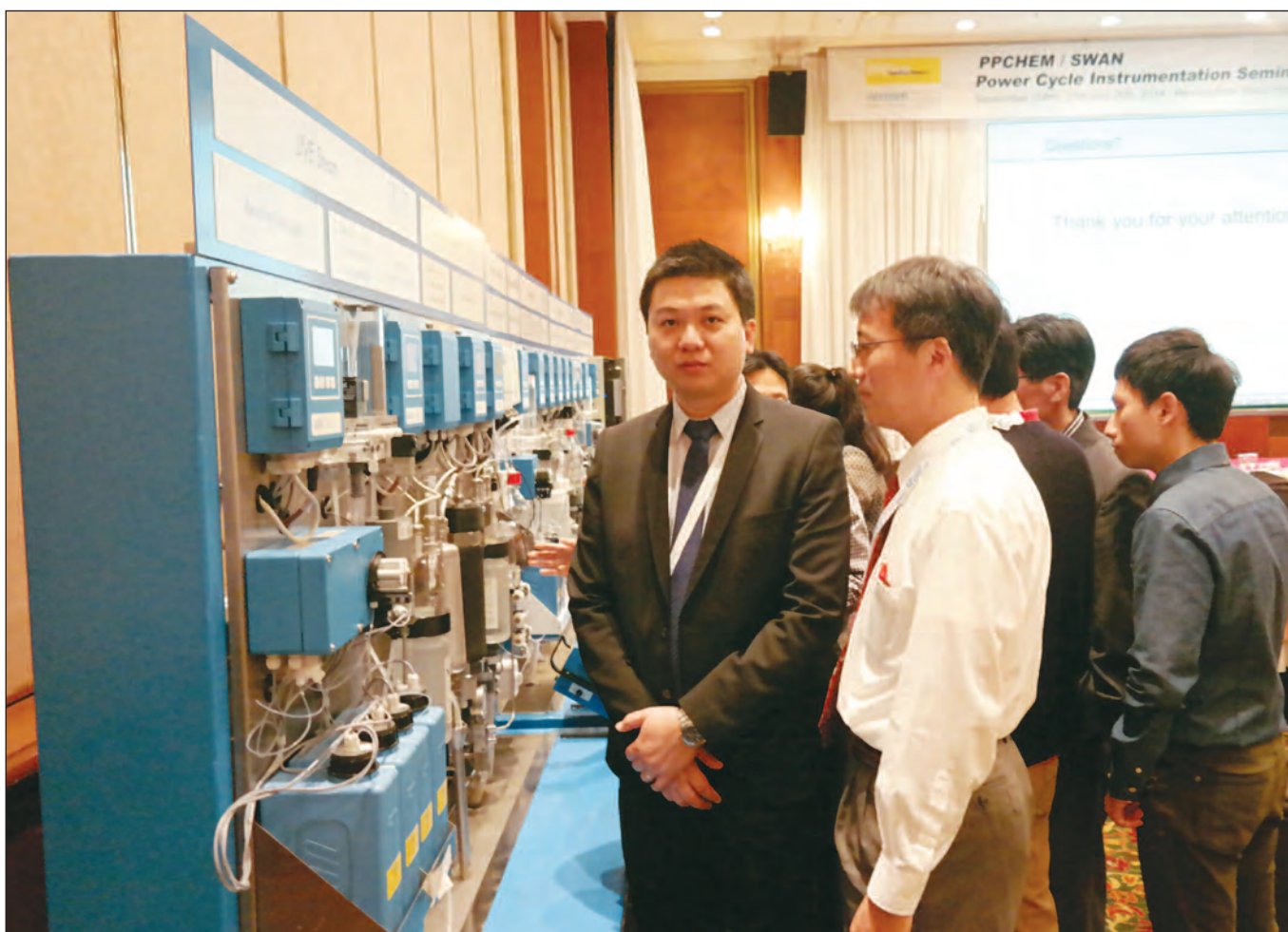
CONCLUSION

The seminar in Seoul attracted over 40 station chemists, instrument technicians, designers and C&I-engineers. Linked to participation was a free e-paper subscription to the PPCHEM journal for the next year.

The feedback from the audience was very positive. In order to continue expanding the knowledge of cycle chemistry and the understanding of analytical instruments, the organizers have decided to repeat this kind of event on a regular basis.

New events are already being planned. Seminar dates and other details will be published in this journal as soon as they are available.

- [1] EPRI: <http://my.epri.com>;
IAPWS: <http://iapws.org>;
VGB: <http://www.vgb.org>.
- [2] *Sampling and Physico-Chemical Monitoring of Water and Steam Cycles*, 2012. VGB PowerTech Service, GmbH, Essen, Germany, VGB-S-006-2012-09-EN.



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