

## BLUE BOOKS GO DIGITAL AND ARE THE STANDING COMMITTEE OF ANALYSTS (SCA) STILL STANDING?

One of my first jobs was in the Tayside Regional Council Public Analysts laboratories in Scotland and I can still remember as a young technician following the "Blue Book Methods" in the Water Analysis laboratory there. So, you can imagine my surprise when the first day of the recent meeting titled "Driving Innovation in Water and Waste Analysis Methods" at the SCI in London was all about Blue Books and the Standing Committee of Analysts (SCA). However, it soon became apparent that there was a great deal of interest in both.

The SCA comprises a series of working groups who provide guidance on methods of sampling and analysis for determining the quality of environmental matrices. Guidance is published as Blue Books within the series Methods for the Examination of Waters and Associated Materials which are available globally. See <http://www.standingcommitteeofanalysts.co.uk/>

Following the welcome and introduction from Marcus Rink the first session of the meeting focussed on the SCA past and present.

The first presentation was by Prof K. Clive Thompson who gave a personal view of "The SCA Story: Past Present and Potential Future". Clive began by comparing methodology for water analysis in 1962 and post 2000 highlighting how technology, workloads and commercial considerations had changed the approach and how the publication of 238 SCA Blue Books had aided method best practice and standardisation. Clive then moved on to discuss the history of the SCA which was established in 1973 by the Department of the Environment and is now managed by the Environment Agency in the UK

The SCA exists to provide authoritative guidance on methods of sampling and analysis of waters and effluents, sewage sludges, sediments, soils (including contaminated land) and biota and the primary duty of SCA is to develop and publish recommended analytical methods. It represents the collective knowledge of the UK in the provision of methodology which is given and shared freely for the purpose of ensuring quality and consistency in the chemical and microbiological analysis of water, waste water and related materials. Clive then went on to discuss SCA methods and gave his personal views on method validation and the pitfalls of approaches such as ISO and CEN interlaboratory trials as a means of validating analytical methods and where he felt the EU Project "HORIZONTAL", whose aim was to prepare methods that could be adopted by CEN as European Standards and cited by the European Commission in legislation, had limitations in some of the technical approaches for ISO method validation. He went on to discuss a long list of emerging analytical challenges for the water industries including pathogenic bacteria, viruses and prions, pharmaceuticals, transformation products, nanomaterials and microplastics and the possible implications of non-monotonic dose toxicity response curves.

The next presentation "Defining the SCA Priorities" given by Marcus Rink, the UK Governments Chief Inspector of Drinking Water and Chair of the SCA board, brought the SCA story up to date. Marcus reinforced the purpose of the SCA and recognised that it has long been regarded as the expert committee for accepted methodology to enable compliance with regulation. However, he stressed that it must continue with a sense of direction, be financially supported by relevant stakeholders in its work and also held to account by its stakeholders. Marcus described how following a period somewhat in the doldrums the SCA had now been revitalised through a strong leadership Board whose objectives

included agreeing a long term strategy, directing the SCA working groups and setting objectives to ensure that methods produced are best practice and align with regulation. The aim was to ensure that UK methodology remains a worldwide standard and to promote membership support to ensure a long-term future for the organisation. In 2012 the SCA board developed five strategic objectives: -

- Develop and implement methods that are current, robust, usable and are globally recognised
- Build relationships in order that laboratories and regulators and those who accredit have confidence in the methods
- A trusted and professional body
- Recognised experts in Drinking Water and Environmental Analysis
- To be an industry focus for innovation and R&D

In 2013 the SCA surveyed users who covered a wide range of activities as shown in Figure 1 and the majority either used the SCA Blue Books as the basis of an in-house method or as a reference to develop new or amend current methods.

The results of the survey in combination with the strategic objectives were employed to develop a strategic delivery plan to

- Produce and Publish the Strategic Direction
- Improve Access to both Current and Historical Methods
- Support the Working Group Structure
- Improve the Participation at Working Level
- Promote the Work of SCA

Marcus then discussed the SCA website and commented on the increasing number of site interactions (Figure 2) especially in the period since August 2017. He concluded by highlighting the next steps in the journey which included increasing membership of the SCA Working Groups, increased resourcing both financially and people, increased company engagement and ensuring the SCA outputs were targeted at the end-users. He encouraged delegates (and their companies) who had an interest in volunteering to work with and for the SCA to contact them.

The final presentation in Session 1 "The UKAS Perspective" was given by Paul Greenwood who is Divisional Director (Operations) of the United Kingdom Accreditation Service (UKAS) and sits on the SCA Board.

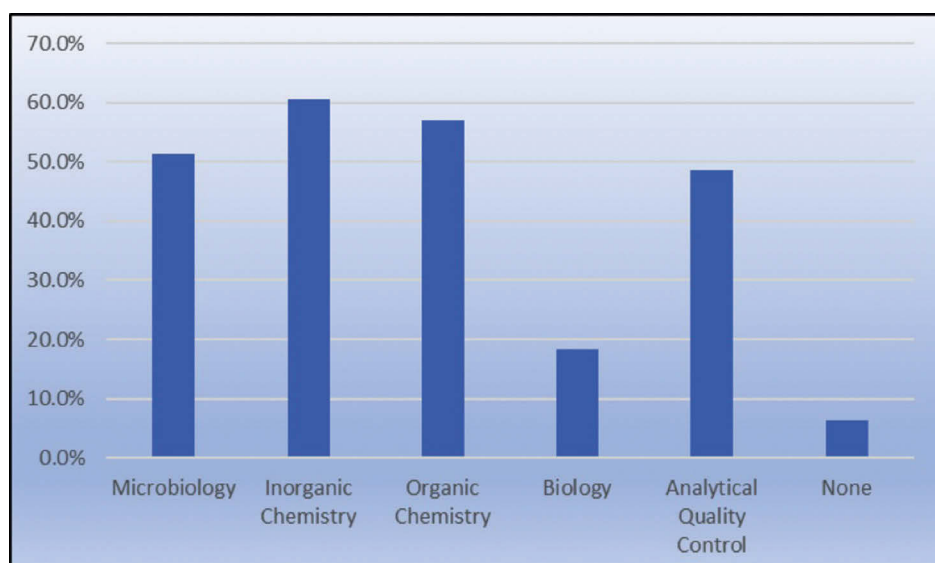


Figure 1: Activity range of the 2013 surveyed SCA users Data reproduced courtesy of the SCA

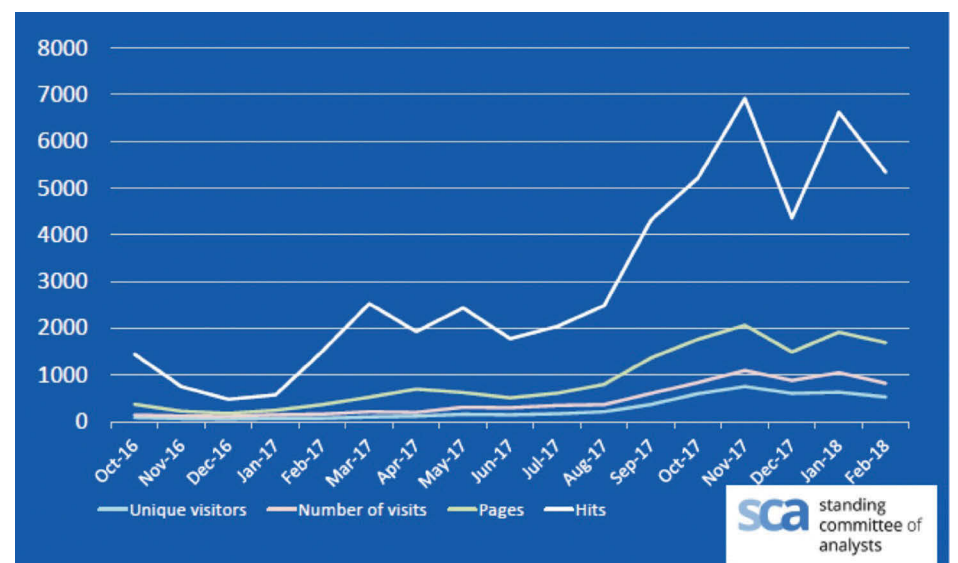


Figure 2: Access data for the SCA website covering the period October 2016 and February 2018

Paul began by showing the history of UKAS from its origins as the British Calibration Service in 1996 through to the present day. He gave an overview of the structure and governance of UKAS and explained that Accreditation was a formal independent recognition of competence to perform specific tasks, and usually the reason for getting an independent evaluation by an accredited organisation is to confirm it meets specific requirements to reduce risks. Accreditation means that testing laboratories have been assessed against internationally recognised accreditation standards to demonstrate competence, impartiality and performance capability, so that their customers can have greater confidence in the results. Accreditation applies internationally and also applies internationally recognised and agreed standards via a hierarchy model ultimately leading to International Standards (ISO) and particularly ISO 17025 "General requirements for the competence of testing and calibration laboratories".

Paul went on to discuss the benefits of SCA Methods for accreditation. They are relatively quick to produce and update and contain data that is easy to authenticate. They are relevant to specific issues experienced in the sector and provide consistency of approach while remaining sufficiently flexible to allow deviations for specific applications.

The use of SCA methods by laboratories assists accreditation as they underpin best practice and mean that UKAS does not need to go "back to the drawing board" for every assessment it undertakes.

Paul then ran through the main technical aspects of accreditation including the equipment used, accommodation and environmental issues to ensure safe and consistent application of the method, personnel competence and training, the fitness for purpose of the method and its validation, and finally the processes employed in generating and reporting results.

Paul summarised by stating that standards are vital to provide an agreed point of reference for everyone as this ensures that when UKAS performs an assessment and raises an issue it is not just an assessor's whim or a laboratory's opinion. Standards provide an extremely good starting point which engenders consistency and best practice across the environmental sector and UKAS is extremely supportive of the development and use of SCA Blue Book methods.

The second Session was tailored to delve more deeply into the current operations of the SCA and featured presentations from the various technical Working Groups.

### The SCA Microbiology Working Group

Shaun Jones, Chair of the SCA Microbiology Working Group discussed the "Evolution of Microbiology". Basically, the Group look at methods to examine materials for microbes with the aim to provide empirical evidence as to the microbial content. Over the years, they have produced numerous Blue Book reports on the Microbiology of Drinking Water as well as methods for the Microbiology of Recreational and Environmental Waters and methods on the Microbiology of Sewage Sludge. (See <http://www.standingcommitteeofanalysts.co.uk/Micro/micro.html> and up to Oct 2014 <https://www.gov.uk/government/publications/standing-committee-of-analysts-sca-blue-books> )

Shaun then recognised over 60 technical contributors and 28 sponsoring companies who enabled the Group to deliver their output. Turning to future challenges for the Microbiology Group Shaun highlighted that there are many micro-organisms out there many of which have still to be discovered and their significance to health determined. He also discussed the challenges of keeping up with new technology and managing the transition from conventional wet chemistry methods to new automated ones. He highlighted 3 emerging technologies - chromogenic and fluorogenic media, flow cytometry and MALDI-TOF technology and concluded by stating that the SCA must ensure that their methods recommend the best and most current proven scientific techniques.

### The SCA Soils Working Group

Hazel Davidson, Chair of the SCA Soils Working Group began by covering the history of the soils working group which was formed in 2001 and set up subgroups for soil preparation, PAHs, dioxins, PCBs, metals, sulphide, cyanide, Total Petroleum Hydrocarbons (TPH) and sulphate. Following a period of inaction from circa 2008 the group was reconvened in 2011 and an asbestos sub-group was set up in 2012. The following methods for the analysis of soils are currently available on the website:- PAHs, Acid soluble sulphide, Cyanide & thiocyanate, Soil preparation, Metals, pH, VOCs, PCBs and Asbestos. Hazel also discussed the problems with soil sampling/handling including sample homogeneity, or lack of it, the uncertainty in sampling and subsampling and the uneven distribution of contaminants. There were also issues around whether the sample should be analysed wet or dry and whether any material should be removed prior to processing and the use of proficiency testing schemes. Hazel also discussed recent developments including comprehensive 2D GC which can give enhanced resolution and sensitivity for volatile components and the automated analysis of anions where modern continuous flow analysers can achieve 600 samples per hour.

She discussed the analysis of respirable fibres in respirable dust stating that the mass % of asbestos in soil is not always a good indicator of risk. The SCA approach can provide an estimate of the three key indicators of the risk that were not possible to calculate before namely: - the fibres per ml of asbestos in air at a given level of dustiness (0.5 mg m<sup>-3</sup> for example), the dustiness level on site before the clearance indicator of 0.01 f/ml would be breached and the dustiness level on site before the control limit of 0.1 f/ml would be breached.

Hazel concluded by stating that the documentation of soils methods is slowly progressing but the lack of homogeneity of soils and the issue of representative samples/subsamples will always need to be considered. Harmonisation between laboratories is improving due to the use of SCA methods but more work is required.

### The SCA Organics Working Group

Dr Ian Barnabas, Chair of the SCA Organics Working Group gave an overview of the group which published its first method on Organochlorine Insecticides and Polychlorinated Biphenyls in Water in 1978 and has since published circa 40 Blue Books covering a wide range of topics and chemistries. He described how the Group had published a Blue Book containing 3 variations of SPE-GC-MS methods for N-Nitrosodimethylamine (NDMA) developed by different UK water companies and similarly a Blue Book covering 6 methods for Phenoxy acids. He went on to describe how a subgroup had been working on "Taste and Odour" methods including Geosmin (trans-1, 10-dimethyl-trans-9-decalol)

## Organics Working Group – current work

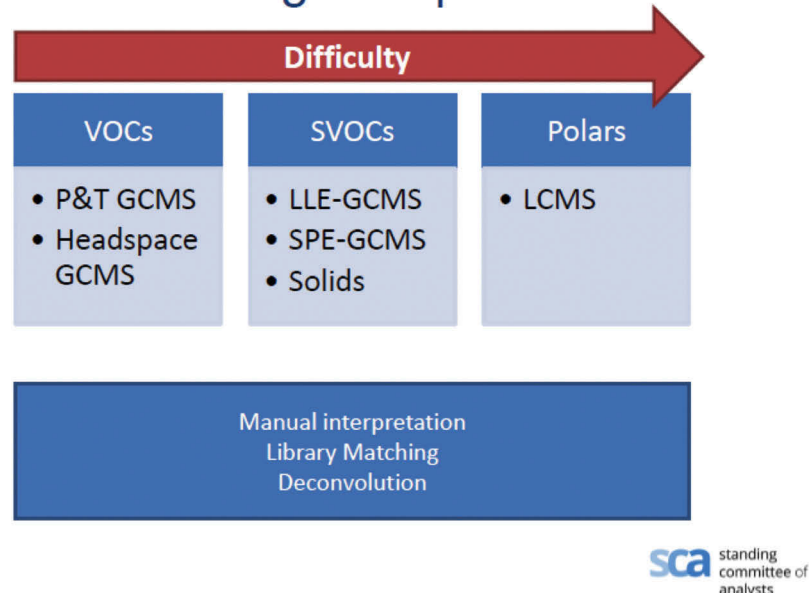


Figure 3: Current workstreams of the SCA Organics Work Group as presented by of Dr Ian Barnabas.

and MIB (2-methylisoborneol), anisoles, substituted phenols and 2-EMD (2-Ethyl-4-methyl-1,3-dioxolane)/2-EDD (2-Ethyl-5,5-dimethyl-1,3-dioxane) and stated that an update will be published soon.

Moving to current work the group has workstreams looking at methods for VOCs, SVOCs and Polars as shown in Figure 3 and the topic of plastics and microplastic pollution is a key area for future studies. In addition to covering the Organics Dr Barnabas also covered the Sample Stability and Uncertainty of Measurement work sub-groups where the SCA has also been active in responding to changes in requirements and a Blue Book titled "Estimation of Uncertainty of Measurement for Chemical and Physico-chemical Determinands in Drinking Water 2018" has recently been published and made available on the SCA website.

### Inorganics and Metals Working Group

Fran Bilby gave an overview of the Inorganics and Metals Working Group which started in 2013 and has a five year plan in place to review, maintain, revise, amend and update and develop existing Inorganic Physio Chemistry and Metals methods portfolio for drinking water and waste water. The group, which had 30 participants, had reviewed existing methods and developed a priority list where the introduction of new technology warranted a revision. These included the introduction of automation of methods for pH, turbidity, colour and electrical conductivity and where developments in ICP-OES and ICP-MS with collision cell technology had warranted reviews. Looking to the future in 2019 the group will develop new 5-year Plan covering novel technology for on-line monitors, looking at environmental benefits and further updates to existing Methods.

Following the formal presentations there was a lively panel discussion session on future challenges for the SCA and the day concluded with a summing up by Marcus Rink who reinforced the messages from the day and especially the fact that the SCA is an open organisation which relies on the participation of individual volunteers and the support of their employers to continue its valuable work. He invited anyone interested in becoming involved with the SCA or any of its working groups to contact them via email at [sca@standingcommitteeofanalysts.co.uk](mailto:sca@standingcommitteeofanalysts.co.uk)

### Conclusions

The methods the SCA produce are based on best practice gleaned from, and moderated by, experts in their field and users can have confidence that they are based on methodology which has been well proven usually in internationally accredited laboratories. The Blue Book methods produced are freely available globally and many of the archive methods are valuable reference materials for developing countries which may not have access to the latest technology instrumentation or where laboratories are developing bespoke methods relevant to their locale. I was very impressed by the enthusiasm and professionalism of all the delegates who contributed to the meeting and their desire to make the world a better place in terms of the quality of water and our environment.

The SCA clearly has a clear vision and purpose for the future and the SCA certainly deserves the continued support of government, water and environmental waste companies, other stakeholders and instrument manufacturers to continue the valuable work it carries out.

### Useful Links

Access the Standing Committee of Analysts (SCA) Blue Books at <https://www.gov.uk/government/publications/standing-committee-of-analysts-sca-blue-books>

(Up to Oct 2014)

The Standing Committee of Analysts Website including an archive of full pdf versions of the older HMSO Printed Blue Book publications which are all listed in the above web site

<http://www.standingcommitteeofanalysts.co.uk/>

Contact the Standing Committee of Analysts

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