THE SOCIETY OF ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY: A FORUM FOR DISCUSSION OF GLOBAL CHEMICAL POLLUTION ISSUES

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Abstract
The Society of Environmental Toxicology and Chemistry (SETAC) is a nonprofit, worldwide professional society of about 5000 members with approximately 40% from academia, 40% from industry and consultancies, and 20% from government. SETAC's mission is to support the development of principles and practices for protection, enhancement and management of sustainable environmental quality and ecosystem integrity. SETAC comprises four Geographical Units, North America, Europe, Asia-Pacific and Latin America, and membership is growing particularly in the Asia-Pacific region. SETAC acts as a meeting place and homebase for global initiatives such as the UNEP–SETAC Life Cycle Initiative and for advisory groups focusing on chemical and risk assessment issues, pharmaceuticals and on bioaccumulation testing. The attraction for these professional advisory groups is the ability to get members together and hold sessions at SETAC meetings and the multidisciplinary scope of SETAC membership. SETAC has frequently been a meeting place for discussion of issues raised by the IPCP. The IPCP initiative promises to raise the profile of global transboundary chemical pollution issues and to bring the science on these issues to decision makers. SETAC and IPCP would benefit from joint initiatives such as special sessions at its annual meetings, technical workshops, and publications.

Introduction
The Society of Environmental Toxicology and Chemistry (SETAC) is a nonprofit, worldwide professional society comprised of individuals and institutions engaged in the study, analysis, and solution of environmental problems, the management and regulation of natural resources, environmental education, and in research and development. SETAC's mission is to support the development of principles and practices for protection, enhancement and management of sustainable environmental quality and ecosystem integrity. The founding principles of SETAC are (1) Multidisciplinary approaches to solving environmental problems, (2) Balance: Academia, Business, Government and (3) Objectivity: Science-based. The Society currently has about 5000 members with approximately 40% from academia, 40% from industry and consultancys, and 20% from government. Membership is growing particularly in the Asia-Pacific region. SETAC comprises 4 “Geographical Units”, North America, Europe, Asia-Pacific and Latin America. About 60% of the members are from North America, 31% from Europe and 6% from Asia-Pacific. The Society has administrative offices in Pensacola, Florida and Brussels, Belgium with a total of about 14 full time staff members and relies on volunteers for organization of meetings and governance of the Society[1].

Overview of SETAC activities and initiatives
SETAC promotes the advancement and application of scientific research related to contaminants and other stressors in the environment, education in the environmental sciences, and the use of science in environmental policy and decision-making. The Society provides a forum where scientists, managers, and other professionals exchange information and ideas for the development and use of multidisciplinary scientific principles and practices leading to sustainable environmental quality. This forum is most clearly evident at SETAC annual meetings. In 2006 SETAC held 5 conferences which were among the largest annual gatherings of environmental scientists in their respective geographical regions. For example, SETAC Europe’s annual meeting in The Hague drew 1800 scientists. In Beijing,

SETAC Asia/Pacific hosted 350 scientists from 25 countries under the theme of “Growth with a Limit: The Integration of Ecosystem Protection for Human Health Benefits”. In Arusha, Tanzania, the SETAC Africa Branch and the African Network for Chemical Analysis of Pesticides (ANCAP) organized one of the largest gatherings ever of environmental scientists in Africa. More than 2300 scientists attended the SETAC North America annual meeting in Montréal in November 2006 to address “Global Environment and Sustainability: Sound Science in a World of Diversity”. The recent SETAC Europe 2007 meeting in Porto Portugal in May 2007 had 2000 attendees and included sessions on climate change and other nonchemical stressors, mechanisms of toxicity, ecotoxicology and stress, ecology, life cycle assessment, pollution and human health effects, political and socioeconomic aspects of environmental issues, tropical ecotoxicology, and new analytical tools in environmental chemistry among about 50 sessions over 4.5 days.

The meetings also provide attendees with professional development opportunities. The SETAC North America meeting in Montreal featured 13 professional development courses. In Porto, 12 professional development courses were held on subject ranging from “REACH and the emerging regulatory toolbox” to “best conduct and report aquatic ecotoxicity tests according to the International Guidelines”. There is very significant involvement and support of graduate student activities within SETAC. In Montreal, student-focused events had more than 600 attending, including the Student–Mentor Dinner, Lunch with an Expert, Job-seeking Skills Workshop, and Seminars on Career Experiences and Networking.

Sessions encompassing the latest advances in environmental chemistry and related disciplines are always a highlight of SETAC meetings. In fact, it is clear from the session topics that SETAC meetings are one of the main global forums for discussion of major topics in environmental chemistry such as new contaminants, quantitative structure activity relationships, chemical fate modeling, long range transport and deposition, bioaccumulation, metal speciation and bioavailability, and analytical methodology. Sessions on environmental fate and effects of nanomaterials, on pesticides, pharmaceuticals, perfluorinated compounds, on REACH, and on advances in bioaccumulation assessment were highlights of the recent meeting in Porto. Each meeting has numerous “first” reports of chemical concentrations in environmental media.

Of course, SETAC meetings also feature numerous sessions related to ecotoxicology of aquatic and terrestrial invertebrates, fish and mammals and on ecological risk assessment. SETAC meetings are the major forum for the emerging science in these fields and also for the interdisciplinary studies that bring together environmental chemists and toxicologists. Recent sessions at Porto included use of field-based (in situ) bioassays in regulatory risk assessment, toxic effects of "new" substances and environmental Quality Assessment using gene expression and "omics" as tools.

SETAC meetings also feature gatherings of professional interest advisory groups on “hot” topics. At the global level the Pharmaceuticals Advisory Group and the Bioaccumulation Science Advisory Group bring together scientists from industry, government and academia for meetings and workshops. In Europe there are Advisory groups on Dung Organism Toxicity Testing, Ecological Risk Assessment, and Pesticide Soil Microbiology, and in North America on Ecological Risk Assessment, Contaminated Soils, Metals, and on Fate and Exposure Modeling.

SETAC also organizes technical workshops on specific emerging topics and publishes the proceedings as books or special journal issues. Known as the “Pellston” workshops these typically bring together 40-50 experts. A balance among academia, business, government, and public-interest groups is sought in both representation by technical experts and in financial support. Recommendations from the workshops often feed into regulatory initiatives on chemicals. For example, the 1998 workshop on “Evaluation of Persistence and Long-Range Transport of Organic Chemicals in the Environment” published a book and summary document which contributed to the science supporting the development of the 2001 Global Convention on POPs. During 2006, Pellston workshops were held on “Veterinary Pharmaceuticals” in response to public interest in the effects of pharmaceuticals in surface waters and

groundwater and consequences of exposure to these compounds in humans and non-target species in the environment and on "Molecular Biology and Risk Assessment: Evaluation of the Potential Roles of Genomics in Regulatory Ecotoxicology".

SETAC also publishes two journals. Environmental Toxicology and Chemistry (ET&C), which has been published since 1982, supports 3 key disciplines: Environmental Chemistry, Environmental Toxicology (aquatic, plants, and terrestrial), and Hazard/Risk Assessment. ET&C is second only to Environmental Science and Technology in terms of Impact Factor for journals publishing articles on ecotoxicology, environmental chemistry of organic chemicals and heavy metals, chemical fate modeling and ecological risk assessment. A new journal, Integrated Environmental Assessment and Management (IEAM) was started in 2005. Focusing on more applied topics than ET&C, it publishes papers in environmental management, environmental modeling, human health and ecological risk assessment, landscape-level and population assessment, multi-criteria decision analysis, regulatory policy, sediment management, sustainability and life cycle assessment, and watershed management.

SETAC also enjoys a long-term, successful partnership with the United Nations Environmental Programme (UNEP) in the UNEP–SETAC Life Cycle Initiative, facilitating knowledge exchange among experts in 4 regional networks (Africa, Eastern Europe, Latin America, and Southeast Asia) and promoting life cycle thinking worldwide. SETAC brings three features that are also critical and important to the LCA community: 1) its membership is international; 2) its scope is multidisciplinary, and 3) its governance and membership are multisector, representing government, industry, and academia. The Initiative is entering its second phase with the objective of bringing science-based life cycle approaches into practice in partnership with the World Business Council for Sustainable Development. SETAC annual meetings typically feature several sessions on Life Cycle analysis. For example at Porto (May 2007) sessions were held on "Life Cycle Management in Industry and Public Policy", "Life Cycle Impact Assessment" and "LCA and Emerging Issues"

Possible Links of SETAC with the IPCP

The International Panel on Chemical Pollution (IPCP) has the primary goal of addressing issues such as (i) incomplete and fragmented scientific knowledge about sources, fate and effects of chemicals in the environment (ii) high uncertainties of much environmental chemistry data and modeling predictions which impede the use of scientific results in decision making processes, and (iii) insufficient support and funding for research into many aspects of chemical pollution[2]. The IPCP would address transboundary pollution by chemicals undergoing long-range transport, in particular persistent organic pollutants (POPs), but also local pollution problems occurring in a similar way in several countries. The IPCP is presently an international network of scientists with environmental and atmospheric chemistry expertise. It plans to find support for the panel by governments from countries in all regions of the world and also within the UN[2].

The scientific goals of the IPCP fit very well with those of SETAC and the issues identified in the article on the IPCP[2], particularly the above points i and ii, are ones that that have been addressed in SETAC conference sessions, and at Pellston workshops. A SETAC workshop on "Science-Based Guidance and Framework for the Evaluation and Identification of PBTs and POPs" planned for early 2008 will be another form in which issues identified in the IPCP article will be discussed and several members of the IPCP are invited participants.

As noted above, SETAC acts as a meeting place and "homebase" for global initiatives such as the UNEP–SETAC Life Cycle Initiative and for advisory groups focusing on regional and global chemical and risk assessment issues, pharmaceuticals and on bioaccumulation testing. These groups operate to a greater or lesser extent, independently of SETAC, e.g. seeking their own funding, organizing meetings and preparing scientific papers and reports. The attraction for these professional advisory groups is the ability to get members together at and hold sessions at SETAC meetings and the multidisciplinary scope of SETAC membership and meetings. The multisector

membership of SETAC, which strives for balanced representation of government, industry, and academia at most major meetings and within advisory groups, is an asset in terms of developing consensus on scientific issues. The OECD Expert Group for the Follow-Up of the OECD/UNEP Workshop on Multimedia Models, which included academic, government and industry scientists (including 2 co-authors of the IPCP article), met several times at SETAC meetings as part of its deliberations on long range transport modeling of chemicals.

The IPCP could become more formally associated with SETAC by becoming an "advisory group" to the Society. SETAC requires advisory groups to be multidisciplinary, with multi-sector and multinational representation [each as appropriate]). Participation in a Group does not require membership in SETAC. Further details can be found at http://www.setac.org/htdocs/files/agguidelines.pdf. As the IPCP expands to address various goals it will likely take on the required multisector membership. Also SETAC journals, particularly IEAM, which publishes multi-criteria decision analysis, regulatory policy and other assessments would be a good outlet for scientific "products" of the IPCP.

In summary, SETAC has been a meeting place for discussion of issues raised by the IPCP and will continue to do so. The IPCP initiative promises to raise the profile of global transboundary chemical pollution issues and to bring the science on these issues to decision makers. Broadly speaking, SETAC and IPCP share many common goals. SETAC would benefit from IPCP initiatives such as special sessions at annual meetings, workshop organization and participation, and publications. IPCP and SETAC would benefit from an association with SETAC in terms of access to multi-sector and global membership and as a meeting place and outlet for its scientific assessments.

References

(1) SETAC, *SETAC 2006 Annual Report*, Society of Environmental Toxicology and Chemistry, Pensacola, FL, 2006. 24 pp.

(2) Scheringer, M.; Fiedler, H.; Suzuki, N.; Holoubek, I.; Zetzsch, C.; Bergman, Å. *Environ Sci Pollut Res* 2006, *13*, 432 - 434.