Date: March 9, 2008

From: Peter Mahaffy, CCE Chair

To: IUPAC Bureau

Re: Report of CCE Plans for the 2008-2009 Biennium

This report outlines CCE plans for the 2008-2009 biennium, organized as follows

---

1. CCE terms of reference

(a) To advise the President and the Executive Committee on matters relating to chemistry education, including the public appreciation and understanding of chemistry.

(b) To maintain a portfolio of educational projects and to coordinate the educational activities of IUPAC.

(c) To monitor chemistry education activities throughout the world and to disseminate information relating to chemical education, including the public appreciation and understanding of chemistry.

(d) To develop liaisons with international organizations such as UNESCO, national and regional chemical societies, chemical education committees, and organizations concerned with the public appreciation and understanding of science.

2. Structure for CCE Activities

CCE carries out those terms of reference through the dedicated efforts of 8 titular members, 8 associate members representing divisions, 19 national representatives and three ex officio members - representing more than 30 countries. That work is focused through projects; through two subcommittees - Chemistry Education for Development, chaired by NR Mei-Hung Chiu (Taiwan) and Public Understanding of Chemistry (PUC), chair - temporarily vacant; and through the biennial International Conferences on Chemistry Education. In addition, educational activities are carried out in cooperation with IUPAC divisions and standing committees, coordinated by TM and division liaison, Eva Åkesson (Sweden). CCE also works with partners outside of IUPAC on particular areas of focus, such as the International Year of Chemistry.

3. CCE Priority Areas for 2008-2009

As requested, this report focuses on our plans for the 2008-09 biennium rather than past activities. In our January, 2008 strategy meeting, we proposed six priority areas for CCE, which will be addressed, modified, and worked out more fully by CCE membership at our August 3, 2008 meeting just prior to the 20th ICCE conference. Below each priority area, I have

highlighted one or more examples of proposed activities and approaches that CCE may use to address that area.

- *To foreground the importance of learner-centred chemistry curriculum, both in the developed and developing world. The extent to which this is done should be one criterion used to assess educational projects.*

  The concept paper developed by the Commission on Higher Education of the Office of the President for the Republic of the Philippines highlights the implementation of learner-centred approaches as a key goal for the forthcoming IUPAC-CCE Flying Chemist Programme Visit April 17-19, 2008. The overall goal for the visit, which is coordinated by CED subcommittee chair Prof. Mei-Hung Chiu, is to improve chemistry education in the Philippines, and stakeholders from many of the key universities, as well as government ministries will participate.

  The theme will be further developed for a global audience in various presentations and workshops scheduled for the 20th International Conference on Chemistry Education (ICCE) to be held in Mauritius, August 3-8, 2008

- *The efforts of CCE's Public Understanding of Chemistry committee will be focused on obtaining designation for an International Year of Chemistry and contributing to implementation, as appropriate.*

  CCE has placed a major priority on giving leadership to the process for obtaining designation of 2011 as an International Year of Chemistry by the United Nations. A draft recommendation has been placed on the agenda of the 179th Executive Board meeting of UNESCO as outlined further elsewhere in the Bureau agenda.

- *To give priority to initiatives that highlight the relationship between chemistry and sustainable development, consistent with the goals of the UN Decade for Education for Sustainable Development.*

  The UN Decade for Education for Sustainable Development was introduced as a key theme in the draft recommendation prepared for obtaining designation of 2011 as an International Year of Chemistry. This mechanism will help to ensure that IUPAC, chemical societies and other IUPAC partners in the International Year of Chemistry give attention to this area.

  A new CCE working group on implementing Green Chemistry approaches into education was established at the CCE meeting in Torino in August, 2007. This group plans to carry out projects related to this theme in the current biennium.

- *To continue to support initiatives that raise awareness and understanding of ethical issues that are important in chemistry.*

  We will build on successful collaborations involving IUPAC, OPCW, and other partners to develop further educational materials about dual use chemical technologies and other ethical issues that are particularly relevant to chemistry.

  The need to focus to raise awareness and public understanding of industrial best practices, science education, the social responsibility of science, and the role chemistry plays in health and environment are all highlighted in the draft recommendation prepared for obtaining designation of 2011 as an International Year of Chemistry.

A group within CCE members has expressed interest in a project that will contribute to public understanding of nanotechnology, including questions related to environmental safety. This may be an area where our partnership with the Chemical Heritage Foundation (see last priority area below) will be invaluable, as CHF has a committee that focuses on nanotechnology. At our meeting in Mauritius, consideration will be given to the formation of a project and/or working group focused on this area.

- *The biennial International Conferences on Chemistry Education are flagship activities for CCE. We seek to more fully integrate ICCE activities into the work of CCE and use ICCE conferences to report the outcomes of CCE projects and bring participants together to implement CCE strategies*

The 20th ICCE will be held in Mauritius, August 3-8, 2008, with a satellite conference in Nairobi, Kenya (http://www.uom.ac.mu/20icce.htm) immediately following. CCE is working with conference organizers and others to ensure that the conference brings benefits to sub-Saharan Africa. The 21st ICCE will be held in Taipei in August 2010. Preliminary discussion will be held at our meeting in Mauritius about site considerations for the 2012 Conference. Preference has been expressed for locating the 2012 meeting in Europe or North America.

- *To build chemistry education networks, using fully the multicultural competence within CCE.*

Following the initiative of former IUPAC Secretary General Ted Becker and others, a significant partnership is emerging between CCE and the Chemical Heritage Foundation (CHF) in Philadelphia. CHF has one of the world's richest research collections in the history of chemistry, successful educational programs that emphasize the relevance of the history of the chemical and molecular sciences, and on-line content that is accessed widely around the world. IUPAC's CCE brings to this partnership an international and multi-cultural network of experts in chemical education, many of whom have an interest in telling the stories of chemistry in their own countries. CCE's 2008 strategy meeting was hosted by CHF in January 2008, with a goal of further developing this partnership. Emerging from these discussions are:

- a proposal to create an ex-officio position for a CHF member on CCE to maintain channels of communication, to be served initially by Dr. John Theibault
- a decision to work together in the short term on the International Year of Chemistry initiative
- a suggestion to initiate a session at the 20th ICCE in Mauritius focused on the History of Chemistry, with a more substantial effort at the Glasgow IUPAC Congress. One intriguing possibility is to tie this in to the International Year of Chemistry by facilitating the telling of stories of chemical achievement in countries around the world. This may be particularly important for countries who have few resources to focus on their important history of chemistry.

The Network for Inter-Asian Chemistry Educators (NICE) was initiated following discussion at two Asian ICCE conferences. Two successful symposia, with the purpose of sharing chemistry teaching strategies and materials between Asian chemistry educators, have been held, and a third symposium is scheduled in 2009 in Japan.

Local networks have been built in many regions through the efforts of ex-officio member John Bradley, who continues to hold workshops around the world on microscale chemistry for student laboratories.

4. Current CCE Projects

- 2007-018-1-050 – Toward an Improved Teaching and Learning of Chemistry at the Tertiary Level in the Philippines
- 2007-011-1-050 - International Year of Chemistry - Initial strategy planning
- 2007-005-2-050 – Research-Based Evaluation of the Young Ambassadors for Chemistry (YAC) Programme
- 2006-043-3-050 - The Social Responsibility of Chemists: Responsible Stewardship
- 2002-021-2-050 - A feasibility study of the scope and limitation of machine translations as a means of disseminating useful reading material for chemical education on the internet

Joint Projects with Other Divisions/Standing Committees

- 2007-032-1-100 – Green Book – Abridged Version, Joint with Div I
- 2007-050-2-600 – Climate and Global Change: Observed Impacts on Planet Earth, joint with Div VI
- 2007-022-2-020 – Recommendations for Codes of Conduct
- 2006-050-3-100 – Wet Surface Vibrational Spectroscopy Experiments, Joint with Div I
- 2004-037-1-400 – Design of Polymer Education Material for French Speaking Countries, joint with Div. IV
- 2004-045-1-700 – Training of School Children on Pesticides and Health – Toxicology in the Classroom, Joint with Div. VII

Projects Under review

- 2007-038-3 – Development of an isotopic periodic table for the educational community (with Div II)

5. Other Activities and Projects of Interest

- The Flying Chemists Program
- *Chemical Education International* (the *e*-journal succeeding to the International Newsletter in Chemical Education)
- DIDAC
- Virtual Chemical Education
- International Network for Locally Produced Low Cost Equipment
- Source Books for Teaching of Chemistry
- CHEMRAWN X - Chemical Education
- Teaching High Temperature Materials Chemistry at University
- Green Chemistry in Africa (a book meant for university students and with a focus on Africa)
- Global Climate Change - a monograph for secondary schools
- Medicinal Chemistry Curriculum
- The Science of Chemical Safety Essential Toxicology - an Educational Resource

6. Membership, Roles and Sub-Committees

Titular Members

- Prof. Peter G. Mahaffy (Canada) – Chair
- Prof. Eva Åkesson (Sweden) - Secretary - *Division Liaison*
- Prof. Mei-Hung Chiu (China/Taipei) – *Project Group Member*
- Prof. Choon H. Do (Korea) - *Project Group Coordinator*
- Prof. Ram S. Lamba (Puerto Rico)
- Dr. Lida Schoen (Netherlands)
- Prof. Mustafa Sözbilir (Turkey)
- Prof. Natalia P. Tarasova (Russia)

Associate Members (Divisional Representatives)

- Prof. A. James McQuillan (New Zealand) – *Project Group Member*
  Physical and Biophysical Chemistry
- Dr. Javier Garcia-Martinez (Spain)
  Inorganic Chemistry
- Prof. Mary Garson (Australia)
  Organic and Biomolecular Chemistry
- Prof. Jean-Pierre Vairon (France)
  Polymer
- Prof. Roger M. Smith (United Kingdom)
  Analytical Chemistry
- Dr. Hemda Garelick (United Kingdom)
  Chemistry and the Environment
- Dr. Mukund S. Chorghade (United States)
  Chemistry and Human Health
- Prof. Richard Hartshorn (New Zealand)
  Chemical Nomenclature and Structural Representation

National Representatives

- Prof. Tony Wright
  Australia
- Ludo Brandt
  Belgium
- Prof. Borislav Toshev
  Bulgaria
- Prof. Qiankun Zhuang
  China/Beijing
- Prof. Ameen Farouk M. Fahmy
  Egypt
- Dr. Christiane Reiners
  Germany
- Prof. Miklos Riedel
  Hungary
- Prof. Uday Maitra
  India

- Prof. Peter E. Childs
  Ireland
- Dr. Mordechai Livneh
  Israel
- Prof. Liberato Cardellini
  Italy
- Prof. Masahiro Kamata – *Project Group Member*
  Japan
- Dr. Maryam Al-Wateed
  Kuwait
- Prof. Farzana Mahmood
  Pakistan
- Prof. Erica Steenberg
  South Africa
- Prof. Katarina Edström – *Project Group Member*
  Sweden
- Prof. Phillippe Boesch
  Switzerland
- Prof. Morton Z. Hoffman – *Conference Coordinator, Project Group Member*
  United States
- *Pending* – Chile, Ethiopia, United Kingdom,

Ex Officio

- Prof. John D. Bradley
  South Africa; Consultant for Microscale Project/Programme
- Mark C. Cesa (*COCI Representative*)
- Dr. John Theibault, Chemical Heritage Foundation

Subcommittee on Chemistry Education for Development

- Prof. Mei-Hung Chiu, Chair and *Project Group Member* (China/Taipei)
- Prof. John Bradley (South Africa)
- Prof. Bob Bucat (Australia)
- Dr. Derek S.P. Cheung (China/Hong Kong)
- Prof. Masahiro Kamata (Japan)
- Prof. Ram Lamba (Puerto Rico)
- Dr. Jing-Wen Ling (China/Taipei)
- Dr. Mordechai Livneh (Israel)
- Dr. Lida Schoen (Netherlands)
- Dr. Erica Steenberg (South Africa)
- Prof. Natalia Tarasova (Russia)

Subcommittee on Public Understanding of Chemistry

- Chair – temporarily vacant
- Prof. Liberato Cardellini (Italy)
- Prof. Shu-Nu Chang (China/Taipei)
- Prof. Peter Childs (Ireland)
- Prof. Choon Do (Korea)
- Prof. Masato Ito (Japan)
- Dr. Lida Schoen (Netherlands)