

**Draft Minutes of CHEMRAWN Committee Meeting**  
**Headquarters, Société Française de Chimie, Paris**  
**Saturday – Sunday, November 4-5, 2000**

**Members Present:** Dr. P. Norling (chairman), Dr. I. Buncel, Dr. Min Che Chon, Prof. M. Droescher, Prof. R. Hamelin, Dr. M. Imanari, Prof. J.A. Kopytowski, Prof. F. Kuznetsov, Dr. J. Malin (secretary), Prof. P. Moyna, Prof. I. Onyido, Dr. S. Sivaram, Dr. A. Smith  
**Attending:** Drs. Bievre, Bonne, Larderel, Legube, Pokrovsky (UNESCO), and Rusnac (Chisenau); Ms. N. Norling.

**Agenda**

1. Introductions and welcome to observers and guests.
2. Minutes of the Berlin Meeting
3. Approval/modification of the agenda
4. Overview of CHEMRAWN programs and plans
  - a. CHEMRAWN X– Prof. Kopytowski
  - b. CHEMRAWN XII - Prof. Buncel
  - c. CHEMRAWN XIV – Dr. Malin
  - d. CHEMRAWN XIII – Prof. Kuznetsov
  - e. Proposal to review past conferences - Prof. Kopytowski
5. Discussion and planning for water-related CHEMRAWN
6. Proposals for additional/new CHEMRAWN conferences:
7. Plans/location/timing of CHEMRAWN committee meeting in 2001
8. Committee administrative details
9. Other items as needed.

**1. Welcome.** The Chairman greeted all members of the committee and welcomed all present. He thanked Dr. Hamelin for his assistance in organizing the meeting and the Société Française de Chimie for their hospitality.

As a prelude to discussion, Dr. Norling invited those present to mention any recent activities that might bear on CHEMRAWN and on international science. Dr. Hamelin (France) reported that he had visited Chisenau, Moldova to discuss the organization of an Eastern European regional meeting on water quality. That meeting, he noted, was related to discussions that would occur later in the afternoon. Dr. Sivaram (India) noted that General Electric is opening a large technical center in Bangalore, India. GE has hired 500 Ph.D's and will eventually hire 2000 more to work there. Efforts at the center will involve e-commerce. Dr. Smith (U.K.) reported that there has been approximately a 25% decline in research & development in the chemical industry in U.K. He informed the committee that he is now President of the Industrial Affairs Division of the Royal Society of Chemistry. Dr. Smith added that at the Committee on Chemical Industry meeting he and Dr. Pokrovsky had presented the DIDAC transparencies, which have been developed with industrial support to promote training in chemical safety. Dr. Norling informed the group that he had recently visited Kenya, Korea and Poland. As Chair of the

CHEMRAWN committee, Dr. Norling is an ex-officio member of the IUPAC Bureau, which met at Guildford, U.K. Much discussion at the Bureau meeting, he said, centered around the recent IUPAC reorganization. Although IUPAC commissions will no longer exist for certain topics, the CHEMRAWN committee will continue. Norling recalled that there have been 10 CHEMRAWN conference since 1978. Five conferences, CHEMRAWNs X, XII, XIII, XIV and a water quality/availability conference, are currently in the planning stages. He indicated he has been working with the organizers of CHEMRAWN X, the “Chemical Education CHEMRAWN.” Finally, Dr. Norling announced that an IUPAC project evaluation committee is studying CHEMRAWN IX.

2. **Minutes.** The Minutes of the Berlin meeting (August 10, 1999) were APPROVED unanimously, with the proviso that the presence of IUPAC Young Observers at the meeting should be noted.
3. **Agenda.** The committee agreed upon the agenda listed above, although the order in which items were taken was modified occasionally for convenience.

#### 4. Overview of CHEMRAWN Programs and Plans.

- a. **CHEMRAWN X** – Dr. Norling summarized events thus far. Much discussion has centered on whether there should be such a conference, since CHEMRAWN refers to chemical *research*. However, there exists strong feeling in the education community that better curricula and improved articulation among countries are needed to prepare students for employment in the international chemical industry. The conference organizers, Drs. Lagowski and Boggs, have followed a strategy of holding one- or two-day pre-CHEMRAWN meetings at international forums including the 2000 International Congress on Chemical Education (Budapest), the fall 2000 ACS national meeting and the PACIFICHEM meeting in Honolulu, December 2000. Norling indicated that the IUPAC Bureau is very supportive. The mini-CHEMRAWNs have operated almost without funding, have tended to be somewhat loosely formatted and have not yet produced recommendations for future actions.

In order to address whether the chemical industry feels there is a need for an educational CHEMRAWN, Dr. Kopytowski has produced a questionnaire, which he and other committee members circulated among colleagues in the chemical industry. He summarized the results of the survey as follows.

- Some 13 responses were obtained (plus an additional 5 from India, which Dr. Sivaram indicated he would forward to Dr. Kopytowski).
- The chemical industry is not in the forefront of the “new economy”, but companies continue to finance major R&D projects. There is continued demand for trained chemical scientists.
- The responses from multinational companies indicate they are generally not interested in CHEMRAWN X because: 1) The supply of trained scientists continues to exceed demand, allowing companies to choose the best people. 2) Industry is accustomed to retraining its own employees, even at a cost of up to \$150,000 each, when necessary. 3) Respondents felt that no curriculum can satisfy all companies – it is necessary for

each individual to fit the local R&D culture. 4) the Ph.D. curriculum doesn't normally teach team activities, but these are important in industrial research.

Committee members made the following points:

- Global companies behave differently in various parts of the world. Educational standards for chemists also vary. (Droescher)
- Responses to the questionnaire in India, from both Indian and non-Indian companies, indicate that the research performed is so diversified that universities perhaps can't be asked to tailor curricula to individual needs. Industry desires a broad education, a contemporary curriculum, good interpersonal skills, seamless teamwork, ability to think laterally and vertically within the company, high personal potential and a habit of lifelong learning. (Sivaram)
- The French chemical industry is not particularly interested in educational systems elsewhere, because the industry in France already controls training of chemists and especially chemical engineers. Indeed, the definition of "engineer" might not be the same in France as in Great Britain, Germany or the U.S. Chemists and chemical engineers should have a wide background in physics, law and mathematics, as well as chemistry. The French industry supports universities because they maintain a cadre of bright teachers. The question of whether an individual has a Ph.D. or not is relatively unimportant to the industry, which simply hires people with the skillsets it needs. No respondents indicated a need for a multinational conference. (Hamelin)
- Canadian chemical industries are active in pharmaceuticals, polymers and communications technology (e.g., Xerox). University faculty are working to inform themselves on how their students can fit into the New Economy. (Buncel).
- The quality of education in Africa has decreased and is highly variable from place to place. South Africa, for example, differs substantially from western Africa. (Onido)
- Nevertheless, the training of chemists worldwide is rather homogeneous because chemistry around the world has common European roots. (Moyna).
- The questionnaire was translated into Russian and circulated. Russian industry generally is not interested in a CHEMRAWN X because they are satisfied with the current educational process. However, three areas of interest to Russian industry are: (1) knowledge of new problems and directions in chemical research, (2) establishing links to new companies, and (3) identification of new educational methods. Thus, CHEMRAWN X is not a failure. The project, should continue to address the key issues. Proceedings of the regional conferences should be published in Pure and Applied chemistry (Kuznetsov).
- In Korea, Chemistry, Chemical Engineering and Biochemistry are separated. Chemical Engineering students are now included in materials science departments. Research activity in industry is limited (Chon).
- More interdisciplinary training is needed in Japan (Imanari).
- American Chemical Society is moving ahead to assist in interdisciplinary education, particularly through the Green Chemistry Institute and through its Experiential Opportunities program. Educational programs at the University of North Carolina and the University of Texas, for example, have been set up to help students develop an international perspective (Malin).

The committee reached consensus that industry is unlikely to support a major CHEMRAWN conference in chemical education. In light of the discussion, committee members concluded that CHEMRAWN X is perhaps best embodied in the regional conference series that is already taking place. Papers and opinions should be collected and considered at the committee's Brisbane meeting. Members suggested that the organizers should publish the results, possibly on a website.

Dr. Hamelin raised the question of ethics in Chemistry, suggesting that chemists should develop a greater sensitivity towards chemical ethics, but that this might vary considerably among nations and regions of the world. Dr. Kopytowski pointed out that international industry has created the Responsible Care program, which should be publicized in universities, for example, in process engineering curricula. Dr. Norling suggested the committee could ask chemical education groups to comment on the issue.

**b. CHEMRAWN XIV.** Dr. Malin described progress in organizing the conference, scheduled for Boulder, Colorado, June 9-15, 2001. The Organizing Committee has met a number of times as have the Program and Future Actions committees. Over \$200,000 has been raised and a workshop for young scientists is scheduled to be held in the days before the conference. All indications are that CHEMRAWN XIV will be successful. Committee members suggested that CHEMRAWN XIV should also include nuclear chemistry and process engineering. Dr. Malin responded that process engineering topics are very likely to be included, but he was not certain whether nuclear chemistry would be on the program.

**c. CHEMRAWN XII.** Dr. Buncel traced the history of CHEMRAWN XII, which was described in the Minutes of previous meetings. He reported that he has arranged with Prof. Peter Steyn in South Africa to hold a 2-3 day event in conjunction with the Soils Science conference scheduled for Stellenbosh, South Africa in 2003. Plans are to have a one-day session at the start of the conference and then convene the Future Actions Committee for a day at the end. Dr. Norling added that the whole conference appears to have a CHEMRAWN-like flair. Buncel noted that Dr. Malin's office is still holding some \$8,000 in funding, out of \$10,000 that was provided several years ago by ACS. Dr. Hamelin suggested that additional funding might be obtained through the French Agricultural Ministry. Other committee members suggested the Swedish Royal Institute, the Swedish-African Institute, the British Council, the Italo-African Institute, the Japanese organization JAICA, the FAO (Rome), possible sources in India, the International Fertilizer Development Center (Alabama, USA) and the UNESCO list of international counterparts. Dr. Buncel agreed to draft a short outline of the proposed conference to send to CHEMRAWN committee members. He will also conduct more extensive discussions with the Soils Science Conference organizers.

**d. CHEMRAWN XIII. Cleaner Energy.** Dr. Sivaram and Dr. Kuznetsov discussed their proposal to hold a CHEMRAWN conference on Clean Energy, in India. Sivaram noted that there is general interest in the conference and that the January, 2001 Indian petroleum/hydrocarbons conference in Delhi was supported by an oil company grant. A

CHEMRAWN conference on clean energy is, he said, potentially a great opportunity, but funding opportunities appear scarce. He proposed to contact potential stakeholders after the hydrocarbons conference and noted that the CHEMRAWN conference might piggyback on the next such conference in 2003. He suggested a small organizational meeting in India in March 2001 or perhaps at the Brisbane IUPAC meeting.

Prof. Kuznetsov noted that the program would be very ambitious scientifically, considering all significant modes of energy production as well as optimization of production, recovery of sources, and waste management. Conference organizers would include Prof. Siveram, Dr. Mehta, the president of INSA, and the Indian chapter of APAM. Discussions have been held with Drs. Rao, Varadarajan, Joshi, Subramanian, and with leaders of the Asia-Pacific Academy. Prof. Kuznetsov presented a list of proposed speakers.

- Dr. Smith volunteered to send a report on European use of household waste for energy.
- Dr. Droscher suggested the organizers need to show a Chemistry focus.
- Other members noted there is need also to feature the Hydrogen Economy and the Kyoto Protocol.

**e. Review of Past CHEMRAWN Conferences.** Dr. Kopytowski has prepared a questionnaire for organizers and participants in past CHEMRAWN meetings. He will circulate this and summarize the results. For reference, he has obtained copies of the Perspective and Recommendations books from a number of past conferences.

**5. Discussion of CHEMRAWN Regional and World Conferences on Water availability.** Dr. Hamelin recalled that at its previous meeting the committee was receptive to the idea of a CHEMRAWN conference on water quality. He had recently contacted scientists in Chisenau, Moldova, to discuss a regional conference. However, he noted, a world conference as well as a series of regional conferences on water quality would show world leaders that chemistry is effective in addressing the problems.

Dr. Pokrovsky noted that the new Director-General of UNESCO has identified water quality as a priority for the science sector in 2001-2003. Conservation of water and soil, he said, will be two of the main problems for the 21<sup>st</sup> Century. UNESCO is amenable to holding both a world conference on water quality and a series of regional conferences, particularly in Moldova and Mozambique. Participants added that the world conference should cover industrial water usage, wastewater issues and rural components to water pollution. The committee agreed in general that the conference should focus on water purity solutions.

Dr. Pokrovsky and the committee discussed holding a world conference at UNESCO headquarters. Pokrovsky suggested that the organizers should first request UNESCO cosponsorship without funding, and that the funding might be arranged later. The sequence of events should be as follows: First, decide on the title of the conference – it should include *fresh water*. Second, the IUPAC President should within the next 3-4

months request that the UNESCO Director-General approve UNESCO sponsorship of the conference. Third, requests should then be submitted to UNESCO and elsewhere for funding. Sources of funding might include the UNESCO office of Hydrology, the Science Sector and the Ocean Sector. UNESCO member states also may find it possible to fund attendees at the conference.. Dr. Pokrovsky offered to help draft a letter that IUPAC could send to UNESCO. Committee members suggested obtaining CNRS funds to support French-speaking participants.

Dr. Pokrovsky also discussed with the committee the possibility of holding regional or sub-regional conferences before and/or after any major water quality conference. Possible venues include Moldova, Mozambique and Asia Pacific region. Sub-regional case studies could be performed in advance of a major conference, but UNESCO can provide only some \$500 in support of each case study.

Prof. Hamelin introduced Prof. Rusnac of Moldova. Dr. Rusnac noted that, since all global problems start locally, it would be best to begin by studying local/regional aspects to the problem. Moldova, he said, is typical of many areas of the world encountering (1) intensive use of water in agriculture and (2) a scarcity of drinking water. The University of Moldova is studying the problems together with Romanian scientists and a team from the University of California. Moldova has already achieved considerable expertise in water purification. Prof. Rusnac suggested that a regional conference could be held in Moldova as early as October of 2001. The Moldovans have an organizing committee already in place, with representation from the Moldovan Academy of Science. Prof. Duca, one of the conference's supporters, is a member of the Moldovan Parliament. Prof. Rusnac asked the CHEMRAWN committee to suggest experts who might participate. Members of the CHEMRAWN committee added that the Moldovan conference could help lay foundations for the subsequent CHEMRAWN world conference in Paris by developing case studies and defining the critical fresh water problems of Moldova and neighboring states.

As discussion progressed, the Committee reached consensus that a major CHEMRAWN conference on water quality should be held in Paris on 6-9 November or 13-15 November, 2002 at UNESCO Headquarters. Members suggested a variety of titles, including:

*“CHEMRAWN XV: Can the Fresh Water Supply be Sustained?”*

*“CHEMRAWN XV: Quenching the World's Thirst for Fresh Water”*

*“CHEMRAWN XV: Sustainable Fresh Water Development – The Contribution of Chemistry to the Water Cycle”*

*“CHEMRAWN XV: Fresh Water - Chemistry's Contribution to Quality and Sustainability*

*“CHEMRAWN XV: Fresh Water – Ensuring Quality and Sustainability through Chemistry”*

*“CHEMRAWN XV: Fresh Water - Contribution of Chemistry to Quality and Sustainability”*

The committee decided that the title should be:

*CHEMRAWN XV. Fresh Water: Contribution of Chemistry to Quantity and Supply - Can the fresh water supply be sustained?*

Members suggested several sub-topics:

- 1) The role of chemistry in water treatment including surface, recycled and ground water.
- 2) The ecological chemistry of natural water, its availability, analysis and risks in using it.
- 3) Water and agriculture
- 4) Regulation, standards and economics of water purity
- 5) Conservation.

The next steps in organizing the conference should be: (a) establish as soon as possible whether the UNESCO headquarters can be used as the conference venue, (b) appoint, in January, 2001 an Organizing/Finance Committee, a Program Committee, and a Future Actions Committee, (c) schedule the first meeting of the organizing committee for March, 2001, (d) have a first announcement of the conference ready for the IUPAC Congress and General Assembly (Brisbane) in July, 2001, (e) develop a Web page for the congress by July, 2001 and (f) produce a preliminary program by November, 2001.

Dr. Legube and Dr. Hamelin asked the committee members to nominate persons who might help organize the conference. Dr. Alan Smith volunteered to work on the Organizing Committee.. Dr. N. Norling suggested the organizers contact the head of the American Water Works Research Association and the Canada Centre for Inland Waters for more names. The possibility was discussed of having an industrial exposition. The general reaction was favorable but two points were raised: (1) A competing exposition, called Polutek, takes place every October in Paris. (2) It was pointed out that if UNESCO were host to the meeting on its premises, that organization would have to agree to having the exposition there.

**6. Future CHEMRAWN Conferences.** Dr. Kopytowski suggested that in this era of globalization there may be special problems for small and medium-scale chemical companies. This could be a theme for a future meeting with COCI as well as a possible CHEMRAWN topic.

**7. Next Committee Meeting.** Dr. Norling informed the committee that the next meeting of the CHEMRAWN committee is scheduled for Tuesday, July 3, 2001 at the IUPAC Congress and General Assembly in Brisbane, Australia.

**8. Committee Administrative Details.** Dr. Norling reviewed the terms of current committee members. He noted that he would be working on financing committee members' travel to the IUPAC Congress and General Assembly in June-July of 2001. Norling asked whether members had suggestions on how to improve CHEMRAWN committee meetings. Dr. Droescher suggested that discussion times might be set for specific agenda items.

**9. Other Items as Needed.** There were no other items.

The meeting adjourned at 11:00 a.m. on Sunday, November 5, 2000. A group photograph was taken.

Respectfully submitted,

John M. Malin  
Secretary  
2/21/2001

CHEMRAWN 11002