Assessment and Perspective Regarding the ACS-EPA Integral Virtual Symposium on PPCPs

On 25 August 2004, a "virtual" symposium was held for the first time at a national meeting of the American Chemical Society (ACS) in Philadelphia. The symposium's theme was the environmental ramifications of PPCPs (Pharmaceuticals and Personal Care Products). Presenters and attendees at the actual on-site conference in Philadelphia were joined by those who were also present at 20 or so remote sites in Europe, Canada, and the U.S.; a list of the remote sites is available here. Participation at this pioneering event occurred across nine time zones and included over 100 on-site attendees at the main Philadelphia site and roughly the same number of attendees spread across the remote sites. Of particular noteworthiness was the patience and perseverance of the audience and presenters during the problematic parts of the symposium's experimental format (discussed below).

This document provides a brief summary of how this pioneering meeting for the ACS was conducted, as well as some perspective and insights that could prove useful for those who might be interested in organizing and hosting their own "virtual" meeting.

History and Background: This meeting was born over 3 years ago when Dr. Christian Daughton and Tammy Jones-Lepp (with the EPA's Office of Research Development) completed the first draft (on 14 March 2001) of the concept for this new type of meeting format. The concept was then presented to Dr. Larry H. Keith (Editor, EnvirofACS; Instant Reference Sources, Inc., Monroe, GA) for consideration as a proposal for a future symposium in the Division of Environmental Chemistry of the ACS, to be jointly organized and sponsored by the U.S. EPA's ORD. The idea was then vetted with the ACS by Dr. Larry Keith. Tammy Jones-Lepp and Christian Daughton then developed the Inter-Agency agreement that allowed the U.S. EPA and the American Chemical Society to bring the concept to fruition through the diligent efforts of Dr. Martha Wells and others, at the Center for the Management, Utilization, & Protection of Water Resources, Tennessee Technological University.

It is important to note that by no means does a virtual meeting require over 3 years to implement. Planning for this pioneering effort was lengthy because the EPA first required a feasibility study, because the concept had to be approved by the ACS as a pilot experiment to be held in conjunction with one of its biannual national meetings, and because an Inter-Agency Agreement had to be developed to allow interaction of the EPA (ORD-Las Vegas) with the ACS (Division of Environmental Chemistry). In the absence of these requirements, there's really no reason that a virtual conference could not be organized and implemented with a mere 2-months of advance notice for attendees and presenters alike (assuming that the hosts are versed in using the various software programs and hardware required for file conversions and Internet broadcasts).

Staging: The 2-day meeting (25-26 August 2004) included a mix of traditional on-site presentations coupled with (on the first day only) live presentations from remote sites as well as several pre-recorded presentations. This format allowed the participation from several presenters who were not able to attend the on-site meeting because of time-conflicts or insufficient travel resources and one presenter who was not even available to give a live remote presentation (so his presentation was made in a pre-recorded format).

Although the symposium was held over the course of two full days, only the first day was conducted in a virtual format. The planning and logistics for this first day were extremely time-consuming because of the lengthy learning curve. The added dimensions of setting up the Internet connections for the 20-plus "remote" sites so that presenters and attendees could be seamlessly linked while the on-site physical meeting was conducted as part of a normal national meeting of the ACS

encountered several challenges, the most serious being the loss of the Internet connection at the Philadelphia meeting site part way through the second to last presentation.

One of the requirements for the presenters during the first-day (the joint virtual and on-site presentations) was to submit to the meeting organizers pre-recorded, fully narrated slide shows. This gave us the ability not just to present the talk for Dr. Kuemmerer, who was not available to give a live presentation from Germany, but it also afforded us a fall-back plan, allowing us to still make presentations for remote speakers should problems with their live connections or presentations be encountered (and this scenario did indeed occur).

Problems: Given that any number of problems can be expected during a pilot experiment, relatively few were actually encountered. The combination of three possible presentation formats (live on-site, live remote-site, and pre-recorded) posed several problems for the on-site audience. The video and audio quality of the format that had to be used for Internet broadcast (PowerPoint slides, especially narrated versions, use too much bandwidth and must be converted to a compressed format) does not yet rival that of a live presentation on-site using conventional presentation hardware; and the presence of the multiple staff required for operating the broadcast equipment at the on-site Philadelphia meeting room proved a little distracting for the on-site audience. We expect that these types of problems will rapidly diminish as Internet broadcast technology continues to rapidly improve. The time-zone differentials proved somewhat disconcerting, especially for the session chairs. Daughton introduced Philadelphia morning speakers to afternoon-evening audiences in Germany, and Jones-Lepp (who served as the chair for the afternoon session, from the Las Vegas satellite site) introduced Philadelphia early-afternoon speakers to morning audiences in the western U.S.

Advantages of the Virtual Format: We believe that a symposium format that includes a virtual component, allowing for audience participation at remote sites worldwide, will become commonplace in the near future. Some of the obvious major abilities and advantages of this format include:

- Time conflicts do not prevent participation (for either presenters or attendees), especially if pre-corded presentations are used.
- Lack of travel resources does not preempt participation for either presenters or attendees. Indeed, feedback received from one university professor remarked that this type of webcast would allow him to expose many more graduate students to national conferences.
- Greatly reduced loss of work time for attendees who would otherwise have lengthy travel times to and from distant meetings.
- A sizeable number of people who would otherwise be interested in attending national meetings choose not to attend because of the increasingly onerous nature of travel. Remote, virtual locations allow full participation for this group of people.
- A real-time dialog can be established during question-and-answer sessions by the use of both voice over the Internet as well as by typing questions via the broadcast software (*Elluminate*'s virtual classroom was used for this pilot symposium); the typed questions can be viewed by other locations and answered by any location using either voice or keyboard.
- Since a virtual conference can be conceived, organized, and hosted with only several months advance notice, the virtual format is well-suited for addressing emerging topics in a timely fashion. This contrasts sharply with the 6-18 months of advance time required for traditional major events.
- The requirement for pre-recorded presentations serves dual purposes: (1) as a fall-back when presenters who were scheduled to present in real time are no longer able (this preempts disruptions of the meeting agenda, a problem commonly encountered at traditional/meetings when presenters fail to attend); and (2) for archiving on the web, allowing later access by those

who were not able to participate in real-time or by those who want to listen again to particular presentations. The presentations for the PPCPs meeting are currently archived at http://epa.gov/nerlesd1/chemistry/ppcp/acs-25aug2004.htm. Note that the archive of these presentations will change with time. As of early October 2004, several presentations were not yet available, and initially only the pre-recorded versions were available (not the actual versions that were delivered live).

- Costs associated with holding and attending a virtual meeting are orders of magnitude lower than for physical meetings (no physical space or hotel equipment to rent; no travel, lodging and food expenses for attendees).
- The use of pre-recorded presentations allows session chairs to know in advance the exact length of each presentation. By requiring the presenters to edit their pre-recorded presentations to fit within allotted time slots, meetings can be maintained on strict schedules. This is a major advantage for both the audience and the session chair.
- Pre-recorded, narrated presentations have the added advantage over live presentations in that presenters tend to speak more slowly, enunciate more clearly, and choose their words with more care.
- Listeners in the remote audiences are better able to ask follow-up questions of presenters after the meeting via email or telephone.

Additional, Unanticipated Outcomes: In addition to the major advantages outlined above for the virtual format, a number of other positive outcomes were reported by attendees at the remote sites. Here are several examples.

- Although the wide expanse of time-zones proved somewhat challenging for the European and western-U.S. to attend both the morning and afternoon sessions, one remote site (arranged by Dr. Alistair Boxall in the UK) made use of what would have otherwise been an empty agenda during their morning hours by hosting their own series of local presentations on PPCPs (see: http://epa.gov/nerlesd1/chemistry/ppcp/images/satellite_ppcp_conf.pdf) before the morning presentations in Philadelphia began. Large time-zone differences can undoubtedly be accommodated by any number of other equally innovative approaches; time-shifting by recording the sessions on a conventional hard-drive based video recorder is but one example.
- Another remote site (Tennessee Technological University), attended their sessions in a training room that projected the presentations on a central screen as well as on individual computer terminals for all attendees. One attendee remarked that this format was more useful than attending the presentations in-person because they could instantly retrieve from the Internet information that the speakers were referencing (such as reprints of papers) during the presentation.

Problems Encountered - Lessons Learned: The following problems were encountered as a result of the virtual format. Some were unique to this new way of conducting meetings, and others derived from the same problems that have long plagued conventional meetings:

- Failure of some presenters to meet the due dates for submitting their pre-recorded presentations placed the conference at risk should a problem with performing the live broadcast have occurred (e.g., loss of Internet connection from the host site; inability of the speaker to be available to make their presentation live).
- The pre-recorded presentations were made by using the narration utility in MS PowerPoint. Once mastered, this utility is very easy to use, but there is a learning curve required that frustrated some of the scientists.
- Narrating a pre-recorded presentation requires considerably more time than making a live presentation because the spoken words have to be considered more carefully; this sometimes also causes a related problem in that some speakers end up speaking too slowly. The software's

narration utility, however, allows each slide to be individually narrated, and re-narration is easy to perform on individual slides (no need to restart at the beginning of the presentation each time an oral faux pas is committed).

- Several problems were encountered in the preparation of the pre-recorded (narrated) presentations. In general, narrations using PowerPoint are straightforward to perform, but a major annoyance often encountered was the program's propensity to clip narrations before they were complete at the end of a slide (this problem can usually be corrected by extending the slide timings, which can be manually set). These problems were much more serious with the Macintosh version of the software, where large portions of narration was often omitted, a problem that had no known solution. Until these limitations can be resolved, it is recommended that all pre-recorded presentations be done using the PC version of PowerPoint, not with a Mac. Another limitation is that while animations and movies and imbedded sound files are fully functional in narrated PowerPoint presentations, the software used to compress and convert PowerPoint to a lower-band-width format suitable for broadcast strips out animation and sound files. Presenters need to recognize this when creating their narrated files. The compression software and the current broadcast technology also degrades the resolution of the graphics.

The Future for Virtual Meetings: We anticipate that the virtual format for meetings will eventually make national meetings of major scientific societies much more accessible to a greatly expanded audience worldwide. This will foster not just a faster and more widespread exchange of information and ideas, but also catalyze the birth of more comprehensive and productive networks and collaborations among researchers. We also anticipate that major science societies will eventually adopt stand-alone virtual meetings (comprising numerous satellite sites) to address hot, emerging topics in a quick and timely manner.

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