Scientific Working Group
for the
Analysis of Seized Drugs

SWGDRUG Conference
January 23 – 25, 2008
San Francisco, California, USA

Attendees:

Nelson A. Santos, Drug Enforcement Administration, Chair
Scott Oulton, Drug Enforcement Administration, Secretariat
Susan Ballou, National Institute of Standards and Technology
Michael Bovens, European Network of Forensic Science Institutes
Sylvia Burns, Forensic Science Service, England
John Chappell, Drug Enforcement Administration
Garth Glassburg, American Society of Crime Laboratory Directors
Linda Jackson, Mid-Atlantic Association of Forensic Scientists
Richard Laing, Health Canada
Jack Mario, Northeastern Association of Forensic Scientists and
American Society for Testing Materials
Jerry Massetti, Northwestern Association of Forensic Scientists and
California Association of Criminalists
Chris Matchett, Southern Association of Forensic Scientists
Iphigenia Naidis, United Nations Office on Drugs and Crime
Osamu Ohtsuru, National Research Institute of Police Science, Japan
Richard Paulas, Mid-Western Association of Forensic Scientists
Robert Powers, Connecticut Department of Public Safety
Catherine Quinn, Victoria Forensic Science Centre, Australia
Chris Tindall, Metropolitan State College, Denver, Colorado
Udo Zerell, Bundeskriminalamt, Germany

Not Present:

Suzanne Bell, West Virginia University
Eileen Waninger, Federal Bureau of Investigation

Welcome

Nelson Santos, SWGDRUG Chair, opened the conference and welcomed all of the participants. Nelson thanked Susan Ballou and NIST for their sponsorship. Nelson introduced Chris Matchett, Georgia Bureau of Investigation, who is acting as a

representative for the Georgia Bureau of Investigation and the Southern Association of Forensic Scientists, and John Chappell, Drug Enforcement Administration, who is serving as note taker.

Goals

Nelson Santos stated that the goal of the conference was to revise the draft document concerning SWGDRUG recommendations for the estimation and reporting of uncertainty. The expectation is to have a completed document for presentation at the annual meeting of the American Academy of Forensic Sciences in February 2008, and to offer the document to the forensic community for comments.

Initial Review of the Draft Uncertainty Document

A review of the draft document was initiated with an open discussion of the introductory statements of the document. After some debate, Nelson Santos directed the committee to reconsider the main elements of the document: why the estimation of uncertainty is relevant to the forensic community, when it should be considered and how one may reasonably estimate uncertainty. A revised outline for the document was constructed from an open discussion and assumed the following form:

1. Introduction (why?)
    - guidance
    - raise awareness
    - benefits
    - when?

2. Qualitative Analysis (how?)

3. Quantitative Measurements (how?)

4. Reporting

5. Training

Several issues were raised during the open discussion. A question was asked whether the uncertainty in sample homogeneity should be addressed in the document and the general consensus from the committee was that sampling should be considered. It was agreed that the details of estimating uncertainty should be placed in a supplemental section. In addition, a supplement was necessary for examples and that citing references would not be sufficient. A suggestion was made that the document should clarify all sources of uncertainty, including sample homogeneity, as well as instrumental sources.

The Introduction Section was revised in the course of an open discussion with a focus on the benefits. The document would also emphasize that analysts shall have an understanding of the limitations of their qualitative and quantitative determinations.

Revision of the Qualitative Analysis Section

An open discussion on the degree of uncertainty present in the identification of a drug substance was considered next, and the appropriate semantics for the document were debated. Specifically, the term *negligible uncertainty* was proposed to describe the degree of uncertainty in qualitative determinations, as opposed to the previously used phrase of *effectively no uncertainty*. After much discussion, the term *effectively no uncertainty* was accepted.

Revision of the Quantitative Measurements Section

A discussion began by suggesting that the significance of the measurement uncertainty for the customer should determine how precisely the uncertainty value is estimated. This approach would acknowledge that there are critical values for quantitative determinations (weight or purity) when a detailed calculation of measurement uncertainty is necessary. Critical values would correspond to quantitative determinations (e.g., net weight of a drug substance), where the measurement uncertainty may impact the customer use of the measurement (e.g., statutory threshold amounts). However, a less-precise estimate of measurement uncertainty may be sufficient for most analyses, so long as the magnitude of the measurement uncertainty is known not to affect the customer use of the measurement. The analyst, though, must always have an awareness of the uncertainty associated with their analyses, and particularly with their quantitative determinations. A mechanism is then necessary to assess when a detailed estimation of measurement uncertainty is made and reported.

A revision to the introductory statements of the section was made to incorporate a decision-making process for the estimation of measurement uncertainty. The sources of uncertainty for weight determinations were discussed and several specific factors listed for inclusion into the document. The sources of uncertainty for purity determinations were then discussed and a list of specific factors inserted into the document.

The approaches to the estimation of measurement uncertainty were discussed. Three main approaches were raised in the open discussion: uncertainty budget, control charts and replicate analyses. A statement was made that replicate analyses provide a measure of the uncertainty in sample homogeneity, which may not be easily addressed in an uncertainty budget. A suggestion was made that an uncertainty budget approach may then be adequate for non-critical cases, but that replicate analyses are appropriate for cases of critical values. The committee was reminded that replicate analyses neglect systematic error (the mean value from the analyses is assumed to be the true value), and therefore the uncertainty in the calibrator (standard purity, uncertainty from standard solution preparation, etc.) must also

be factored into the precision of the replicate analyses to completely consider the measurement uncertainty.

Revision of the Reporting Section

There was an open discussion regarding when was reporting of uncertainty necessary. The reporting section was revised to state that uncertainty associated with a result should be reported when the result impacts the use of the result by the customer. The document also emphasizes that the analyst must be aware of the uncertainty of their analytical determinations (qualitative and quantitative) when not reported.

A comment was made that the terminology used in reporting and documentation should follow scientific conventions, as employed by standardizing organizations (ISO, ASTM). A statement to this effect was inserted into the Introduction Section of the document.

Reporting examples were next considered for discussion. Several additional examples were incorporated into the document that illustrated a variety of forms. An example of a lay description was included, which sparked some debate as to the merits of including an informal example.

Revision of the Training Section

The training section was revised to emphasize that all analysts shall be able to explain their laboratory procedures for estimating uncertainty in a manner that is understandable to the layperson. The analyst shall also be familiar with the fundamental concepts of uncertainty, although the degree of comprehension the analyst must demonstrate was subject to debate. An argument was made that the analyst should possess an understanding of basic statistics, comparable to that of an introductory statistics course. A counter-argument was offered to state that not all analysts may have this level of training. The document was edited to incorporated several related topics (e.g., general metrology, error analysis, basic statistics) as additional suggested training.

Completion of the Draft Uncertainty Document

Chris Tindall moved to make the draft document available to the forensic community for comment. Garth Glassburg seconded the motion. The motion was passed unanimously. Nelson Santos and Scott Oulton will present the document to the American Academy of Forensic Sciences in Washington, D.C. at the annual meeting next month. Comments will also be solicited through the SWGDRUG website and other forensic associations. The comment period will be approximately from February to June, and Scott Oulton will collect the comments for evaluation. Nelson Santos commended the contributions of Chris Matchett to the discussion of the conference, and extended SWGDRUG committee membership to him. Nelson stated that the agenda for the next meeting will include

addressing the comments on the draft uncertainty document, as well as to draft a supplemental document that will illustrate approaches to estimating uncertainty values. Nelson suggested Boston, Massachusetts to be the site for the next SWGDRUG Conference, and to convene on the tentative date of July 7, 2008.

Core Committee Business

Scott Oulton opened the business meeting stating that there is an apparent conflict between the bylaws 2.2.2 and 2.4.1. Bylaw 2.2.2 states

> *SWGDRUG membership resides with the individual, and is not an appointment by their agency or affiliation.*

Bylaw 2.2.1 may be misinterpreted that membership to SWGDRUG is maintained when a member leaves their organization without the consideration of the Chair. A proposed revision of bylaw 2.2.1 was discussed and the following revision was presented to the core committee.

> *Appointment to SWGDRUG membership resides with the individual and continues at the discretion of the Chair. It is not an agency or affiliation appointment.*

Chris Tindall moved to bypass the 30 day review period and to accept the change to bylaw 2.2.1. Richard Laing seconded the motion. The motion was unanimously approved.

A comment was made that completion of the draft uncertainty document was faster than any past recommendation documents. The presentation form of the uncertainty document will be available in approximately one month for members to present to their local association meetings. Nelson Santos stated that he is committed to keeping SWGDRUG active. Jack Mario asked that ASTM members please attend the ASTM meeting in Washington, D.C. in February, and to vote for the SWGDRUG documents to become an ASTM standard. Scott Oulton reviewed the status of the SWGDRUG website, noting that the number of downloads for this year (850 to date) is consistent with past years (13,796 in 2006, 13,988 in 2007).

Nelson Santos closed the conference and thanked all attendees for their participation.

Minutes respectfully submitted by John Chappell on January 29, 2008.