

**Expert Consultation for 2nd Addendum
to the 3rd Edition of the
Guidelines for Drinking-water Quality**

Geneva, 15–19 May 2006



**Public Health and Environment
Water, Sanitation and Health
Geneva 2006**



WHO/SDE/WSH/06.05
English only

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World Health Organization 2006

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Printed by the WHO Document Production Services, Geneva, Switzerland

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ACRONYMS

ACP	African, Caribbean and Pacific
ADI	acceptable daily intake
AIDS	acquired immunodeficiency syndrome
AMRO	WHO Regional Office for the Americas
ATSDR	Agency for Toxic Substances and Disease Registry (USA)
AUSAID	Australian Agency for International Development
AWWARF	American Water Works Association Research Foundation
BDCM	bromodichloromethane
BSE	bovine spongiform encephalitis
CAC	Codex Alimentarius Commission
CD	compact disk
CDC	Centers for Disease Control and Prevention (United States)
CEPIS	Pan American Center for Sanitary Engineering and Environmental Sciences (WHO/PAHO)
CICAD	Concise International Chemical Assessment Document
CSD	Commission for Sustainable Development
DALY	disability adjusted life year
DVGW	German Drinking-water Suppliers' Association
DWQC	Drinking Water Quality Committee
EC	European Commission
EHC	Environmental Health Criteria monograph
EIA	environmental impact assessment
EMRO	Regional Office for the Eastern Mediterranean (WHO)
EOM	Efficient Operation and Management
EPA	Environmental Protection Agency (Denmark)
ETV	environmental technology verification
EU	European Union
EU DWD	European Union Drinking-water Directive
EUREAU	European union of national associations of water suppliers and wastewater services
EURO	Regional Office for Europe (WHO)
FAO	Food and Agriculture Organization of the United Nations
FTF	Final Task Force
GDWQ	<i>Guidelines for Drinking-water Quality</i> (WHO)
HACCP	hazard analysis and critical control point
HIV	human immunodeficiency virus
IARC	International Agency for Research on Cancer
ICRP	International Commission on Radiological Protection
IRIS	Integrated Risk Information System (USEPA)
ISO	International Organization for Standardization
IWA	International Water Association
JECFA	Joint FAO/WHO Expert Committee on Food Additives
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
LRV	log reduction value
MCL	maximum contaminant level

MDG	Millennium Development Goal
NAS	National Academy of Sciences (USA)
NOAEL	no-observed-adverse-effect level
NTP	National Toxicology Program (USA)
OMN	Operation and Maintenance Network
P&C	Protection and Control
PAHO	Pan American Health Organization (WHO Regional Office for the Americas)
PCS	Programme for the Promotion of Chemical Safety (WHO Headquarters, Geneva)
PES	Pesticide Evaluation Scheme (WHO Headquarters, Geneva)
PHE	Public Health and the Environment (WHO Headquarters, Geneva)
PHRMP	Public Health Risk Management Plan (New Zealand)
PIC	Prior Informed Consent
POP	persistent organic pollutant
POU	point of use
PPCP	pharmaceuticals and personal care products
QA/QC	quality assurance/quality control
QHRA	quantitative health risk assessment
QMRA	quantitative microbial risk assessment
RIVM	National Institute of Public Health and the Environment (The Netherlands)
SARS	severe acute respiratory syndrome
SEARO	Regional Office for South-East Asia (WHO)
SODIS	Solar Water Disinfection
TDI	tolerable daily intake
TDS	total dissolved solids
THMs	trihalomethanes
TPE	technology performance evaluation
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
USA	United States of America
USEPA	United States Environmental Protection Agency
USNRC	United States National Research Council
WG	working group
WHO	World Health Organization
WPC	World Plumbing Council
WPRO	Regional Office for the Western Pacific (WHO)
WSH	(former) Water, Sanitation and Health Programme (WHO Headquarters, Geneva)
WSP	water safety plan
WSSCC	Water Supply and Sanitation Collaborative Council

SUMMARY

An Expert Consultation for updating the Third Edition of the *Guidelines for Drinking-water Quality* (GDWQ) was held in Geneva, Switzerland, from 15 to 19 May 2006. The Water, Sanitation and Health Programme of WHO Headquarters (now Public Health and the Environment) organized the meeting.

This meeting had the following objectives:

- 1) To technically finalize material to be included in the second addendum to the Third Edition of the GDWQ.
- 2) To identify the “theme” or “personality” of the Fourth Edition and undertake a review of the technical work required in preparation towards its publication.
- 3) To update the policies and procedures by which the GDWQ are developed.

A total of 39 participants attended the meeting or participated in it via videoconferencing, including staff from WHO Headquarters, representatives of WHO Regional Offices, temporary advisers who served as “coordinators” for the process of the rolling revision (members of the Working Groups on Microbial Aspects, Chemical Aspects and Aspects of Protection and Control) and observers. A list of participants is given in Annex 1.

Videoconferences with staff of WHO Regional Offices were held during the meeting. Members of the Vector Ecology and Management Programme, the Programme for the Promotion of Chemical Safety, the Radiation and Environmental Health Programme, the Reduction of Micronutrient Malnutrition Programme, the Occupational and Environmental Health Programme and the Health Promotion Programme also met for discussions with the Chemical Aspects Working Group.

The objectives of the meeting were met. A realistic plan of work for the rolling revision, including finalization of material to be included in the second addendum to the Third Edition and a plan of work towards the Fourth Edition, were decided on.

1. INTRODUCTION

1.1 Background

The first WHO document dealing specifically with public drinking-water quality was published in 1958 as *International Standards for Drinking Water*. It was subsequently revised in 1963 and in 1971 under the same title. In 1984–1985, the First Edition of the WHO *Guidelines for Drinking-water Quality* (GDWQ) was published in three volumes: Volume 1, Recommendations; Volume 2, Health Criteria and Other Supporting Information; and Volume 3, Surveillance and Control of Community Supplies. Second editions of these volumes were published in 1993, 1996 and 1997, respectively. Addenda to the first and second volumes of the Second Edition were published in 1998, addressing selected chemicals only. An addendum on microbial aspects, reviewing selected microorganisms, was published in 2002.

It was recommended in 1995 that the GDWQ be subject to a rolling revision process. Through this process, microbial and chemical aspects of drinking-water are subject to periodic review, and documentation related to aspects of “protection and control” of public drinking-water quality is progressively prepared. This process was initiated at a meeting of the Coordinating Committee for the Rolling Revision of the WHO GDWQ, at which three working groups were established. The first meeting of the working groups was in 1995 to address microbial and chemical aspects, and a later meeting addressed the protection and control aspects of drinking-water quality.

The plan for the preparation of the substantive content of the updated Third Edition of the GDWQ was agreed to at a planning meeting in Berlin, Germany, in June 2000, and the Third Edition of the GDWQ, Volume 1, was published in 2004. The plan of work for the future rolling revision of the GDWQ following finalization of the Third Edition, including the publication of addenda to Volume 1 approximately every 18 months, was decided at a Final Task Force Meeting held in Geneva, Switzerland, from 30 March to 4 April 2003. The first addendum to the Third Edition of the GDWQ was finalized at an Expert Consultation for the Rolling Revision of the GDWQ, held in Geneva, Switzerland, from 9 to 13 May 2005, and was published in 2006.

An Expert Consultation for updating the Third Edition of the GDWQ was held in Geneva, Switzerland, from 15 to 19 May 2006.

1.2 Objectives

The objectives of the Expert Consultation for updating the Third Edition of the GDWQ were:

- 1) To technically finalize material to be included in the second addendum to the Third Edition of the GDWQ.
- 2) To identify the “theme” or “personality” of the Fourth Edition and undertake a review of the technical work required in preparation towards its publication.
- 3) To update the policies and procedures by which the GDWQ are developed.

1.3 Participants

A total of 39 participants attended the meeting or participated in it via videoconferencing, including staff from WHO Headquarters, representatives of WHO Regional Offices, temporary advisers who served as “coordinators” for the process of the rolling revision (members of the Working Groups on Microbial Aspects, Chemical Aspects and Aspects of Protection and Control) and observers. A list of participants is given in Annex 1.

1.4 Organization of the Meeting

The meeting consisted of plenary sessions to discuss general issues and three technical working group sessions — the Chemical Aspects Working Group, the Microbial Aspects Working Group and the Aspects of Protection and Control (P&C) Working Group — which were held simultaneously. The agenda/timetable is attached as Annex 2.

The elected officers of the meeting were as follows:

Plenary Sessions

Co-Chairs	-	Dr Ingrid Chorus, Germany
	-	Dr Suresh Kumar, Malaysia
Rapporteur	-	Ms Marla Sheffer, Canada

Microbial Aspects Working Group

Chair	-	Dr Suresh Kumar, Malaysia
Rapporteur	-	Dr David Cunliffe, Australia

Chemical Aspects Working Group

Chair	-	Ms Michèle Giddings, Canada
Rapporteur	-	Ms Marla Sheffer, Canada

Aspects of Protection and Control Working Group

Chair	-	Dr Ingrid Chorus, Germany
Rapporteur	-	Dr Mark Sobsey, USA

On the first day of the meeting, participants participated in videoconferences with three of the Regional Offices (PAHO, SEARO and WPRO). Items relevant to all working groups were discussed in plenary sessions on the first and fourth days. During the remaining sessions on the second, third and fourth days, the working groups broke up into separate and joint sessions to discuss relevant agenda items. On the last day, a plenary session was again held to discuss the “personality” of the Fourth Edition and to wrap up the meeting.

Parallel events during the week included meetings between the working groups and staff from the Vector Ecology and Management Programme (Pesticide Evaluation Scheme, or WHO/PES), the Reduction of Micronutrient Malnutrition Programme, the Radiation and Environmental Health Programme, the Programme for the Promotion of Chemical Safety, the Health Promotion Programme and the Occupational and Environmental Health Programme.

Two additional meetings were held prior to the expert consultation on the GDWQ: one on environmental technology verification, or ETV (now called technology performance evaluation, or TPE), in the context of point-of-use (POU) devices in household water treatment; and the other on reviewing achievements and future needs in the implementation of water safety plans (WSPs). Both meetings were of an advisory nature to inform the discussions of the Drinking Water Quality Committee (DWQC) in their specific subjects. Minutes for both meetings can be found in Annexes 3 and 4, respectively.

1.5 Opening Session

Dr Jamie Bartram welcomed the participants on behalf of Dr Maria Neira, the Director of Public Health and the Environment at WHO. He noted that the first addendum to the Third Edition, which was the principal goal of the last Expert Consultation on the GDWQ, has been completed and is now available on the Internet. He reminded the group that the aim of the present meeting is twofold: to review and finalize materials for the second addendum to the Third Edition, and to identify the “personality” of the Fourth Edition, which is to be published in 2008 to coincide with the 50th anniversary of the first *International Standards for Drinking-water*, which was published in 1958. Two potential issues that have already been identified for the Fourth Edition are emergencies and disasters and certification approaches in securing safe drinking-water, and Dr Bartram suggested that many more would undoubtedly be identified throughout the week.

Dr Bartram then informed the group of two advisory meetings on ETV (now called technology performance evaluation, or TPE) and WSPs held the previous week at WHO. He advised participants that they would hear feedback from the regions on issues of importance to them during videoconferences on the first day of the current meeting, and the rest of the meeting would be devoted to the detailed plan of work for the second addendum and the Fourth Edition. A half-day session at the end of the week was planned to elaborate the linkage between the Vector Ecology and Management Programme (WHO/PES) and this group.

2. GENERAL RECOMMENDATIONS

The working groups (WGs) made a number of general recommendations throughout the meeting. Those recommendations, some of which are logistical in nature, are as follows:

- 1) It was recommended that the Water, Sanitation and Health Programme (WSH) establish a shared workspace on the Internet where documents at various stages of development can be downloaded. The workspace can act as a historical repository of drafts. Sizes should be kept small to facilitate downloading by all WG members.
- 2) It was recommended that a one-page briefing note be prepared to address the need to emphasize that disinfection should not be compromised in an attempt to meet chemical guidelines, as this seems to be an area of confusion in the regions.
- 3) It was also recommended, as a result of discussions with the regions, that Annex 4 of the GDWQ be augmented with guidance on how to use the Guidelines, so that countries do not simply take the tables of values and try to apply them.

- 4) It was recommended that there be a systematic approach to expediently develop information on chemicals for which there are no existing guidelines as guidance to stakeholders, as the WGs are concerned about the emergence of such chemicals.
- 5) It was recommended that a new, shorter-format background document be prepared as guidance for those chemicals that are likely to be present in drinking-water only as a result of spills (i.e. no significant or widespread occurrence in drinking-water).
- 6) It was recommended that the original source reports for any future background documents prepared by the Chemical Aspects Working Group — i.e. Joint FAO/WHO Meeting on Pesticide Residues (JMPR) reports, Concise International Chemical Assessment Documents (CICADs) or Environmental Health Criteria monographs (EHCs) — be included on the WSH CD (as background documents could then be shorter in length, or an expanded summary statement may be sufficient). Links to these documents would also appear on the web page of the rolling revision for each of the relevant parameters.
- 7) It was recommended that WSH investigate ways in which access to WHO guidance documents can be improved.
- 8) It was recommended that consideration be given to rotating WG meetings between the various regions (rather than inviting regional representatives to attend the annual meetings in Geneva) to encourage their active participation and to help them more fully understand the process. Although it is recognized that increased regional contact would be beneficial, better empowering the Regional Offices to disseminate Guideline developments regionally, the DWQC needs to think about what the regions need to bring to the meeting in order to enable them to take an active role (e.g. perhaps organize a special session on an issue of local concern).
- 9) It was recommended that the WHO nutrition group (Reduction of Micronutrient Malnutrition Programme) try to consider drinking-water in future discussions and work/projects, particularly in relation to bottle-fed infants.
- 10) It was recommended that consideration be given to preparation of a short promotional video for the Fourth Edition.

3. POLICIES AND PROCEDURES MANUAL

One of the objectives of the meeting was to update the policies and procedures by which the GDWQ are developed. To fulfil this objective, the meeting discussed the manual as a direct agenda item (#1) and approved various texts that had been prepared for addition to the Policies and Procedures Manual (agenda items ##1A, 1B-1, 1B-2, 1C, 1D, 58-1, 68, 78, 99, 109, 110; see Section 9 below). The revised Policies and Procedures Manual was discussed during individual WG meetings, and further revisions were suggested. The revised draft of the Policies and Procedures Manual was then circulated to WG members for comment. The WGs agreed that the Policies and Procedures Manual will need further editing and checking after the meeting in order to ensure that new text has been inserted where it most appropriately belongs.

In addition, discussions on several agenda items by WGs resulted in recommendations for revisions to the Policies and Procedures Manual (agenda items ##1, 52, 78, 100, 140). These revisions will be made to the Policies and Procedures Manual before the next meeting. Revised/next texts that are required for the Policies and Procedures Manual are summarized in Annex 5.

Agenda items that will be removed from the plan of work once new/revised text has been inserted into the Policies and Procedures Manual are listed in Section 8 below.

#1. Policies and Procedures Manual

Background: The document *Policies and Procedures Used in Updating the WHO Guidelines for Drinking-water Quality* describes the process through which the GDWQ are developed and revised. The purpose of both the process and document is to maintain the relevance, quality, credibility and integrity of the GDWQ, while ensuring their continuing development in response to new, or newly appreciated, information and challenges. The manual should provide more detailed guidance than the outline of process and procedures contained in the GDWQ. The manual will undergo continuous revision and updating to reflect current protocols.

Expected end-product(s): 1) The updated Policies and Procedures Manual, available on the web and periodically revised as the need arises; 2) modified text for various sections of the GDWQ, for inclusion in the second addendum to the Third Edition, to reflect changes made to the manual

Progress to date: The Policies and Procedures Manual has been progressively developed since 2000, when a plan of work for its development was adopted by the Berlin 2000 Coordinating Committee meeting. Changes and additions are suggested and agreed to in WG meetings.

Plan of work for all WGs:

- 1) Terms of reference for peer reviewers are to be included in the manual to explain how to write to peer reviewers and what is wanted from them. **Oliver Schmoll** will prepare a draft terms of reference (for review by WG members).
- 2) The P&C WG recommends that section F of the Policies and Procedures Manual provide more specific information on how microbial risk assessments are performed and establishing priorities for which pathogens are selected for quantitative microbial risk assessment (QMRA). **David Cunliffe** will do this for the next meeting.
- 3) A new category is to be added to the flow chart in the Policies and Procedures Manual to allow for the preparation of short background documents on certain parameters where there is concern over exposure because of a spill, for example, but there is no evidence supporting occurrence in drinking-water under normal circumstances. **WSH** will do this.
- 4) A new paragraph is to be added to G1.15 to accommodate the preparation of new shorter background documents (e.g. for certain pesticides) when there is no evidence for occurrence in drinking-water but there is likelihood of a spill. **John Fawell** will prepare this paragraph.
- 5) The need/rationale for expanded summary statements (i.e. need for more management guidance on certain parameters) needs to be added to the Policies and Procedures Manual. **John Fawell** will prepare this text.

- 6) **John Fawell** has drafted text for inclusion in section I (Radiological Aspects). **WSH** will liaise with the **Radiation and Environmental Health Programme** so that section I can be completed.
- 7) Section G5.6, Significance and interpretation of a chemical guideline value, is to be deleted from the Manual, as it belongs only in the GDWQ. **WSH** will delete.
- 8) **WSH** is asked to send electronic versions of the revised Policies and Procedures Manual to WG members, who are asked to revise the electronic version using tracked changes and return to **Oliver Schmoll** by the end of May 2006.

4. REGIONAL CONCERNS

On the first day of the meeting, participants participated in videoconferences with three of the WHO Regional Offices (SEARO, WPRO and AMRO). EMRO, AFRO and EURO were unable to participate. In these sessions, the Regional Offices explained that they were still in the process of disseminating the Third Edition of the Guidelines, and thus it was still too early to conclude how well the Guidelines are working in their regions. Nevertheless, they noted that the regions were quite enthusiastic about the framework for safe drinking-water quality that was introduced in the Third Edition, in particular WSPs.

The regions then identified those issues of primary interest to them, which were addressed by WG members directly during the videoconferences and then turned over to the relevant WGs for further discussion during the course of the meeting. Annex 6 lists the regional concerns. The relevant agenda items can be searched using the index at the end of the report.

5. ITEMS AGREED TO FOR SECOND ADDENDUM TO THIRD EDITION

During discussions, meeting participants finalized items to be included in the second addendum to the Third Edition and suggested that a few additional agenda items also be included in that addendum. The agenda items for which text will be included in the second addendum are ##1B-1, 1D, 5, 10, 16, 19, 20, 22, 23, 36, 38, 49, 52, 52B, 52D, 53, 60, 68, 71, 78, 84, 85, 86, 87, 92, 101, 103, 104, 105, 106, 109, 121, 125, 127, 128, 130, 131, 133, 136, 139, 147, and 149 (see Section 9 below).

The text that is to be included in the second addendum is summarized in Annex 7. This text includes summary statements for those background documents listed in Annex 8 for publication in the second addendum.

6. ITEMS AGREED TO FOR FOURTH EDITION

During discussions, meeting members recommended that items be included in the Fourth Edition of the GDWQ. The agenda items for which text will be included in the Fourth Edition are ##4, 5, 7, 10, 11, 17, 21, 22, 23, 28, 36, 38, 39, 41, 52A, 54, 58-3, 61, 63, 66, 71, 74, 79, 90, 101, 109, 120, 123, 131, 136, 141, 142, 146, 150 and 151. This text includes

summary statements for those chemical background documents listed in Annex 8 for publication in the Fourth Edition (see Section 9 below).

On the first day of the meeting, several suggestions were put forward regarding the “flavour” or “personality” of the Fourth Edition. These were further discussed and expanded on in a plenary session on the final morning of the meeting, additional points were brought up for discussion and several actions for work needed in the Fourth Edition were identified. The suggestions made, together with a brief summary of discussions on each, where appropriate, are, in no particular order, as follows:

- Text is needed up front in the document to very simply explain how to use the GDWQ. The existing text in section 1.2 needs to be edited, and text on how various user groups (as mentioned in the Foreword) could use the guidelines needs to be inserted. Much of section 1.1 could also be moved elsewhere. In addition, the focus of the health-based targets chapter (chapter 3) should be refocused on how to set national regulatory standards, chapter 4 should emphasize how to set up a WSP, and chapter 5 should be about independent oversight. These changes should help the Guidelines become more user friendly. No one was identified as being responsible for this action item.
- Several additional suggestions — such as strengthening text on household use and small systems using Volume 3; prioritizing chemicals for monitoring purposes, with linking text to the almost completed supporting document — could also be linked under a unifying heading of helping countries to apply the Guidelines (with links to the Millennium Development Goals).
- Delivering concepts contained in the Guidelines, training and applications to help people absorb and use this information should be a mission of WHO.
- The GDWQ should be read carefully to ensure that the message that comes across is that, from both a developed and developing countries perspective, the transition to the new water quality framework should be a gradual evolution or improvement. The GDWQ should not give the message that countries with systems in place are doing it wrong and have to completely change their way of doing things.
- Natural disasters and emergencies (acute exposures): Some text has already been modified to address this issue. It was pointed out that addressing this issue may require the expertise of experts from outside of this group. It was also suggested that acute exposures have already been dealt with adequately in the first addendum. What is needed is more information on preparedness (as part of WSPs) for emergency planning (separate from emergency response, which is dealt with in chapter 6) and how a utility builds this into a WSP. This information should go into a free-standing volume on WSPs with a brief insert in the GDWQ on prioritizing efforts in emergency situations and perhaps the addition of a sentence noting that water utilities should coordinate responses with national authorities. We should coordinate with the United Nations (UN) Interagency Standing Committee in the lead-up to the Fourth Edition.
- The topic of certification fits well within the flow of the current GDWQ (after surveillance/oversight). There are lots of requests for information in this area: what

would be necessary to confirm that a water supply is in compliance with WHO Guidelines? WHO can provide the principles for certification. WHO would not do certification, which would be done by third parties, and would not endorse the certifiers. Taking someone step by step through the WSP (e.g. have you adequately mapped your catchment?) would help ensure good quality drinking-water but is not certification. Whoever starts the drafting process needs to be aware that WSPs are only part of the answer; meeting the guideline numbers also needs to be addressed. **John Fawell** will act as lead with **David Cunliffe**, with help from **Annette Davison** (who has a legal background and helped prepare the Australian document on compliance) and **Jamie Bartram**; a draft will be prepared for the next meeting

- More on WSPs and risk assessment approach
- New water (desalination, reuse, rainwater harvesting) and water conservation or sustainability: Some of these are already being dealt with in the current edition and second addendum. Recycled water is not really covered yet and perhaps doesn't belong, as we want to encourage the use of the best available source of drinking-water. Household water use, rainwater collection, storage, POU treatment — all of these need to be integrated or linked in the Fourth Edition, even if they are dealt with separately. Conservation or sustainability (not wasting water) also needs to be mentioned in the Fourth Edition. **Joe Cotruvo** will coordinate preparation of required text to tie these areas together.
- Water and nutrition
- Sampling and monitoring, practical aspects
- Need better tools for developing countries to perform microbial analysis, indicators and pathogen detection, risk assessment, risk management, household systems, sampling and monitoring
- Community participation (particularly women): It was suggested that the current GDWQ cover this area quite well; if it needs expansion, then Volumes 3 and 4 would be the place to do it. **Jorge Latorre** was asked to have a look at the current text and to provide feedback as to whether the issues he's raised (including gender) are adequately covered; **Suresh Kumar** and **Feroze Ahmed** will also examine whether any new information (new mechanisms of community participation in provision of safe drinking-water) from developing countries should be added to these volumes and bring forth a report to the next meeting (**Bruce Gordon** is to be contacted as well).
- Technology selection
- Simplify presentation of material
- Don't neglect urban utilities in emphasis on small systems
- The regions asked for guidance on iodine and silver (see discussion in Section 7 on New Issues).

- The issue of indicator chemicals, which are partly covered in the prioritization document, needs to be summarized in the Guidelines. Indicator chemicals (to be used where resources are limited) were brought up as an issue by the regions. However, this is likely to be a limited possibility except for disinfection by-products.
- Look at the role of microbial indicators in supporting WSPs etc. (in risk assessment/risk management context). Some are being used inappropriately as surrogates for pathogens, and others (coliphage indicators, spore indicators) are not being used at all. The Guidelines should encourage more progressive thinking on the use of these indicators in specific circumstances (rather than sole dependence on *E. coli*). It was pointed out that there is quite a bit of text in chapter 11 on index and indicator organisms but not enough text in chapter 7 (not balanced). It was also suggested that the issues are about verification and validation; we need adequate text in the section on the specific microorganisms as to what they are suitable for use as, as well as text in the verification and validation sections regarding the use of microbial indicators. Concerns therefore need to be addressed in three clear places in the GDWQ. **David Cunliffe** volunteered to tackle this.
- DALYs (see agenda item #10 for action item on this one)
- We carried forward thinking from the Second Edition with negligible change to the Third Edition. Disinfection and chlorination are not synonymous. Many other disinfectants are increasingly being used. In preparation of the Fourth Edition, we need to work through the entire document and make sure that the text reflects the current status of disinfection worldwide and gives good guidance in this area. A person has not yet been identified to tackle this.

It was also agreed that actions required for the Fourth Edition that have been identified in previous meeting reports should be consolidated in one area of the meeting report to ensure that they are implemented. These items are as follows:

- The Guidelines are to be edited so that the term “achievability” is not used when what is meant is technical achievability. The term can still be used when what is meant is analytical achievability (agenda item #1A).
- The Guidelines are to be edited so that the term “risk” is used only to refer to the quantitative probability that a hazard will occur, not in the more general, qualitative sense. The term “level of risk” should no longer be used (agenda item #109).
- The Guidelines are to be edited to ensure consistency in terminology usage (agenda item #11).

7. NEW ISSUES¹

The following issues were identified as emerging priorities by the Expert Consultation:

- (a) *Perchlorate*: An official request was made by Japan for WHO to develop guidance concerning perchlorate in drinking-water, as it has been found at high levels in surface water. Accordingly, this item has been added to the rolling revision as agenda item #141.
- (b) *Sodium*: Correspondence was received noting that the United Kingdom, in implementing the EU Drinking Water Directive into national regulations, has made sodium a mandatory parameter, at 200 mg/litre, “to protect against infant hypernatraemia and those on a salt-restricted diet” — even though the GDWQ state only that concentrations in excess of 200 mg/litre may give rise to an unacceptable taste. There is some question as to whether this interpretation of the United Kingdom regulations is correct. The Committee therefore added sodium to the rolling revision in order to clarify the issue (see agenda item #142).
- (c) *Avian influenza*: The issue of avian influenza in drinking-water was raised as an area of concern because of the possible increased risk to water supplies caused by animal sources of the virus. This issue was added to the plan of work as agenda item #144.
- (d) *Alachlor*: Alachlor is a Rotterdam Convention Prior Informed Consent (PIC) chemical. As the assessment for alachlor was conducted in 1993, alachlor has been added to the plan of work (see agenda item #146).
- (e) *Lindane*: Lindane has been nominated for addition to the list of persistent organic pollutants (POPs) under the terms of the Stockholm Convention. As a result, it has been added to the plan of work (see agenda item #147).
- (f) *Chlorine residuals*: It was brought to the attention of the Committee that there is a lack of clarity when comparing statements in different sections of the GDWQ with regard to recommended residual chlorine levels at the point of delivery. The Committee therefore decided to add this issue to the plan of work (see agenda item #149).
- (g) *Zoonosis fact sheets*: It has been pointed out that consistency between the scope of organisms listed in Table 7.1, Figure 7.1 and the fact sheets in chapter 11 could be improved. In addition, several zoonosis fact sheets have been provided to the Committee, some of which are not included in the GDWQ. As a result, the Committee decided to include this item in its plan of work for the Fourth Edition (agenda item #150).
- (h) *Silver*: One of the regions suggested that the Committee could provide default provisional guideline values for some of the chemicals, such as silver, that are

¹ The working groups considered the following issues and decided not to add them to the plan of work: Linkage between Fluoride and Iodine Deficiency Disorder (see agenda item #143); HIV and Drinking-water (see agenda item #145); and Differences between EU DWD and WHO GDWQ (see agenda item #148).

mentioned in the GDWQ but for which no guideline is yet provided. As silver is used as a disinfectant in special situations and has not been evaluated since 1993, it has been added to the agenda as agenda item #151 for assessment as a water treatment additive.

These new agenda items will need to be presented to the Final Task Force meeting in late 2007 or early 2008 for approval.

8. AGENDA ITEMS CONCLUDED AND REMOVED FROM ROLLING REVISION

Several agenda items were concluded following the last meeting and have already been removed from the rolling revision (see previous meeting report), so the agenda items in this report are not consecutively numbered.

In addition, the following agenda items were concluded at this meeting and have been removed from the plan of work:

- #1C (Non-ingestion Exposure to Chemicals)
- #26 (Protecting Groundwaters for Health)
- #35 (Safe Plumbing Practices)
- #37 (Boil Water Advisories)
- #96 (Risk Assessment of Pesticide Residues in Water and Food)
- #99 (Methodology for Extrapolating to GVs from Database on Sensitive Biochemical End-points)
- #122 (Bonn Charter and the GDWQ)

The following agenda items have been reported on in this meeting report, either for information purposes or because the plan of work has not yet been completed. However, they will all be removed from the plan of work of the next meeting, as their plans of work will in all cases be completed shortly, in most cases once the Policies and Procedures Manual is updated or once the second addendum is published:

- #1B-1 (Allocation Factors for Chemical Guideline Derivation)
- #1B-2 (Default Assumptions for Chemical Guideline Derivation)
- #19 (Temporary Water Supplies)
- #24 (Chemical Safety of Drinking-water: Assessing Priorities for Risk Management)
- #58-1 (Nutrient Minerals in Drinking-water)
- #91 (Petroleum Products)
- #100 (Exposure Data)
- #110 (Linearized Multistage Model and Dose–Response Modelling)
- #127 (Bromate in Bottled Water)
- #133 (Bottled Water in Emergencies)
- #140 (Chemical Background Documents Specification Sheet)

9. PLAN OF WORK FOR ROLLING REVISION

Each item on the agenda (numbered according to the meeting report from the May 2005 Expert Consultation) was discussed by the appropriate WG(s). A plan of work together with any progress to date were recorded in most cases. Some agenda items were concluded and will be removed from the rolling revision (see Section 8 above).

The following summarizes the meeting discussions by agenda item. Action items for individual members of the Expert Consultation are itemized in Annex 9. However, it is recommended that all WG members carefully read the plans of work recorded for all agenda items in case any contributions or tasks have not been recorded in the individual agenda items or in Annex 9.

It should be noted that agenda items are not consecutively numbered, as some have been concluded and removed from the plan of work.

#1A. “Achievability” for Water Treatment Chemicals/Materials

Background: The term “achievability” as applied to chemical constituents is used in the GDWQ to refer to both technical achievability and analytical achievability. When applied to technical achievability (i.e. treatment), this term is not appropriate in all cases. It applies only to chemicals in source water, but not, for example, to chemicals used in water treatment or from materials in contact with drinking-water.

Expected end-product(s): 1) Revised text in Policies and Procedures Manual; 2) editing of GDWQ such that the term “technical achievability” is no longer used in Fourth Edition

Progress to date: The GDWQ WG Meeting (Geneva, 2004) agreed to discontinue the use of the term “technical achievability.” The GDWQ WG Meeting (Geneva, 2005) agreed on wording to be inserted in the Policies and Procedures Manual. The GDWQ WG meeting (Geneva, 2006) agreed to keep this item in the plan of work until the Fourth Edition is published. The Policies and Procedures Manual has been revised.

Plan of work for Chemical and P&C WGs:

- 1) This item is to be kept on the agenda until after publication of the Fourth Edition, to remind WGs that the entire GDWQ are to be edited so that the term “achievability” is not used when what is meant is technical achievability. The term can still be used to refer to analytical achievability.

#1B-1. Allocation Factors for Chemical Guideline Derivation

Background: The GDWQ use a variety of allocation factors (to allocate the proportion of a tolerable daily intake, or TDI, attributable to drinking-water) for deriving guideline values for chemicals. Where there is not sufficient exposure information to derive chemical-specific allocation factors, default values are used. The explanation of the process by which allocation factors are chosen (in chapter 8 of the GDWQ) needs greater clarity.

Expected end-product(s): 1) Revised text in chapter 8 and section 2.3.2 of GDWQ Volume 1 for inclusion in the first addendum to the Third Edition; 2) revised text in Policies and

Procedures Manual; 3) revised text in chapter 8 of GDWQ for inclusion in second addendum to Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed on a plan of work, and revised text has been prepared for inclusion in the Policies and Procedures Manual and the first addendum to the Third Edition. The GDWQ WG meeting (Geneva, 2005) agreed on the need for additional text, for possible inclusion in the second addendum. The GDWQ WG meeting (Geneva, 2006) agreed to revise text for the second addendum to the Third Edition. The Policies and Procedures Manual has been updated. Once the second addendum is published, this agenda item can be removed from the plan of work.

Plan of work for Chemical WG:

- 1) **John Fawell** is to provide text and modifications needed for the second addendum (chapter 8, allocation factors) to indicate that it is preferable to use an allocation factor based on real exposure data. The availability of such exposure data will be carefully assessed on a case-by-case basis. When such data are not available or adequate, then “rule of thumb” (to replace use of the term “default,” which should be avoided) values can be used. The text will also explain why 20% is felt to be more realistic than 10% as a “rule of thumb” allocation factor. It needs to be checked that the ideas expressed in the text are similar in both the Policies and Procedures Manual and the second addendum.
- 2) *Once the second addendum is published, this agenda item will be removed from the rolling revision.*

#1B-2. Default Assumptions for Chemical Guideline Derivation

Background: Annex 3 of the GDWQ briefly discusses default assumptions on drinking-water intake and body weight as well as inhalation and dermal exposure. Concern has been raised regarding the appropriateness of inclusion of this annex in the GDWQ.

Expected end-product(s): 1) Deletion of Annex 3 of GDWQ in the first addendum to the Third Edition; 2) addition of new text in chapter 8 for inclusion in the first addendum to the Third Edition; 3) revised text in Policies and Procedures Manual

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to delete Annex 3 from the Third Edition. Revised text has been prepared for chapter 8 of the first addendum and for the Policies and Procedures Manual. The GDWQ WG meeting (Geneva, 2006) agreed to revise text in the Policies and Procedures Manual (and possibly in the second addendum). Once these actions have been completed, the item can be removed from the plan of work.

Plan of work for Chemical WG:

- 1) John Fawell revised the text on drinking-water intake in the Policies and Procedures Manual (section G1.5) to reflect Guy Howard’s comments on studies showing increased intake in hotter climates. Country-specific data on drinking-water intake habits can be used to modify drinking-water guidelines, where such data are available. In addition, the text on body weight in the same section has been made into a new paragraph.
- 2) The revisions made to the Policies and Procedures Manual need to be checked against the first addendum revisions to see if any additional changes are necessary for the second addendum. **Marla Sheffer** will do this. If any changes are necessary, **John Fawell** will make them.

- 3) *This item will be removed from the plan of work once the above actions are completed (and the second addendum is published, if a need for revised text is identified).*

#1C. Non-ingestion Exposure to Chemicals

Background: Current chemical guideline values in the GDWQ take into account primarily exposure via ingestion in drinking-water and also use default relative source contribution assumptions. However, volatile chemicals may be absorbed by other routes (e.g. inhalation during showering and other household uses, dermal during bathing). The GDWQ Final Task Force (FTF) meeting (Geneva, 2003) discussed approaches for dealing with non-ingestion exposure, including increasing the allocation factor and increasing the daily intake, and agreed that new methodologies need to be developed for some substances and under some circumstances.

Expected end-product(s): 1) Revised text in section 2.3.2 of GDWQ, for inclusion in the first addendum to the Third Edition; 2) progressive updating of summary statements (chapter 12 of GDWQ) and background documents for volatile chemicals to reflect revised approach

Progress to date: Revised text was prepared for inclusion in the first addendum to the Third Edition of the GDWQ and for the Policies and Procedures Manual. The GDWQ WG meeting (Geneva, 2006) agreed to further revise the text of the Policies and Procedures Manual and then to remove the item from the plan of work.

Plan of work for Chemical WG:

- 1) John Fawell has revised the text on non-ingestion exposure to chemicals (currently section G3.8 of the Policies and Procedures Manual) according to comments made by WG members (including instructions for authors of background documents regarding the need to consider the potential for non-ingestion exposure to chemicals).
- 2) *This item can be removed from the plan of work.* It is noted, however, that as background documents for volatile chemicals are updated, they should take into consideration this new approach.

#1D. Short-term Exceedances and Guidance Values for Chemicals in Emergency Situations

Background: The Chemical Aspects WG meeting (Tokyo, 2002) recommended the development of short-term guidance values for cyanide and petroleum oils. Such guidance would be useful in planning for and responding to accidental and deliberate pollution incidents. The GDWQ FTF meeting (Geneva, 2003) reiterated that guidance on short-term exceedances of guidelines (related to both accidental and deliberate chemical pollution) is frequently sought and noted that the adverse impacts of some management options (discontinuing supply/access) preclude a simple precautionary approach. The 2003 FTF meeting identified this as a priority area for the development of guidance and GDWQ expansion. A document entitled *The Use of Guidelines for Chemical Parameters in Emergency Situations* had been prepared for discussion purposes.

Expected end-product(s): 1) New section on “Use of guidelines for chemicals in emergency situations” (probably in section 6.2) for inclusion in the first addendum to the Third Edition; 2) new text to describe methodology for deriving short-term guidance values and use of JMPR acute reference doses for pesticides (probably in section 8.2) for inclusion in the

second addendum to the Third Edition; 3) new text for Policies and Procedures Manual on the establishment of short-term drinking-water guidance values

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work with respect to text on boil water and water avoidance advisories, to be incorporated into the new text on emergency situations included in the first addendum. The text has been published in the first addendum. The GDWQ WG meeting (Geneva, 2006) agreed on the need for text on the establishment of short-term drinking-water guidance values for the Policies and Procedures Manual and the second addendum and decided on a plan of work.

Plan of work for Chemical WG:

- 1) **John Fawell** will prepare text on the establishment of short-term drinking-water guidance values for the Policies and Procedures Manual and the second addendum. John has not yet prepared this text but will do so shortly and circulate the text to WG members for review so that it can be incorporated into the second addendum (probably section 8.2). For those chemicals where health effects may occur after acute exposure, the JMPR acute dose methodology will probably be useful and applicable.

#3. Use of GDWQ

Background: The GDWQ FTF meeting (Geneva, 2003) expressed the need to document the use of the GDWQ (e.g. setting health-based targets) in general. WHO has not systematically tracked the use of its GDWQ. Proactive tracking would be too time-consuming. It has been suggested that WSH might prepare, for its own purposes, a simple table in which it is recorded instances where countries have used or referred to the GDWQ in national regulatory development.

Expected end-product(s): Table (Word spreadsheet) recording use of GDWQ by various countries

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on the need for such a table. The GDWQ WG meeting (Geneva, 2006) reiterated this need and suggested that relevant information be collected through the Regional Offices via RegNet and that it be disseminated to WG members through a collaborative Internet workspace.

Plan of work for all WGs:

- 1) **Oliver Schmoll** explained to WG members that passive accumulation of information by WSH has resulted in a short table with lots of blanks. There are four points of entry on the table: uses of or reference to the Guidelines by countries, water suppliers, regulators or independent surveillance, and others (e.g. studies, guidance, etc. from various countries making reference to the Guidelines). The Committee was asked to comment on the usefulness of further development of this concept, how its findings/contents could/should be used or disseminated and whether more active data collection should be undertaken.
- 2) **WSH** is to ask the regions to provide information relevant to the table via RegNet.
- 3) The development of proposals for pilot projects (ACP region — African, Caribbean and Pacific countries — for implementation of WSPs and framework) previously reported by **Tom Williams** under the Bonn Charter (agenda item #122) has been moved to this agenda item.

#4. Water Safety Plans for Buildings, Including Health-Care Facilities

Background: Section 6.1 of the GDWQ deals with water management in large buildings. However, there is a lack of more substantive guidance on WSPs for both large and small buildings, particularly health-care facilities (e.g. dialysis centres, dental chairs, medical devices), for both developed and developing countries. Uses of water in health-care facilities may lead to increased exposure (through proliferation in complex piping and devices), enhanced contact (wound washing, dental drains, catheter cleaning) and increased contact with vulnerable population groups (young, elderly, immunocompromised). *Pseudomonas aeruginosa* (not just from drinking-water, but from water used for cleaning machines, wound cleaning, etc.) alone has been reported as having a significant impact in hospitals and nursing homes, resulting in longer hospital stays and deaths. Concern extends to patients discharged to home care.

Expected end-product(s): 1) Stand-alone document for publication (no specific timeline); 2) revised (expanded) section 6.1, for inclusion in the Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) revised the plan of work, deciding that the substantive document needed to be completed before the GDWQ text was revised. The GDWQ WG meeting (Geneva, 2006) reiterated that section 6.1 would be revised once the draft document had been finalized, probably in time for the Fourth Edition.

Plan of work for P&C and Micro WGs:

- 1) Progress on this item was reported by **Yves Chartier**. Two meetings have already been held in 2005, and considerable progress has been made on writing the document. The document is in three sections; chapter authors have been identified, and many have produced draft chapters. Documents (draft chapters) will be circulated later in May 2006 for additional review and comments. Another meeting of the project team is scheduled for October 2006 to review progress. A final draft document will be submitted to WHO for internal review by the time of the next GDWQ meeting in May 2007.

#5. Emergencies and Disasters

Background: Section 6.2 of the GDWQ deals with various aspects of water supply and quality in emergencies and disasters (primarily natural disasters such as earthquakes and floods) as an application of the Guidelines in specific circumstances. However, there is a need for more detailed guidance on water safety in emergencies and disasters. Other WHO documents available on emergencies and disasters include *Environment and Health in Emergencies and Disasters* and *Public Health Response to Biological and Chemical Weapons*, but do not address water substantively. AMRO has reiterated the importance of this issue to the region and stressed the need for checklists, specific guidance on actions to take in the event of an emergency or disaster, etc.

Expected end-product(s): 1) Stand-alone document; 2) new text throughout WSP chapter (chapter 4) for inclusion in the second addendum to the Third Edition; 3) new text for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. A draft document and new text for the second addendum were prepared for the GDWQ WG meeting (Geneva, 2005) and will be reviewed. A training package on how to ensure the provision of

safe drinking-water in emergencies has been developed. The GDWQ WG meeting (Geneva, 2006) revised the plan of work and set new timelines for text preparation for the second addendum and the Fourth Edition.

Plan of work for P&C WG:

- 1) Background on progress was reported by **José Hueb**. There is a new UN initiative on emergency response and preparedness. An Interagency Standing Committee has been created. This entity is divided into clusters, one of which is water and sanitation. For this, UNICEF is the lead, because it is an emergency response. However, WHO is recognized as the lead on drinking-water. A review process of existing documents is ongoing. There is a new training package being prepared for water in emergencies that is intended to be a practical document; it is being field tested. **Federico Properzi** is leading the effort to write this package. Major information from the UN cluster (the overall review report and training package) should come to WHO for review by the GDWQ WGs.
- 2) At this meeting, emergencies and disasters were identified as an area to be addressed for the Fourth Edition.
- 3) The last rolling revision meeting recommended that the WSP chapter needed more on emergencies and disasters. **Joe Cotruvo** drafted an assessment document for general guidance on emergencies and disasters that also is responsive to bioterror threats or events. The document (a) serves as one basis for developing text for the Fourth Edition and (b) will also be used to extract a shorter text to go into the WSP section of the GDWQ focusing on preparedness. This text is different from how to create a WSP for emergencies and disasters involving displaced people, such as earthquakes. There are other groups dealing with this issue for the unexpected disasters and displacements.
- 4) It was concluded that a large document that Joe Cotruvo prepared for José Hueb on disasters and emergencies and previously cited under this agenda item is not part of the rolling revision process for the GDWQ. The preparation of a new stand-alone document is no longer envisaged.
- 5) Next steps: **Joe Cotruvo**, with input from **Guy Howard**, will use the draft document (as described under 3) above) as a source of information to revise and expand the text for the WSP chapter for the second addendum. Text for the Fourth Edition will also be prepared, and the WG needs to decide on the specific content. All texts will be reviewed by **José Hueb** for harmonization with UN efforts in this area.
- 6) Timelines: Comments from **Guy Howard** to **Joe Cotruvo** by the end of June. Joe provides revised text for the second addendum on WSPs by the end of July, to be included in the second addendum package.

#6. Bulk Water Shipments

Background: WHO has received an unofficial request from the New Zealand government for guidance concerning technologies for the management and monitoring of the safety of large volumes of water carried by ship tanker or other marine vessel.

Expected end-product(s): Supporting document, publication date unknown

Progress to date: WHO has followed up with New Zealand and circulated their proposal. Comments have been consolidated and delivered to New Zealand, and New Zealand has agreed to prepare a text. No progress had been reported by the time of the GDWQ WG meeting (Geneva, 2006).

Plan of work for all WGs:

- 1) The draft text, when it is received, will be circulated by **WSH** to the WGs for comments.
- 2) Health Canada has recommended two reviewers for the peer review stage: Tim Macaulay, Saskatchewan Health, and Kristina Taracha, First Nations and Inuit Health Branch of Health Canada. **Joe Cotruvo** has also offered to review the document.
- 3) New Zealand has not provided an update on progress, if any. **WSH** is requested to contact New Zealand and determine what progress has been made.

#7. Vulnerable Groups

Background: There is increasing awareness of increased susceptibility among certain vulnerable population groups to some water-related diseases. In particular, it is increasingly recognized that immunocompromised groups (e.g. those severely immunocompromised through HIV/AIDS or immunosuppressive therapy) may be at risk from water supplies that meet normal, achievable standards of “safety.” The GDWQ FTF meeting (Geneva, 2003) recommended that guidance to address the specific concerns of such groups be included in the Fourth Edition of the GDWQ.

Expected end-product(s): New section to be inserted in GDWQ (chapter 6 tentatively), to be included in the Fourth Edition; possible free-standing document

Progress to date: A draft document has been prepared and will be circulated to the Chemical and Microbial WGs for comment.

Plan of work for all WGs:

- 1) **Ana Maria de Roda Husman**'s draft was distributed by email to WG members in July 2005, but comments have not yet been received. **David Cunliffe** will resend the draft to WG members (Guy Howard, Health Canada and USEPA in particular expressed an interest in reviewing it), who are asked to send their comments to Ana Maria by August, as she is planning an expert meeting on the subject in September 2006. WG comments and the results of the September meeting need to be presented to WG members at the next meeting.
- 2) **Ana Maria** is asked to verify that she is aware of the results of a susceptibility workshop held on behalf of the USEPA in the late 1990s. She can contact **Ambika Bathija** for more information.
- 3) WG members stressed the importance of including experts from outside North America and Europe (particularly from developing countries) at the expert meeting. Experts should be public health experts, not just drinking-water experts. This advice assumes that Ana-Maria has not already organized the meeting and invited all participants. If not, then WG members would like to suggest experts to be included.
- 4) **Ana-Maria** is asked to inform the WG, via **Oliver Schmoll**, on the purpose of the meeting and how it relates to this group.
- 5) The document should be circulated in-house to the HIV/AIDS group at WHO (WSH).
- 6) It was noted that an external communication was received noting that two new studies on HIV and drinking-water are available (see agenda item #145). The WGs were asked to review new evidence from these studies and to recommend whether or not this item should be dealt with on the rolling revision. It was decided that this item should be dealt with under the vulnerable subgroups agenda item.

#10. Levels of Protection

Background: The Third Edition of the GDWQ provides, for the first time, some comparisons regarding the levels of protection against microbial, chemical and radiological hazards. The GDWQ FTF meeting (Geneva, 2003) recommended that this be further developed and, to the extent possible, that information on “best estimates of risk” be included. AMRO has requested guidance on calculating disability adjusted life years (DALYs), taking into account social impact (i.e. differences between low- and high-income countries).

Expected end-product(s): 1) Revisions to Policies and Procedures Manual; 2) instructional note for authors of JMPR reports and CICADs (also to be included as an annex in the Policies and Procedures Manual); 3) revised paragraph in chapter 3 of the GDWQ, for the second addendum; 4) guidance on calculation and use of DALYs for inclusion in the Fourth Edition or (probably) post-Fourth Edition and/or cross-reference to an alternative source

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. A fact sheet on guidance for calculating DALYs, taking into account differences between low- and high-income countries, was prepared and reviewed by the GDWQ WG meeting (Geneva, 2005).

Plan of work for all WGs:

- 1) **Ana Maria de Roda Husman** prepared a specification sheet on guidance for calculating DALYs. The sheet was revised on the basis of comments received, and further comments were sent to Ana Maria. The WG needs to wait for **John Fawell** to complete a conceptual discussion paper on the application of DALYs to chemicals before continuing with this fact sheet. Discussions indicated that this would be quite a difficult undertaking, although the approach could be applied at least to radionuclides (the WHO **Radiation and Environmental Health Programme** plans to do something like this in the future).
- 2) In discussions, it was noted that the specification sheet for microorganisms could still be developed and circulated, explaining in detail how these calculations are done, but it is not to be added in the second addendum, as it is a work in progress and doesn't update the GDWQ as an emerging issue. **Mark Sobsey** offered to ask Crawford Brown to participate in discussions. Jamie Bartram suggested that the WGs may want to encourage outside discussions. It was concluded that there is no particular rush in dealing with the agenda item.
- 3) Final decision: The WGs decided to wait for John's conceptual discussion paper, which will perhaps be ready for the next meeting, but not necessarily, as there is no rush. **John Fawell** will write two or three pages to start the discussion going and circulate them to WG members for comment. The WG will discuss John's paper at the next meeting. The approach will then be revised, to be considered post-Fourth Edition.
- 4) All new microbial fact sheets should systematically lay out information to support the DALY approach, where it is available (and it may not be available for most). This includes all effects associated with the hazard, the probability of the effect, the severity of the effect and the duration of the effect. This cannot yet be applied to chemical background documents, as it has not yet been shown that the DALYs approach is feasible for chemicals.
- 5) The Policies and Procedures Manual needs to be modified to include this under “Effects on Humans” for chemical background documents and in the specification sheet for the microbial fact sheets. The Microbial and Chemical Aspects WGs will review the

microbiological and chemical needs to develop this text (**Ana Maria de Roda Husman** and **John Fawell**). The WG agreed that it is not ready to proceed with this task yet.

- 6) It was earlier suggested that a one-page “how-to” document should be prepared and provided to authors of JMPR reports and CICADs (also to be included as an annex in the Policies and Procedures Manual). This task is also on hold until the feasibility of the approach to chemicals has been demonstrated. When the task is carried out, minimum requirements regarding the output of the JMPR and CICAD groups should be clearly laid out, encouraging them to include information that is relevant to DALYs-type issues, such as severity of outcome data. This will eventually require a discussion session with PCS.
- 7) There is a need to provide guidance on how to calculate DALYs from this information, taking into consideration local conditions and circumstances. **Mark Sobsey** prepared a paragraph (on adapting risk levels in light of certain circumstances), which has been reviewed and adopted by the WGs. This paragraph will be inserted on p. 47 to follow the first paragraph in the second addendum.

#11. Terminology in the GDWQ

Background: The GDWQ FTF meeting (Geneva, 2003) noted that changing terminology (e.g. sanitary inspection) needs to be updated via the rolling revision process. It has also been brought to WHO’s attention that the phrases “drinking-water supply surveillance” and “surveillance of drinking-water quality” are used inconsistently and/or incorrectly in sections 1.2.1 and 2.1.5 and chapter 5.

Expected end-product(s): 1) Glossary as a free-standing web-based product; 2) any related changes to text of Volume 1 as a result of inconsistency in terminology usage, for inclusion in Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to a plan of work, and the GDWQ WG meeting (Geneva, 2006) revised it as a result of discussions.

Plan of work for all WGs:

- 1) **Michèle Giddings** is to compile a list of terms used in the GDWQ and submit them to **WSH**, who will ensure their inclusion in WHO’s list of water-related terms, which have been translated into seven languages and will be defined. Michèle will compile this list using terms and definitions that have been submitted to her by various WG members.
- 2) WHO/PHE’s glossary will be ready for public review within a month. He showed the WGs the home page of THE (The Health and the Environment) LEXICON, which will include water-related terms in English, French, Spanish, Portuguese, German, Russian, Arabic and Chinese. Each item will include the term, definition, explanation, example (term is used in a sentence), reference for definition, and useful Internet links (as well as a feedback field).
- 3) **Michèle**’s glossary will need to be completed by the time of publication of the Fourth Edition (i.e. submitted by late 2007).
- 4) WG members as well as IWA practitioners will be asked to review the glossary when it is ready.
- 5) **Jamie Bartram** noted that a separate process may be needed for a microbiology glossary, as the field is moving forward rapidly, and there may be a need for international harmonization of terminology in this area.

#12. Toxic Cyanobacteria in Water

Background: The book *Toxic Cyanobacteria in Water: A Guide to their Public Health Consequences, Monitoring and Management* was developed as part of the rolling revision process based on a recommendation of an expert meeting held in Geneva in 1995 and was published in 1999. The GDWQ FTF meeting (Geneva, 2003) recommended that the book be updated. In addition, at the last meeting of the Working Group on Water and Health (WHO Regional Office for Europe), it was noted that a significant number of European countries are facing increasing water stress and are building reservoirs to store water, but these often experience cyanobacterial blooms, and the resulting toxins are a major problem for the European countries, as indicated by EURO.

Expected end-product(s): Second edition of the supporting document *Toxic Cyanobacteria in Water*, publication date pending

Progress to date: The GDWQ WG meeting (Geneva, 2004) approved the workplan and time schedule for the updating of the book. The GDWQ WG meeting (Geneva, 2005) approved the outline of the second edition, with amendments. A detailed writing frame has been prepared, and authors have been identified. An authors' meeting with first drafts is targeted for autumn 2006.

Plan of work for all WGs:

- 1) **Ingrid Chorus** reported that not much progress has been made since last year. A more detailed table of contents, revised since the last meeting, was provided to the WGs. A small editorial meeting for the first draft will be held by the end of 2006; funding has been provided for this. A revised draft of the text will be ready for the next meeting of the WGs.
- 2) **Michèle Giddings** is to provide **Ingrid** with some country-specific information.
- 3) Oversight is to be provided by inclusion of WG members in the peer review of the document. In addition to fulfilling normal requirements of a peer reviewer, WG members are to ensure consistency with the GDWQ water quality framework.

#12-1. Fieldworker Guidance

Background: A member of one of the GDWQ WGs suggested, prior to the GDWQ WG meeting (Geneva, 2004), that there is a lack of guidance for field staff in undertaking surveillance or monitoring activities in the field. Documents such as Volume 3 remain largely in the offices of managers and are not routinely consulted by those staff actually undertaking the work in the field. A simple practical guide (covering microbiology as well as field analysis of arsenic, fluoride and some other key chemicals) would add significant value to the GDWQ suite of materials and would provide field staff with very useful materials.

Expected end-product(s): A simple practical WHO guide providing fieldworker guidance

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed in principle to the need for a guide and agreed to review a brief (e.g. two-page) outline by email. The GDWQ WG meeting (Geneva, 2005) requested that such an outline be prepared and distributed to the WGs for approval. A draft document was prepared and circulated to the WGs for review. The GDWQ WG meeting (Geneva, 2006) suggested that the draft document be made more geographically representative and reviewed.

Plan of work for all WGs:

- 1) A document on this subject written for field workers was prepared for Uganda, with a primary focus on microbes. This document was expanded and updated by Jan Willem Rosenboom for Bangladesh. There is a need to make the document more geographically representative, as it is now mostly focused on Bangladesh. A more general document is needed. The current number of pages is about 100. There are also annexes, which are forms and could go on an accompanying CD.
- 2) Proposal: There will first be internal peer reviewers for the basic organization and content of the document in relation to meeting its key objectives. They are **Feroze Ahmed** from the P&C WG and **Suresh Kumar** from the Microbiology WG. **Guy Howard** and **Jan Willem Rosenboom** will identify external reviewers who can add examples from their parts of the world. Some reviewers will be selected from WHO Regional Offices. Peer reviewers will be asked to add additional examples from other parts of the world.
- 3) Timelines: Mid-June 2006 from WG members. End of November for external peer review and report back at the 2007 GDWQ rolling revision meeting.

#16. Water Safety for Travellers

Background: Diarrhoea is the most common cause of ill-health for travellers; up to 80% of all travellers are affected in high-risk areas. Cases occur among people staying in resorts and hotels in all categories. It is important that travellers be aware of possible risks and take appropriate steps to minimize these. A draft summary document and a technical support document on water safety for travellers had been prepared, and parts of them had been extracted and used in section 6.3 of the Third Edition of the GDWQ. The draft documents had been reviewed previously and had been used by WHO/PAHO and some other organizations.

Expected end-product(s): 1) Revised section 6.3, for inclusion in second addendum to the Third Edition; 2) reformatted pamphlet providing advice to travellers; 3) technical support document retained as reference document to support reformatted pamphlet

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work, which was updated by the GDWQ WG meeting (Geneva, 2005). The GDWQ WG meeting (Geneva, 2006) agreed to include the revised section 6.3 in the second addendum. The pamphlet providing advice to travellers has been completed.

Plan of work for P&C WG:

- 1) Section 6.3 was revised in late 2005 by **Mark Sobsey** and went to peer review in early 2006. It was slightly revised based on external reviews and is now finalized. The WGs recommend that the text be considered finalized as of now and that it go forward for inclusion in the second addendum to the Third Edition of the GDWQ. **Mark Sobsey** is to provide **Marla Sheffer** with the final version of section 6.3, which has been revised to consider all reviewers' comments.

#17. Desalination

Background: Desalination of seawater and brines within particular WHO regions (e.g. EMRO) and globally is a large and rapidly growing process for producing new drinking-water. There is a clear public health and environmental protection argument for providing

guidance on production of desalinated water for drinking-water. There are certain chemicals and microbes that are of particular importance in desalinated water. Of these, particular concern has been expressed regarding the presence of microbes due to blending of final waters that, because they were derived from coastal and marine sources, may not be adequately addressed in the GDWQ. Similar concerns have been noted about particular chemicals in source water or that are not well removed by the desalination process.

Expected end-product(s): 1) Stand-alone guidance document with comprehensive coverage of health and environmental aspects of desalination processes and projects; 2) revised text of section 6.4 for the Fourth Edition

Progress to date: The Berlin Coordinating Committee meeting (2000) endorsed the need for guidance in this area. Development of guidance on desalination as a safe drinking-water source began in the rolling revision of the Second Edition of the GDWQ following a recommendation at the Berlin meeting that a free-standing monograph also be prepared. Work was initiated by WHO/EMRO at a planning meeting in Bahrain in 2001, and the workplan was presented to the Chemical Aspects WG meeting (Tokyo, 2002). Work on the guidance document *Desalination for Safe Drinking-water Supply* was initiated by WHO/EMRO in March 2004. The Steering Committee of six experts met in May 2004, developed a workplan and identified candidates for chairs and members of five Technical Work Groups: 1) Technology, 2) Health, 3) Marine and Sanitary Microbiology, 4) Monitoring and 5) Environmental Impact Assessment. Two meetings have been held. The final guidance document should be published in English by the end of 2006. An Arabic translation will also be prepared using funding provided by the Kuwait Foundation for the Advancement of Science.

Plan of work for P&C and Chemical WGs:

- 1) The desalination guidance document (coordinated by **Joe Cotruvo**) is being prepared. Recommendations from the document will come to the WGs to be picked up in the Fourth Edition of the GDWQ (e.g. boron, former agenda item #63). The product should be ready this summer for peer review by WGs. Four people in the WGs are already part of it, so additional reviewers are needed. In particular, oversight review is needed to make sure that the document follows the GDWQ water quality framework (WSPs, etc.). **Ingrid orus**, **Peter Jackson**, **Health Canada**, **Suresh Kumar** and **Robert Bos** for environmental impact assessment review were suggested as reviewers, plus any external reviewers that the WGs can provide to **Joe (Joyce Donahue** of USEPA has been suggested by **Ambika Bathija**). The document will be published in English by the end of this year.
- 2) The environmental impact assessment (EIA) section of the guidance document was so comprehensive that it was decided that UNEP (with WHO) would also publish a separate volume dedicated to EIA related to desalination. An abbreviated chapter on EIA will be part of the desalination guidance to be published by WHO (with UNEP).
- 3) Section 6.4 of the GDWQ needs to be reviewed for the Fourth Edition in light of the new document.
- 4) The WG noted that this agenda item should be cross-referenced to the agenda item on hardness (#58-3).

#18. Ships and Aviation

Background: The issue of water on cruise ships and in aircraft/airports, which is covered briefly in chapter 6 of the Third Edition of the GDWQ, is of considerable international interest. The International Health Regulations are being revised. Drinking-water is addressed in the documents *Guide to Ship Sanitation* and *Guide to Hygiene and Sanitation in Aviation*, which are both in revision at present.

Expected end-product(s): Two stand-alone documents for publication in 2006 or later; additional text for GDWQ post-Fourth Edition

Progress to date: The first draft of the *Guide to Ship Sanitation* was completed and reviewed in 2004, and comments have been provided to the technical editor. It should be published in 2006. Progress on the *Guide to Hygiene and Sanitation in Aviation* is much slower. It is expected that a stand-alone document will be ready in 2008.

Plan of work for P&C WG:

- 1) **Joe Cotruvo** reported that there was a recent (April 2006) meeting in Baltimore organized by WHO and international airline organizations and attended by **Jamie Bartram** and **Joe** on behalf of WHO to address concerns about microbial contamination of airplane water. The outcome of the meeting was an agreement to develop international guidance as a stand-alone document for managing water on airplanes. The timeline for this document is in about 1.5 years (2008). A working committee will be organized among stakeholders to move the preparation of this document forward. Suggested candidates for the stakeholder group are **Hartmut Bartel** and **Mark Sobsey**. In terms of the GDWQ, the anticipated outcome is that a small amount of text will eventually be added to the GDWQ, based on this guidance document. The WG recommends that this item stay on the agenda and that it be checked next year for progress.
- 2) For ships, there is already detailed guidance on water on ships in the form of a stand-alone document, and there is already text in the GDWQ (chapter 6). The stand-alone document on ship sanitation should be published in 2006.

#19. Temporary Water Supplies

Background: The topic of temporary water supplies is only briefly mentioned in chapter 6 of the Third Edition of the GDWQ. The GDWQ FTF meeting (Geneva, 2003) recommended the preparation of a text on standards and guidelines for temporary water supplies (e.g. festivals, markets), for eventual inclusion in chapter 6 of the GDWQ Volume 1. The FTF meeting also recommended that the P&C WG look at approaches for effective control of temporary water supplies for public health protection, for inclusion in the Fourth Edition.

Expected end-product(s): Additional text on temporary water supplies for inclusion in chapter 6 of GDWQ, for publication in second addendum to Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed that text should be added to chapter 6 on temporary water supplies and adopted a plan of work. The GDWQ WG meeting (Geneva, 2005) approved the two-page text for insertion in chapter 6, with amendments. The GDWQ WG meeting (Geneva, 2006) approved the revised text for inclusion in the second addendum and agreed that this item could be removed from the agenda once the second addendum has been published.

Plan of work for all WGs:

- 1) **Shoichi Kunikane** drafted the text for this topic and has received and considered editorial comments. Any additional comments (from **Ingrid Chorus** and **David Cunliffe** in particular) should be emailed to Shoichi by mid-June. He will incorporate the comments and send the revised version to **Marla Sheffer**, for incorporation into chapter 6 of the GDWQ (new section 6.9) as part of the second addendum to the Third Edition.
- 2) Proper cleaning and storage of hoses after the last use and immediately before the next use were identified as topics needing addition to this text.
- 3) *This item will be removed from the agenda once the second addendum has been published.*

#20. Vended Water

Background: The topic of vended water supplies is only briefly covered in Volume 1, chapter 1 (section 1.2.7), of the Third Edition of the GDWQ. The GDWQ FTF meeting (Geneva, 2003) recommended the preparation of a text on the application of standards and guidelines to vended water (i.e. private vendors of not necessarily potable water, a widespread practice in cities in developing countries worldwide) for eventual inclusion in chapter 6 of the GDWQ Volume 1. This should include a discussion of *de facto* vending of non-potable water. The FTF meeting also recommended that the P&C WG look at effective approaches to support and control water vending and ensuring that this contributes to public health protection, for inclusion in the Fourth Edition. The WHO Regions (e.g. WPRO) have expressed considerable interest in this area.

Expected end-product(s): 1) Modification of text in chapter 1, for publication in the second addendum to the Third Edition; 2) additional text on vended water supplies to be included in chapter 6, for publication in the second addendum to the Third Edition; 3) stand-alone document on vended water, publication date unknown

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed that more substantive text on vended water is needed and adopted a plan of work. The GDWQ WG meeting (Geneva, 2005) was advised that work on the stand-alone document had not yet been initiated, but a draft of text for chapter 6 was almost completed. The GDWQ WG meeting (Geneva, 2006) provided substantive comments on the draft of text for chapter 6, and the revised text will be circulated for review.

Plan of work for all WGs:

- 1) A first draft of the text has been prepared by **Jorge Latorre Montero** and was distributed to WG members at the meeting.
- 2) It was suggested that **Jorge** contact **Hussain Abousaid**, as vended water is the principal source of water in some areas of the world, about which he has considerable knowledge.
- 3) The WGs determined that the draft text should be rewritten into the format for chapter 6, following the water safety framework. Not much modification of section 1.2.7 is needed, perhaps just the addition of a cross-reference to the revised section in chapter 6.
- 4) **Feroze Ahmed**, **Hussain Abousaid**, **David Cunliffe**, **Will Robertson** (Health Canada), and **Guy Howard** are to help **Jorge** rewrite and reorganize the paper for chapter 6 within the next four weeks. **Jorge** is to revise the document and send it to WG members for review by the end of July.
- 5) The WGs identified the need for a short (20 pages) stand-alone document for developing countries. This topic will be revisited at the next meeting.

- 6) The WGs should also discuss at the next meeting the FTF meeting recommendation that the P&C WG look at effective approaches to support and control water vending and ensuring that this contributes to public health protection, for inclusion in the Fourth Edition.

#21. Dual Water Supply Systems

Background: Dual water supplies are not addressed in the Third Edition of the GDWQ. The GDWQ FTF meeting (Geneva, 2003) recommended that dual water supply systems (i.e. separate systems for domestic use and drinking-water) be considered in the rolling revision. The meeting also recommended that a comment be included in the Fourth Edition on maintaining effective separation of potable and non-potable waters and on the availability of guidance on non-potable water management. WPRO has expressed an interest in this area.

Expected end-product(s): 1) Brief text on need for rigid separation between dual water supplies for inclusion in Fourth Edition of GDWQ

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed on the need to address this topic in the Fourth Edition. This item was not addressed during the GDWQ WG meeting (Geneva, 2005). The GDWQ WG meeting (Geneva, 2006) decided that a major initiative within the Guidelines process should not be done at this time but reiterated the need for a brief mention of dual water supplies in the Fourth Edition.

Plan of work for P&C WG:

- 1) There has been recent discussion of this topic in several fora but no progress. The WG is not aware of appreciable immediate demands for guidance on large-scale implementation of dual water systems. To pursue this topic, the WG recognizes that there would be a need for considerable new and challenging risk assessment, and there is a lack of data to support this effort. For these reasons, the WG concludes that a major initiative within the Guidelines process should not be done at this time. It was agreed that the need for rigid separation between the two supplies where this is being practised or is being contemplated should be addressed in the Fourth Edition of the Guidelines.

#22. Rainwater Harvesting

Background: Rainwater harvesting is in use in many countries throughout the world. Rainwater collected and used on-site can supplement or replace other sources of household water. Rainwater can also be used as drinking-water if it is properly treated before use. The GDWQ FTF meeting (Geneva, 2003) identified safe rainwater harvesting as an important omission from the GDWQ and requested that a text to address it be developed as soon as possible. The WHO Regions (e.g. SEARO and WPRO) have expressed considerable interest in this area.

Expected end-product(s): 1) Additional text for chapter 6 of the GDWQ, for inclusion in the second addendum to the Third Edition; 2) additional text woven throughout the early chapters of the GDWQ, for inclusion in the Fourth Edition; 3) stand-alone document providing technical guidance on stability, storage and monitoring of rainwater and information on health concerns associated with rainwater harvesting systems

Progress to date: As of the GDWQ WG meeting (Geneva, 2005), no progress had been made on the preparation of a separate document on rainwater harvesting. The GDWQ WG meeting (Geneva, 2006) approved the additional text for chapter 6 of the GDWQ, with amendments, for inclusion in the second addendum to the Third Edition.

Plan of work for P&C and Micro WGs:

- 1) A free-standing supporting document is still in preparation, with **Han Heijnen** as the author. There has been a request by the author for the WG to provide guidance on the structure and content of this document. The WG recommends that the content of this document focus on water quality, based on the WHO GDWQ risk-based approach to identifying target microbes of public health significance and WSPs, including relevant design considerations to achieve safe water for rainwater harvesting systems. The WG does not expect the document to be a “how to” technical document on rainwater harvesting systems. This puts the focus on the positive aspects of rainwater harvesting systems. The WG recommends that Han Heijnen consult with the RIVM team that is investigating pathogens and their associated health risks in rainwater harvesting systems (as related by **Ana Maria de Roda Husman**).
- 2) Text on this topic has been drafted to be included in the GDWQ for the second addendum. The text has been reviewed by Han Heijnen and needs WG review. Initial review by some WG members has raised concerns that need to be addressed. The WGs recommend that the text be revised to more clearly address the issue of where microbial contamination comes from (i.e. either faecal contamination or regrowth). The list of pathogens associated with rainwater needs to be examined and possibly revised. The WGs recommend that the text in the section on health aspects of minerals in rainwater needs to be revised. The text on first-flush devices also needs to be revised to indicate that these devices are not always completely effective. The text on operational monitoring also needs some revision, recognizing that actual water quality monitoring is rarely done but that sanitary inspection monitoring is to be encouraged. The WGs recommend that text for the second addendum go forward regardless of the status of the supporting technical document. The WGs believe there is the need for a clear definition of rainwater harvesting and what type of physical water collection systems meet this definition. The focus of this agenda item is direct rainwater harvesting from roofs and other above-ground catchment rainwater harvesting.
- 3) Next steps: **David Cunliffe** and **Guy Howard** will review the text to address these issues and assist in finalizing it. This will be completed by the beginning of July 2006, and the text will be forwarded to WHO by **Feroze Ahmed** by the end of July. The text for the second addendum of the GDWQ will be updated again for the Fourth Edition.

#23. Household Water Treatment

Background: Household water treatment is common in both the developed and developing world. There is now conclusive evidence that simple, acceptable, low-cost interventions at the household level are capable of dramatically improving the microbial quality of household stored water and reducing the attendant risks of diarrhoeal disease and death. A variety of physical and chemical treatment methods to improve the microbial quality of water are available, and many have been tested and implemented to varying extents in developed and developing countries. Several WHO regions (e.g. WPRO) have expressed considerable interest in this area.

The GDWQ FTF meeting (Geneva, 2003) deleted part of a table referring to household water treatment (Table 7.6, section 7.3.2) and referred it to the rolling revision. In addition, although information is provided in chapter 7 about pathogen removal performance targets required by treatment processes used for piped supplies, additional information is required on the capacity of household and POU treatment devices to achieve pathogen removals from different types of source water. A supporting document on *Managing Water in the Home* is in draft form.

Expected end-product(s): 1) An additional table dealing with household water treatment, for inclusion in the second addendum to the Third Edition, to extend the information contained in Table 7.6; 2) text on household treatment processes to remove chemical contaminants, for inclusion in chapter 8 of the Fourth Edition; 3) updated version of the supporting document *Managing Water in the Home*, for peer review at end of 2006; 4) assessment of capacity of devices used as a single barrier to meet required pathogen reductions, for possible inclusion in future editions of GDWQ

Progress to date: The need for guidance in the area of water quality changes in non-piped distribution and household management for developing countries in particular was agreed at the Berlin Coordinating Committee meeting (2000). A draft report was tabled at the joint Microbial Aspects WG and P&C WG meeting in Adelaide (2001) with extensive review and discussion, and meeting participants recommended that the comments and recommendations be addressed in improving the document. The revised document was presented and discussed at the expert consultation in Loughborough, UK (2001). The document *Managing Water in the Home* was published in 2002. The GDWQ WG meeting (Geneva, 2004) made a few recommendations on the content of the supporting document and agreed to a plan of work for dealing with household treatment in the GDWQ proper. The GDWQ WG meeting (Geneva, 2005) agreed that the plans for the identified tasks should proceed as scheduled, and the GDWQ WG meeting (Geneva, 2006) suggested a path forward.

Plan of work for Micro and P&C WGs:

- 1) The plan of work is being coordinated by **Bruce Gordon** (WSH), **Mark Sobsey** and **Joe Cotruvo**.
- 2) A new table analogous to Table 7.6 on required pathogen reductions for household water treatment is required, for publication in the second addendum. It will attempt to address the variability of conditions for raw water quality and treatment effectiveness. **Mark Sobsey** is to extract key text from the ETV (now called technology performance evaluation, or TPE) document (see agenda item #36) to make a table on household water treatment performance. The new table, like the old one, should include baseline and maximum removals.
- 3) There has been no progress on new text for chapter 8 on household treatment processes to remove chemical contaminants. **Mark Sobsey** and **Joe Cotruvo** are responsible for this item. It will be pushed back from the second addendum to the Fourth Edition unless new text is forthcoming in the very near future.
- 4) **Bruce Gordon** noted the preparation of two documents: the update of *Managing Water in the Home* and an ETV document. The ETV document is currently under revision (for more information, see agenda item #36). Regarding the update of *Managing Water in the Home* document, three new chapters will be ready by the end of July for internal review (including a chapter on cost-effectiveness from Thomas Clasen et al. and a behavioural chapter from Maria Elena Figueroa).

- 5) Timelines: The updated *Managing Water in the Home* document will be ready for peer review by the end of 2006 or early 2007.

#24. Chemical Safety of Drinking-water: Assessing Priorities for Risk Management

Background: The *Chemical Safety of Drinking-water: Assessing Priorities for Risk Management* supporting document provides tools that allow users to undertake a systematic assessment of their water supply system(s) locally, regionally or nationally; to prioritize the chemicals likely to be of greatest significance; to consider how these might be controlled or eliminated; and to review or implement standards that are appropriate to specific circumstances.

Expected end-product(s): Supporting document for publication in 2006

Progress to date: The Berlin Coordinating Committee meeting (2000) recognized that the Second Edition of the GDWQ did not provide sufficient information to enable countries, especially poorer countries, to be able to prioritize and select the chemicals that should be included in routine monitoring and assessments and recommended that an application-focused document be prepared, as outlined at that meeting. A draft protocol was reviewed at the expert consultation in Loughborough (2001), which made suggestions for improvement, to be discussed at the expert consultation on monitoring chemicals in drinking-water in Bangkok in December 2001. The Bangkok meeting (2001) decided to trial the draft document in a selected number of countries in the WHO Western Pacific Region to assess the document's practicability. At the Chemical Aspects WG meeting (Tokyo, 2002), it was reported that draft texts had been developed through two meetings of experts in Bangkok and field trials in the regions. The text has been reviewed and will be published in 2006. The GDWQ WG meeting (Geneva, 2006) agreed that this item could be removed from the plan of work once the document has been published.

Plan of work for P&C WG:

- 1) **Shoichi Kunikane** is the coordinator for the plan of work.
- 2) A revised version will be prepared after comments from the WSH Secretariat have been integrated. It is envisaged that the document will be finalized in 2006. In the light of feedback voiced from the Regional Offices (i.e. a demand for more guidance for setting national standards; less stringent values for some settings such as remote communities; core set of parameters), launching and promotion of this document will be very important. Regional workshops are suggested for this purpose. Translation into other languages is recommended.
- 3) *Once the document is finalized, the item can be removed from the agenda.*

#26. Protecting Groundwaters for Health

Background: The need for a text on the control of health hazards in drinking-water from various sources, including groundwater, has been recognized since 1996. To fulfil this need, the DWQC agreed that a text on pathogen and indicator attenuation in groundwaters, the effectiveness of source protection measures and broader guidance on resource protection

(including guidance on spring protection and bankside filtration) be developed in support of the Third Edition of the GDWQ.

Expected end-product(s): Stand-alone supporting document, publication date 2005

Progress to date: The 1996 meeting of the P&C and Microbial Aspects WGs in Bad Elster, Germany, recommended preparation of a text on the control of health hazards in drinking-water from groundwater sources, and an outline was proposed at the joint meeting of the two WGs in Medmenham in 1998. The initiative was further discussed at the Berlin Coordinating Committee meeting (2000), and plans for the document, including substantial draft text, structure and scope, were reviewed at a dedicated planning meeting in February 2001. At the joint Microbial Aspects and P&C WG meeting in Adelaide (2001) on effective approaches to regulating microbial drinking-water quality, participants recommended that the document be completed as outlined, taking into account their comments. The scope and purpose of the monograph, as well as its status of preparation, were presented to the Chemical Aspects WG meeting in Tokyo (2002). The co-editors attempted to address the concerns raised by the GDWQ WG meeting (Geneva, 2004) with regard to the draft monograph and asked for feedback by 30 June 2004. The WGs authorized the authors to proceed with public domain review in July 2004. The GDWQ WG meeting (Geneva, 2005) endorsed the publication of the final draft. The document was published in 2005. The GDWQ WG meeting (Geneva, 2006) agreed to remove this item from the plan of work.

Plan of work for P&C WG:

- 1) The final document has been produced and printed. Therefore, *this agenda item is to be deleted from the plan of work.*

#27. Protecting Surface Waters for Health

Background: The protection of surface waters is important in regions where these are used as a source for drinking-water supply. Surface water protection is a first step in the management of a multiple-barrier approach for the protection of drinking-water. Moreover, source water quality determines the extent of treatment required. The need for a text on the control of health hazards in drinking-water from various sources, including source water, has been recognized by WHO since 1996.

Expected end-product(s): Stand-alone supporting document, publication date unknown

Progress to date: At the Berlin Coordinating Committee meeting (2000), the need for information concerning surface water quality, and especially regarding the occurrence of pathogens, was noted, and the development of a corresponding text was recommended. The scope and purpose of the monograph, as well as its status of preparation, were presented to the Chemical Aspects WG meeting in Tokyo (2002). This document is in the early phases of completion as a draft.

Plan of work for P&C WG:

- 1) The coordinator of the plan of work is **Ingrid Chorus**.
- 2) Little progress has been made since last year, partly because of the diversity of topics and large numbers of authors. The current organization of the book is very broad. The WG recommends that the book focus on users wanting to use the framework and approach of

the GDWQ and that it be organized around the need for drinking-water safety and the formulation of WSPs.

- 3) Timeline: A writing camp of two is to be organized and held in early 2007.

#28. Water Safety Plans

Background: The improvement of water quality control strategies, in conjunction with improvements in excreta disposal and personal hygiene, can be expected to deliver substantial health gains in the population. The *Water Safety Plans* supporting document provides information on improved strategies for the control and monitoring of drinking-water quality.

Expected end-product(s): 1) Stand-alone report (“principles” document) and supporting document (“how to” document), publication dates unknown; 2) revised text in Fourth Edition to clarify definitions of verification and validation and address the need for suppliers to undertake internal review of their plans (perhaps section 4.6 on documentation and communication and elsewhere)

Progress to date: The potential for application of WSPs was evaluated in a series of expert review meetings in Berlin (2000), Adelaide (2001) and Loughborough (2001), and a text on WSPs and application of the hazard analysis and critical control point (HACCP)-type approach to water supply was introduced at the Chemical Aspects WG meeting (Tokyo, 2002). The WSP document has been reviewed, and comments are being incorporated. It was released in 2005 as a “principles” report, not a “how to” supporting document, in response to the immediate need for guidance in this area. The GDWQ WG meeting (Geneva, 2004) recommended that a supporting document that focused on “how to” guidance be prepared as a high priority. The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work, which was revised by the GDWQ WG meeting (Geneva, 2006).

Plan of work for P&C and Micro WGs:

- 1) A WHO GDWQ WSP meeting was held on 12 May 2006 (see minutes in Annex 4). A WSP supporting document that is scientific and technical was published in 2005. A draft “how to” guidance document is now available (prepared by **Dan Deere** and **Annette Davison**, with support from **Guy Howard**). Text on emergencies and disasters has been included in the WSP workbook. It focuses on urban utility supplies. According to the WSP meeting review, the document is considered to have an overemphasis on Australian case-studies. Having more case-studies and ones from different places is considered useful.
- 2) The WGs confirmed that there is also a need for a “how to” document on WSPs for small supplies. This should be revisited at the next meeting.
- 3) The existing “how to” document is available for peer review. The question was raised as to whether or not it should go to peer review now. Internal WG review will be done by **Ingrid Chorus** and **David Cunliffe** to determine if the document can go forward to peer review, taking into consideration requirements identified in the last meeting report (specifically, quantitative methods and short-term fluctuations).
- 4) There were concerns about the definition of the term “verification.” The group suggested that the definition may need to be better articulated/revised in the Guidelines to better address the issues of water quality verification and auditing. The authors of the WSP document commented that WHO should move to adopt the same definition of verification as is used in other management systems, as WSPs are a quality management system, and

international norms should be applied unless there is good reason to depart from them. There is also a need within the scope of WSPs for suppliers to undertake internal review of their plans. This will be addressed in the preparation of the Fourth Edition. Also, section 4.6 dealing with “documentation and communication” needs to explicitly refer to validation. Also, in the Fourth Edition, the chapter on WSPs should be streamlined, taking into consideration practical experiences and feedback received by then. The text on reporting may also be improved, particularly by addressing “engaging stakeholders.”

- 5) Next steps: The WG reviewers (**Ingrid Chorus** and **David Cunliffe**) will review the existing text in light of the issues raised, looking for major gaps in the document and the extent to which the scope of the document is appropriate to meet its purpose. The scope of their review includes addressing short-term fluctuations and quantitative methods.
- 6) Timeline: **David** and **Ingrid** will complete their review by the end of June 2006.

#28A. WSP Dissemination Mechanisms

Background: The GDWQ WG meeting (Geneva, 2005) identified the need for more structured plans and activities for “dissemination mechanisms” for WSPs. There is a need for the development of training and educational materials, such as workshop programmes, table/desktop exercises and interactive problem-solving tasks, as a way to facilitate the learning of WSPs by water suppliers. Workshops have already been conducted, such as in Iceland in 2004 and another one planned on risk management for July 2005 in Australia, with representation from SEARO and WPRO. Other workshops will possibly be held in Marrakech, Morocco and South America.

Expected end-product(s): 1) Development of a web site on WSPs as a training and education tool; 2) implementation support in the form of training programmes, modules and materials

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. Lead coordinators for the four categories of activities for WSP dissemination updated the GDWQ WG meeting (Geneva, 2006) on progress in their areas.

Plan of work for P&C and Micro WGs:

- 1) **Guy Howard** reported that for organized supplies, IWA and WHO are coordinating through an agreement called the Bonn Charter. A short pamphlet that explains the relationship has been produced. A web portal has been created called the WSPortal. This is the end-product for this agenda item. It has a lot of supporting information. There is an effort to encourage self-reporting on WSPs and the safety of drinking-water for homes served by an improved (piped) water supply.
- 2) **David Cunliffe** reported that there have been new developments on WSPs for small community supplies. These include technical meetings that were held in 2005 and 2006, web sites and ongoing activities, such as a meeting to be held in Canada in 2006. Additional products will appear towards the end of 2006. See also agenda item #132.
- 3) For operation and maintenance programmes, **Shoichi Kunikane** reported that there have been new developments. These include the development of WSPs for several countries and the development of such plans for Japanese water supplies for inclusion in their regulatory framework, possibly in the next couple of years. The main targeted water supplies are the small ones with <5000 people. The draft guidelines of WSPs will be prepared by March 2007 and completed in 2008. Such WSPs are already prepared in some other countries, such as Australia and New Zealand. There will be a web site with links to other organizations. See also agenda item #34.

- 4) **Mark Sobsey** reported that there are substantial developments and progress in household water treatment systems, many through the WHO International Network to Promote Household Water Treatment and Safe Storage. The Network web site informs us of this progress, which has been considerable. There is a major effort on scaling up to large-scale coverage, with initiatives under way for this. The Network has annual working meetings, and in the last two meetings there were attached research symposia.
- 5) See agenda item #138 for information on the GDWQ training pack and related activities.

#29. Water Treatment and Pathogen Control: Process Efficiency in Achieving Safe Drinking-water

Background: The GDWQ FTF meeting (Geneva, 2003) noted that finalization and progressive updating of the supporting document *Water Treatment and Pathogen Control: Process Efficiency in Achieving Safe Drinking-water* would provide substantiation and support to other supporting documents dealing with the issue of system safety evaluation. The document, which has been in preparation for several years, includes a selective and succinct review of the literature, focusing on high-quality papers. The key papers included are those that address failure mode and suboptimal performance. The document will require an update, because this is a dynamic and active area of continued new information. New data should go into a future revision/edition of the document.

Expected end-product(s): 1) Stand-alone supporting document, publication in 2004; 2) second edition of supporting document, publication date circa 2008

Progress to date: At the GDWQ meeting in Medmenham in 1998, the need for an expert review of the state of knowledge and available information on treatment efficiency and pathogen removal was identified. A draft of the text was developed by Mark LeChevallier and reviewed at the Berlin Coordinating Committee meeting (2000). The joint Microbial Aspects and P&C WG meeting in Adelaide (2001) recommended that the text in its current form be submitted for peer review and that comments from the meeting be incorporated as part of the peer review process. The GDWQ WG meeting (Geneva, 2004) strongly supported its publication. The document was published in 2004. The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work for the preparation of a second edition, and the GDWQ WG meeting (Geneva, 2006) suggested a path forward towards a revised second edition.

Plan of work for P&C and Micro WGs:

- 1) The Mark LeChevallier book is the current document under consideration. It was reviewed for suggested changes by **Jorge Latorre**. Based on his review, the WGs recommend that there be additional chapters: (1) sustainable solutions for water treatment, with consideration of seasonal changes, for example, (2) technology selection for water treatment, including community participation in the process, and (3) coverage of non-conventional water treatment, such as multi-stage filtration and other filter technologies (roughing filters, for example). Also, in the introduction, there should be more coverage of integrated treatment and terminal disinfection, as well as some comments on the Third Edition of the GDWQ. The WSP chapter also needs to be updated. As previously recommended, the essential content of **Peter Teunis et al.**'s document on short-term fluctuations in levels of microbial contaminants (see agenda item #39) should be considered for inclusion in the next edition of this supporting document.
- 2) The WGs recommended that **Jorge Latorre** coordinate the activities needed to update the existing book. This would include asking **Mark LeChevallier** if he wanted to update the

existing edition. At a minimum, the WGs recommend that Mark LeChevallier be requested to update the tables and their numbers on pathogen reduction. Jorge Latorre also would identify other authors on the alternative filtration methods, who would provide the text to be included in the revision of the existing document.

- 3) Timelines: **Jorge Latorre** will contact **Mark LeChevallier** about his involvement in revising the book. A decision of the timeline for completion of the revised edition will depend on whether or not Mark LeChevallier agrees to revise the book. **Jorge Latorre** will request suggestions for alternative lead authors from the WGs if Mark LeChevallier declines to be involved in the revision. Drafting of new text can proceed regardless. Target for revised edition: end of 2007.

#31. Water Quality Monitoring, Second Edition

Background: The GDWQ FTF meeting (Geneva, 2003) was informed that the second edition of the text *Water Quality Monitoring* was being updated. This document is not linked to the Guidelines but is referred to for guidance on analytical quality control, sampling and laboratory aspects. The FTF meeting also noted that the need for substantive guidance on sampling and monitoring (in developing countries) had already been taken into account in this supporting document. In relation to a comment that future tasks related to the GDWQ should include providing guidance on good laboratory practice in developing countries in routine and in core/central laboratories, it was pointed out that the *Water Quality Monitoring* book that is currently being prepared deals with this issue. Updating should take account of changes proposed to GDWQ Volume 3 (see agenda item #32).

Expected end-product(s): Updated second edition of book

Progress to date: The GDWQ WG meeting (Geneva, 2006) agreed that the book is still useful in its current form except for the section on laboratories and analytical methods and agreed on a path forward to revise that text.

Plan of work for P&C WG:

- 1) **Guy Howard** recently discussed the update of this book with **Steve Pedley**. It was concluded that the book is still useful in its current form, except for the section on laboratories and analytical methods. The WG recommended that the management of the revision of the document be assigned to a representative from Latin America, because of the strong need expressed by this region. **Jorge Latorre** will identify a candidate manager, and this person will then liaise with **Steve Pedley** and **Debbie Chapman** to move this task forward.
- 2) Timeline: **Jorge Latorre** will begin the process of identifying a project manager from Latin America beginning late May 2006.
- 3) Member(s) of the WG will need to be included in the peer review process to review consistency and confirm the adequacy of the revised text for GDWQ purposes.

#32. Updating Volume 3 of the GDWQ

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that GDWQ Volume 3 (Surveillance and Control of Community Supplies) be updated through moderate editing in order to align it with the Third Edition (including terminology) and to better account for issues of small community supplies in middle- and upper-income countries. The update should include alternative technologies for *in situ* disinfection of household water (e.g.

“bricks,” tablets). This could be linked to preparation of a Volume 4 (see agenda item #33). The updating should include a full review of technical efficacy and programme experience with approaches to disinfection of household wells. The meeting also recommended that the discussion of WSPs for small systems be expanded in an updated Volume 3. The need for substantive guidance on sampling and monitoring should be reviewed in the context of the book *Water Quality Monitoring* (see agenda item #31). WPRO supports the need for increased guidance on WSPs for small systems.

Expected end-product(s): Updated Volume 3 of GDWQ (Community Systems), publication date unknown

Progress to date: The GDWQ WG meeting (Geneva,, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) decided that there was no major urgency to update Volume 3 and that it should be revisited in parallel with the Fourth Edition. The GDWQ WG meeting (Geneva, 2006) recommended that revision of Volume 3 be considered for 2009.

Plan of work for P&C WG:

- 1) **Jackie Sims** reported that there has been little specific new progress on this agenda item and that Volume 3 is still adequate for its users, which are primarily small systems in developing countries. Volume 4 (water supply in urban areas in developing countries) needs to be developed taking close account of what is in Volume 3, with appropriate cross-referencing. Volume 3 is now sufficient in addressing many developing country issues for small, organized supplies. The need for a section on efficient water use needs to be considered for inclusion in Volume 3. Ultimately, Volume 3 will have WSPs, but it will take time to develop the information and experience to inform this process. A five-year timeline is anticipated for this revision of Volume 3. The WG recommends that in the short term, there is a need for a “how to” document on WSPs for small supplies (see agenda item #28).
- 2) It is recommended that revision of Volume 3 be considered for 2009.

#33. Preparation of GDWQ Volume 4

Background: Urban populations that include poor peri-urban and slum populations are increasing worldwide. Such populations often carry a significant burden of water-related disease. They are also frequently exposed to multiple microbial and chemical hazards through multiple routes. The GDWQ FTF meeting (Geneva, 2003) proposed that in order to better respond to issues related to water supply in rapidly urbanizing low- and middle-income countries, the present Volume 3 (Surveillance and Control of Community Supplies) be complemented by a Volume 4 (Surveillance and Control of Water Supply in Urban Areas), which would draw on a number of pilot projects that have been implemented and documents that have been developed. The meeting also recommended that the need for substantive guidance on sampling and monitoring be taken into account in the proposed GDWQ Volume 4 on surveillance of urban drinking-water supply.

Expected end-product(s): Volume 4 of GDWQ on surveillance and control of water supply in urban areas, publication date unknown

Progress to date: The 1995 Coordinating Committee recommended that guidance on the theme of monitoring of drinking-water supply and quality in urban areas be developed, field tested and revised by the time of preparation of the Third Edition of the GDWQ. The 1996

P&C WG meeting agreed to pursue drafting in 1996–97, and the 1998 WG meeting reviewed plans, especially with regard to identification of pilot projects, and recommended that a small group of experts consolidate draft materials. The Berlin Coordinating Committee meeting (2000) recommended that the consolidated document be released as a free-standing publication. The Chemical Aspects WG meeting (Tokyo, 2002) was updated on the status of development of the project. Pilot projects have been implemented in Uganda, Ghana, Bangladesh and Latin America (through WHO/PAHO/CEPIS). The plan of work (encouraging implementation of further pilot projects, with their evaluation leading into drafting of a Volume 4 for pilot tests and then refinement) was endorsed at the GDWQ WG meeting (Geneva, 2004). The GDWQ WG meeting (Geneva, 2005) was advised that three documents, from Uganda, Bangladesh and CEPIS, are currently available and requested that a brief (two-page) outline of the proposed Volume 4 content be prepared and submitted for review. The GDWQ WG meeting (Geneva, 2006) agreed that the three documents should be consolidated into one draft for review.

Plan of work for P&C WG:

- 1) The WG recognized that the outline for this agenda item has been previously approved and that no new progress has been made since last year. The WG recommends that the agenda item go forward now with the next step in the process, which is for **Guy Howard** to consolidate the existing three documents into one document for review.
- 2) Timeline: **Guy Howard** is to have some form of the consolidated draft available for next year's (2007) rolling revision meeting.

#34. Link with Operation and Maintenance Network

Background: The GDWQ FTF meeting (Geneva, 2003) stressed the importance of establishing a link between the Protection and Control WG and the “operation and maintenance network” (OMN). The network was created in 1981 during a global forum formed by 300 people. The core group consists of 10–15 persons. The OMN group has produced several useful publications, and these can be downloaded from the WHO web site. The manuals have been designed to accommodate a wide variety of people. In 2000, the Institute for Public Health, Japan, took over the coordination of the OMN.

Expected end-product(s): Better harmonization of international activities and increased communication

Progress to date: A liaison who is from the P&C WG as well as from the Institute of Public Health, Japan, has been appointed. The WG and the OMN have agreed to collaborate on specific tasks, and the GDWQ WG meeting (Geneva, 2005) encouraged continued linkage and activities. The GDWQ WG meeting (Geneva, 2006) was updated on progress in this area.

Plan of work for P&C WG:

- 1) The coordinator for the plan of work is **Shoichi Kunikane**, and the WHO Headquarters link person is **José Hueb**.
- 2) **Shoichi Kunikane** reported that the OMN homepage was recently completely revised, and links are being re-established. The network faces some difficulties, because WSSCC (Water Supply and Sanitation Collaborative Council) was changed from WHO to UNICEF in March 2006. The network, however, remains under the umbrella of WSH. The OMN is reviewing its activities: information exchange through its web site; publication of tools and materials; and organizing workshops, seminars and sessions in

events such as the World Water Forum. For support of suppliers and renewal of tools for training, a new joint programme with the IWA Specialist Group EOM (Efficient Operation and Management) is planned. A strong focus has always been on leakage control and now is increasingly on WSP. Core group members are currently being reidentified towards intensifying and reactivating the activities. A workshop on WSPs in relation to operation and maintenance (focusing on large- and medium-scale supplies) is being planned to take place in Phnom Penh in collaboration with WPRO, probably in August.

- 3) **Jorge Latorre** reminded the group of a programme in Latin America on unaccounted water about 15 years ago, in which José Hueb was involved. This had a very good impact in reducing leakage (from about 50% to about 25%), and the group suggested that **Jorge** inquire as to whether reports on its implementation success are available to inform current efforts; this programme is still viable, and connections should be made.

#35. Safe Plumbing Practices

Background: Improper design and installation of plumbing fixtures in household plumbing systems are a public health concern, especially when drinking-water becomes contaminated with sewage. A draft document on *Health Aspects of Plumbing* was conceived in 1999, and WHO has been working with the World Plumbing Council (WPC) towards its development. There is a need for the technical editor to read and harmonize the document with the GDWQ. The GDWQ FTF meeting (Geneva, 2003) expressed an interest in safe plumbing practices. Several WHO regions (e.g. WPRO) have expressed an interest in this area, particularly with regard to dual systems.

Expected end-product(s): Supporting document on *Health Aspects of Plumbing*

Progress to date: The Berlin Coordinating Committee meeting (2000) noted that an approach had been received from the WPC to investigate the feasibility of collaborative activity within the field of good practice in plumbing in relation to health protection and recommended that the offer of WPC to draft guidance on this be accepted. At the Chemical Aspects WG meeting (Tokyo, 2002), the outline of work by the WPC was presented, and it was reported that the document was undergoing peer review and the WPC was revising the document as a result. The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) was advised that a firm commitment from the WPC for finalization of the document was received at a recent conference in New Zealand, and the final document would be completed by and launched at World Water Day on March 22, 2006. The document was revised, edited and published in 2006. The GDWQ WG meeting (Geneva, 2006) agreed to remove this item from the plan of work.

Plan of work for P&C WG:

- 1) **José Hueb** reported that the new document on *Health Aspects of Plumbing* has been completed and is being distributed. There is a need now for training activities in support of this document and to meet the needs of the sector.
- 2) *This agenda item is now completed and the agenda item is removed from the plan of work.* However, the WG recommends that the WHO move forward with training and other supporting activities to the sector to support and promote this document.

#36. Technology Performance Evaluation (TPE)

Background: Environmental technology verification (ETV) (now called technology performance evaluation, or TPE) is an important component of strategies towards drinking-water safety and is inadequately addressed in the Third Edition of the GDWQ. The GDWQ FTF meeting (Geneva, 2003) recommended that TPE/ETV be addressed. The Protection and Control WG was asked to identify where best to address TPE/ETV and decide on a plan of action.

Expected end-product(s): 1) Brief statements for insertion in sections 1.2.9, 2.3, 3.2.2 (with cross-reference to microbial target derivation), 4.1.7 and relevant sections of chapter 6 (e.g. safe drinking-water for travellers), and possibly a separate new section in the GDWQ on TPE/ETV, for inclusion in the second addendum of the Third Edition; 2) text on key chemical aspects of TPE/ETV, for inclusion in the Fourth Edition; 3) free-standing supporting monograph on TPE/ETV in safe household water treatment and storage

Progress to date: The proposed actions were agreed at the GDWQ WG meeting (Geneva, 2004). The GDWQ WG meeting (Geneva, 2005) agreed to a revised plan of work.

Plan of work for P&C WG:

- 1) The draft TPE/ETV document was produced in March 2006 and reviewed by peer reviewers. It was then further reviewed at a meeting on 11 May 2006 (see Annex 3 for the minutes of this meeting). The document will be revised to focus on WHO principles and not on providing detailed protocols. The audience was regulators and developers. Performance requirements were the main focus. The document is grounded in the GDWQ risk-based approach and DALYs. Devices would be “graded” based on their ability to achieve DALY levels and their corresponding log removal values. The plan is to finalize the document based on the recent meeting review (see also agenda item #23).
- 2) Preparation of text insertions for the second addendum is in progress. **Mark Sobsey** will work to provide the required text for the GDWQ on certification agencies, national water policy and validation, as well as performance targets. He will need to liaise with **Joe Cotruvo** (certification of products and devices) on the certification component of the text (section 1.2.9), etc.
- 3) **Guy Howard** suggested and the WG agreed that separate activities are needed on key chemical aspects of TPE/ETV. For key chemicals, such as arsenic, fluoride and iron, they would go forward independent of the microbial aspects that are now being addressed in separate documents and content for the GDWQ. Information is needed on the relative effectiveness of different treatment processes and technologies. Information is also needed on related aspects, including affordability and use behaviours. **Joe Cotruvo** and **Feroze Ahmed** will prepare materials for the Fourth Edition. They will submit an outline of this material for review by the WG by October 2006.
- 4) In discussions on agenda item #23, Household water treatment, it was suggested that a process be created for harmonized TPE/ETV programmes and protocols for water purifier devices, of which WHO would be a part.
- 5) Timelines: The TPE/ETV document will be finalized by the end of the summer 2006, then sent for external peer review.

#37. Boil Water Advisories

Background: Boil water notices are an important tool in protecting public health in the event of serious microbial contamination of finished drinking-water. However, they should be applied judiciously for maximum effectiveness. Numerous other tools are also available for

use under appropriate circumstances. Their inappropriate use can have adverse health effects and significant costs. The GDWQ FTF meeting (Geneva, 2003) identified boil water notices as a priority area for the development of guidance and GDWQ expansion and recommended that triggers for boil water advisories and their removal and other emergency action, as well as remedial action and associated risk communication issues, be considered in the rolling revision.

Expected end-product(s): Revised text in chapters 7 and 8 of GDWQ, for inclusion in first addendum to the Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The text was prepared and reviewed by the GDWQ WG meeting (Geneva, 2005). It was incorporated into the new emergencies text in the first addendum, published in 2006. The GDWQ WG meeting (Geneva, 2006) agreed that this item could be removed from the plan of work.

Plan of work for Micro and Chemical WGs:

- 1) *This item has been completed and can be removed from the plan of work.*

#38. Table 7.1

Background: It has been determined from several review comments that Table 7.1 (“Waterborne pathogens and their significance in water supplies”) in the Third Edition requires review and revision to ensure that available information is fully reflected.

Expected end-product(s): 1) Revised Table 7.1, for inclusion in second addendum to Third Edition; 2) additional pathogens to be added to Table 7.1 for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work, the timeline of which was revised by the GDWQ WG meeting (Geneva, 2005). The GDWQ WG meeting (Geneva, 2006) agreed that revision of Table 7.1 is to be completed for the second addendum.

Plan of work for Micro WG:

- 1) **Ana Maria de Roda Husman** revised Table 7.1 and sent it by email to the WG members. The WG has recommended several amendments to Table 7.1; **David Cunliffe** will provide them to **Ana Maria**.
- 2) The WG agreed that organisms in Table 7.1, Figure 7.1 and the microbial fact sheets in chapter 11 need to be made consistent for the Fourth Edition.

#39. Short-term Fluctuations in Levels of Microbial Contaminants

Background: A draft paper by Peter Teunis, Annette Davison and Daniel Deere determined that short-term fluctuations of microbial contaminants in water lead to possible short-term exposures much higher than average values. The paper concluded that exposures can vary if control measures are not sufficient to handle the extreme values, but that the long-term averages would usually indicate low overall risk.

Expected end-product(s): Possible amendments to GDWQ, for publication in Fourth Edition; this item is also being carried forward to the agenda item on the supporting document *Water*

Treatment and Pathogen Control: Process Efficiency in Achieving Safe Drinking-water (see agenda item #29)

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work, which was slightly revised by the GDWQ WG meeting (Geneva, 2005). The GDWQ WG meeting (Geneva, 2006) agreed on a path forward to ensuring that the essential content of the draft document be incorporated into other documents and perhaps the Fourth Edition.

Plan of work for Micro WG:

- 1) The WG finds that the material in the document is a valuable contribution that can inform and support WSPs, microbial risk assessment and related activities of the GDWQ. It is recommended that the essential content of the document be incorporated into other documents on WSPs, the document on water treatment and pathogen control and the quantitative health risk assessment project forward workplan. A WSH representative will invite **Peter Teunis** and his co-authors to participate in these activities of developing these other documents. Also, the key information of this document will be considered in preparation of the Fourth Edition.

#40. Microbial Risk Assessment

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that risk assessments be prepared on *E. coli* O157, *Cryptosporidium*, *Campylobacter* and enteric viruses with varying levels of priority depending on the availability of sufficient data. Drafts had previously been prepared on *Cryptosporidium* and enteric viruses. Both were incomplete, and there was concern about the lack of data regarding enteric viruses. The Microbial Aspects WG was informed of ongoing projects that will undertake risk assessments of Norovirus infection.

Expected end-product(s): 1) Risk assessment (QMRA) on *Cryptosporidium* to be combined with the text on *Cryptosporidium* currently published as part of the microbiological addendum to the Second Edition to become a free-standing report; 2) stand-alone document on *Campylobacter*

Progress to date: A draft document on *Cryptosporidium* has been initiated by Gertjan Medema. The GDWQ WG meeting (Geneva, 2004) agreed that further risk assessments would not be undertaken at this time due to a lack of data. The GDWQ WG meeting (Geneva, 2005) determined that additional documents were needed and agreed to a plan of work. Subject to satisfactory incorporation of comments received, the GDWQ WG meeting (Geneva, 2006) endorsed publication of the draft document on *Cryptosporidium*.

Plan of work for Micro WG:

- 1) The draft document on *Cryptosporidium* was released for public consultation in 2006. A limited number of comments were received. Subject to satisfactory incorporation of the comments, the WG endorsed its publication.
- 2) Preparation of text on *Campylobacter* is to be pursued, and this should take priority over preparation of text on *E. coli* O157. **Ana Maria de Roda Husman** is to identify authors for *Campylobacter*. The WG considers that there is insufficient information to proceed with a text on viruses at this stage.

#41. Legionella and the Prevention of Legionellosis

Background: The GDWQ FTF meeting (Geneva, 2003) requested that the supporting document *Legionella and the Prevention of Legionellosis* be finalized.

Expected end-product(s): 1) Publication of supporting document as a stand-alone document in 2006; 2) updated text in the Fourth Edition

Progress to date: Participants at the Berlin Coordinating Committee meeting (2000) expressed concern that the microbiological addendum to the Second Edition of the GDWQ did not provide sufficient information about the control of *Legionella* and agreed to revisit this issue at a future meeting as a moderate priority. Participants at the joint Microbial Aspects and Protection and Control WG meeting in Adelaide (2001) confirmed the need to address *Legionella* in the GDWQ and endorsed pursuit of a document encompassing both risk assessment and risk management aspects and following the wider approach being developed for microbial hazards in the GDWQ. The final document, containing 11 chapters, will be published in 2006. The GDWQ WG meeting (Geneva, 2006) agreed that the GDWQ should be updated based on this document for the Fourth Edition.

Plan of work for Micro WG:

- 1) **Yves Chartier** reported on this item. The document has been finalized and will be published in June or July 2006. There will need to be an update of the Guidelines text in the Fourth Edition based on this document. This will be discussed at the next meeting.

#43. Safe Piped Water: Managing Microbial Water Quality in Piped Distribution Systems

Background: The GDWQ FTF meeting (Geneva, 2003) indicated that finalization and progressive updating of the supporting document *Safe Piped Water* would provide substantiation and support to other supporting documents dealing with the issue of system safety evaluation.

Expected end-product(s): Stand-alone document, publication date unknown

Progress to date: At the GDWQ WG meeting in Medmenham in 1998, it was recommended that a text be developed concerning water quality changes in piped distribution and storage. At the Berlin Coordinating Committee meeting (2000), it was noted that public health-oriented monitoring of microbial water quality should be based on water consumed (i.e. collected from the tap) and not simply water in supply. The joint Microbial Aspects and P&C WG meeting in Adelaide (2001) reviewed and discussed the full first draft document. The expert consultation in Loughborough (2001) reviewed the document in light of changes since the Adelaide meeting and concluded that although the document was comprehensive, a number of alterations were still required. The document went through three cycles of peer review, including by the Microbial Aspects WG, which endorsed the document and recommended that publication proceed. This document was published in 2004. The GDWQ WG meeting (Geneva, 2006) decided to postpone a decision about updating the document until the next year's meeting.

Plan of work for Micro WG:

- 1) There is an existing document on water quality in piped distribution systems with **Richard Ainsworth** as lead author. The WG believes that the document is contemporary and that a decision about updating and a workplan for that should be decided at next year's GDWQ rolling revision meeting. When the decision is made to go forward, **Guy Howard** will contact **Richard Ainsworth** in 2007 on behalf of the WG to begin the process of revision.

#46. Evaluation of the H₂S Method for Detection of Faecal Contamination of Drinking-water

Background: WHO receives many requests for information and comment on this microbiological test (e.g. from WPRO). It is a potentially important issue, particularly for developing countries. The purpose of the supporting document *Evaluation of the H₂S Method for Detection of Faecal Contamination of Drinking-water* is to review the basis of the hydrogen sulfide test as a measure of faecal contamination of drinking-water and the available scientific and empirical evidence for and against the test as a valid, useful and reliable measure of faecal contamination and drinking-water quality. The draft report addresses the fundamental microbiological considerations of the test, including its chemical and biochemical basis, what organisms it detects, and how it detects and quantifies them and the reported experiences with its practical application to assessing water quality. A problem is that the test is non-specific and may provide false positives for possible pathogenic microorganisms in some waters that are not suffering sanitary contamination, but rather contain reducible sulfate. That will severely limit its use by decision-makers. One general comment was that the draft was ambiguous as to the value of the test and its utility as a screening tool.

Expected end-product(s): 1) Revised draft report for review in early 2006; 2) stand-alone supporting document for publication post-2006

Progress to date: The joint Microbial Aspects and P&C WG meeting in Adelaide (2001) supported the view that a critical review of the significance and applicability of the H₂S test should be added to the work programme of the Microbial Aspects WG and appointed a project coordinator. A draft working document on the use of the H₂S test was presented and discussed in detail at the expert consultation in Loughborough (2001), and the meeting recommended that the document be peer reviewed once suggested changes had been addressed. The document has been peer reviewed, and some revisions have been made. The GDWQ WG meeting (Geneva, 2006) was informed that the main text of the draft document on the use of the H₂S test had been completed.

Plan of work for Micro WG:

- 1) The main text has been completed, but preparation of an Executive Summary is still outstanding (**Mark Sobsey**).
- 2) The WG will review the draft document when it is available with a view to endorsement for public domain review.

#47. Addendum: Microbiological Agents in Drinking-water

Background: The microbiological addendum to the Second Edition was published in 2002. The addendum includes chapters on *Vibrio cholerae*, *Aeromonas*, enteric hepatitis viruses, protozoa and *Legionella*. The question has been raised as to whether the volume can remain

current or whether the contents need to be updated and treated similarly to the chemical background documents.

Expected end-product(s): 1) Updated stand-alone documents on *Vibrio cholerae*, enteric hepatitis viruses and *Aeromonas*, to be published in 2006; 2) updated *Cryptosporidium* text (see agenda item #40); 3) separate *Legionella* text, to be published in 2005 (see agenda item #41); 4) brief summary on *Vibrio vulnificus*, for Fourth Edition

Progress to date: The Microbial Aspects WG agreed on the need to update several texts on microbiological agents and adopted a plan of work to this end. The GDWQ WG meeting (Geneva, 2005) agreed that *Cyclospora* should be dealt with by the existing fact sheet, since there is not a lot of new information, and that stand-alone documents are needed for *Giardia* and enteric hepatitis viruses. The GDWQ WG meeting (Geneva, 2006) agreed to review the draft of an updated *Aeromonas* text by the end of July 2006 and to decide whether an update of the *Giardia* text was appropriate.

Plan of work for Micro WG:

- 1) **David Sartory** has prepared an updated version of the text on *Aeromonas*. The WG is to provide comments by the end of July 2006. Subject to incorporation of internal review comments, the document will proceed to peer review. Peer reviewers are to be identified. It is suggested that those involved with the first edition be included as reviewers.
- 2) **Huw Smith** has agreed to undertake the task of updating the existing *Giardia* text.
- 3) **Ana Maria de Roda Husman** is to contact **Willie Grabow** about updating the enteric viruses text.
- 4) **WSH** has agreed to approach **Dr Nair**, the original author of the *Vibrio cholerae* text, about updating his document to become free standing.
- 5) **Mark Sobsey** has requested that **Anders Dahlsgard** prepare a summary review of *Vibrio vulnificus*. If he is unable to undertake the task, a second author has been identified (**Dr James Oliver** at University of North Carolina – Charlotte).
- 6) The WG discussed the need for developing criteria to determine when a microbe gets a microbial fact sheet and the need to have GDWQ text for microbes that have a fact sheet, and maybe vice versa. This should be brought to the table at the next meeting.

#48. Quantitative Methods

Background: The link between operational parameters and health-based guideline values in the GDWQ is not as clear as it could be. The GDWQ FTF meeting (Geneva, 2003) recommended that guidance on the application of quantitative methods in water, microbiology and health be developed in order to clarify this linkage. This includes guidance on deriving health-based targets (including, for example, DALYs) and on using numbers in WSPs (i.e. system assessment to determine whether the system can meet the targets, effect of treatment on pathogen removal, variability, failure mode analysis) in order to allow the non-specialist to understand the process and to implement the GDWQ.

Expected end-product(s): 1) Text to be included in *Water Safety Plans* supporting document; 2) appropriate text to be included in Volume 1, if not already there (no timeline for this as yet)

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) agreed that the WSP work should not be held up

because there are not enough data on quantitative methods. The GDWQ WG meeting (Geneva, 2006) recommended that there be an initiative to develop simplified tools supported by software for both microbial and chemical risk assessment and suggested a path forward.

Plan of work for Micro WG:

- 1) Progress on this issue includes the development of a tool by **Dan Deere** and **Guy Howard** on how to undertake quantitative health risk assessment in the water sector, including calculating DALYs, for water supply operations in Bangladesh, to help inform decision-making. The document was circulated at the meeting.
- 2) The intent of this agenda item was to bring to the WG the topic of risk assessment and health outcomes. There need to be more supporting documents and Guidelines text for these topics in the form of “how to” information to users. That is, there is a need for a “how to” guide for decision-makers. These would be simplified tools supported by software for both microbial and chemical risk assessment.
- 3) The WG recommends that there be an initiative to develop these simple tools for decision-makers, as a series of products that work towards the ultimate goal of having simple tools for population-based quantitative microbial and chemical risk assessments. It is recommended that this effort be linked to broader efforts within WHO, beyond the water programme, for estimation of disease burdens, risk assessment and health risk-based decision-making.
- 4) Next steps: A subgroup with representatives of each WG will be formed to develop a workplan to meet these goals. The subgroup consists of **Feroze Ahmed**, **Mark Sobsey**, a representative of the **WHO cost–benefit project**, possibly **Ana Maria de Roda Husman** to represent the Microbiology WG, and a member of the Chemical WG (**Joe Cotruvo**). The subgroup will report back to the WG next year with a plan of action to address this issue. This effort will be linked to parallel and complementary efforts already under way, especially that by USEPA under the leadership of **Steve Schaub** (who is involved with microbial risk assessment).

#49. *Enterobacter sakazakii* in Powdered Infant Formula

Background: WHO hosted a Joint FAO/WHO Workshop on *Enterobacter sakazakii* and Other Microorganisms in Powdered Infant Formula in February 2004. *Enterobacter sakazakii* can gain access to infant formula through the raw material used for the formula, through contamination of the formula at the production process or through contamination of the formula as it is being reconstituted. Although water has been investigated as a potential source, current evidence indicates that this is unlikely. The group at risk (meningitis with high death rates) is especially infants less than 2 months old, particularly low-birth-weight, premature and immunocompromised infants.

Expected end-product(s): Fact sheet on *Enterobacter sakazakii*, for publication in the second addendum to the Third Edition

Progress to date: The Microbial Aspects WG (Geneva, 2004) agreed on the need to prepare a fact sheet on *Enterobacter sakazakii*. A final draft has been prepared. The GDWQ WG meeting (Geneva, 2006) agreed to send the fact sheet for public review, following which the document will be revised to take into account review comments and then will be adopted for inclusion in the second addendum.

Plan of work for Micro WG:

- 1) The fact sheet on *Enterobacter sakazakii* has been completed and endorsed by the WG.
- 2) The fact sheet will be posted on the web for public review. **David Cunliffe** will incorporate any comments received, and the final fact sheet will be included in chapter 11 of the second addendum.

#50. Pathogen Occurrence

Background: Information on pathogen concentrations in source waters provides important input to development of WSPs, performance targets, etc. The GDWQ FTF meeting (Geneva, 2003) recommended that a database on pathogen occurrence be created. In addition, Friederike Dangendorf prepared a document entitled *Occurrence of Pathogens in Surface Water*. The untimely death of Dr Dangendorf was noted with regret by the GDWQ WG meeting (Geneva, 2005).

Expected end-product(s): 1) Publication of the document *Occurrence of Pathogens in Surface Water*, with possible consideration of African data, as a report; 2) exploration of the possibility of a joint database at the IWA meeting in Marrakech

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. There had not been any significant progress by the time of the GDWQ WG meeting (Geneva, 2005). The GDWQ WG meeting (Geneva, 2006) was updated on new efforts to develop global databases on pathogens and indicators in water.

Plan of work for Micro WG:

- 1) Since last year, there have been new efforts to develop global databases on pathogens and indicators in water. The USEPA has embarked on such an effort to inform its water programmes for risk assessment and risk management purposes. The effort is led by **Steve Schaub** of the USEPA. **Mark Sobsey** is involved in this USEPA project through its contractor. **Jamie Bartram** believes there is merit in linking to or harmonizing with this database development effort by the USEPA. It was also recommended that other efforts continue to link with pathogen database and data collection efforts by Canada, Germany and other sources. It was suggested that **IWA** be asked to encourage drinking-water utilities to submit their data to these databases. Such data might ultimately be made available to users of the GDWQ for drinking-water risk assessment and management purposes. The WG encourages more progress on these efforts and initiatives that will support the data needs of the GDWQ.

#52. WHO/PES Pesticides

Background: Various vector-borne diseases, such as malaria and dengue fever, may be strongly associated with the domestic storage of drinking-water. One of the vector control options to address the breeding of vectors in domestic drinking-water storage structures is the application of insecticide substances to drinking-water containers in different formulations (e.g. slow release). The WHO/PES endorses pesticides suitable for this purpose. It relies on WHO/PCS for toxicological assessment and on the GDWQ for overall assessment of safety

in this application. These pesticides are deliberately added where there is a significant risk of disease, so that an overly conservative approach is not appropriate.

There are currently four insecticide compounds and a bacterial larvicide recommended by WHO (under WHO/PES) for addition to drinking-water as larvicides: temephos, methoprene, pyriproxyfen, novaluron and *Bacillus thuringiensis israelensis*. Of these, only pyriproxyfen has been reviewed to date and is included in the GDWQ, Third Edition. Temephos (#93), methoprene (#52B), novaluron (#121) and Bti (#52A) are being considered under the rolling revision process. Permethrin (#111) is not recommended for direct addition to drinking-water for public health purposes as part of WHO's policy to exclude the use of any pyrethroids for larviciding of mosquito vectors of human disease. This policy is based on concern over the possible accelerated development of vector resistance to synthetic pyrethroids, which, in their application to insecticide-treated mosquito nets, are crucial in the current global anti-malaria strategy.

A scoping document on the issue of WHO/PES pesticides was prepared in 2003, which described the technical and assessment issues and approaches for reviewing these pesticides. The GDWQ FTF meeting (Geneva, 2003) recommended that background documents be prepared on WHO/PES pesticides for which no background documents exist (i.e. temephos, methoprene, novaluron, Bti — see agenda items #93, #52B, #121 and #52A, respectively) and on proposed WHO/PES pesticides (i.e. diflubenzuron and pirimiphos-methyl — see agenda items #52D and #104, respectively). In order to undertake these evaluations, it is first necessary to confirm an overall strategy with WHO/PES, WHO/PCS and JMPR and to develop a plan of work to deal with general (i.e. formulations) and active ingredients.

Expected end-product(s): 1) New text for Policies and Procedures Manual to explain the relationship between PES, PCS/JMPR and DWQC; 2) new text for the Policies and Procedures Manual and the GDWQ (for second addendum) on the new approach for WHO/PES pesticides; 3) jointly produced summary statements on a group of five or so pesticides for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) met with the WHO/PES and WHO/PCS groups and agreed to a revised joint plan of work. The path forward was further articulated by the GDWQ WG meeting (Geneva, 2006) following fruitful discussions with representatives of the Vector Ecology and Management Programme at WHO.

Plan of work for Micro and Chemical WGs:

- 1) In discussions with representatives of the Vector Ecology and Management Programme, which is responsible for WHO/PES pesticides, the following points were raised:
 - The focus needs to be on active ingredients first, before worrying about formulations etc. However, guidance needs to be included noting that in some cases (e.g. Bti), formulation ingredients may be a source of secondary contamination.
 - The practical aspects section of each background document needs to contain information on the circumstances under which the pesticides are used.
 - The guideline value is in effect a risk assessment for use under WHO/PES, rather than a true guideline value.
 - **John Fawell** and **Joe Cotruvo** explained how guideline values are typically derived; in this case, the JMPR ADI is the point of departure. It is not appropriate to allocate a proportion of intake to drinking-water for these pesticides; instead, an approach is

used in which the ADI is compared with dosage, such that the margin of exposure can be compared between pesticides, giving some indication that one pesticide is safer than another. The final recommendation will be along the lines of “where X is used for vector control in potable water, this will result in less than lifetime exposure. Under these circumstances, the maximum dosage in drinking-water of y mg/litre would be equivalent to approximately x% of the ADI.”

- Factors that need to be considered in recommendations include increased water consumption in warmer climates, the compound’s behaviour in water, thus determining “real” exposure (e.g. present in surface films or dissolved in water), whether children are going to be exposed, dosage, application time, seasonal use (the recommendation is based on continuous use, but if use is seasonal, authorities can adjust the guideline value accordingly), etc. It was pointed out that the label recommendation is the best estimate of application.
 - Perhaps different numbers need to be provided for various use situations. It needs to be clear that national authorities must apply these guidelines correctly because of direct application of these pesticides to drinking-water.
 - If exposure could exceed the ADI, there is a need to examine margins of exposure on the ADI.
 - The Vector Ecology and Management Programme representatives at first requested that the meeting report specify for each compound what additional information is required before the Committee can make its recommendations concerning the compound. Following discussions, it was decided to make a recommendation concerning each compound and identify any information that could modify that recommendation.
 - Industry wants guideline values (they seem to interpret them as product approval by WHO).
 - Ranking of larvicides in terms of safety may be a project for this group, as there is a wide range of larvicides available for this use.
 - It was determined that there was at this time no need for an acute value in an overdosing incident. However, there is a need to request an acute toxicity evaluation whenever these pesticides are evaluated by JMPR.
 - Companies need to be asked to provide data on the behaviour of pesticides in water, if such data are not already available (data may already be provided to JMPR for ecotoxicity assessment).
 - WHO/PES requested that the WG inform them about the margin of safety when pesticides are used at an effective dose and let them know for which pesticides there is a potential problem.
 - It was agreed that text should be added to the GDWQ on how member states establish the institutional arrangements to approve and control the use of these pesticides for vector control in drinking-water. **Robert Bos** is to provide a brief, non-prescriptive text.
- 2) New text on this approach needs to be added to both the Policies and Procedures Manual and the GDWQ (second addendum). **John Fawell** will prepare this.
 - 3) Drafts of all WHO/PES pesticides will be modified according to discussions. Bti (see agenda item #52A) will be completed on the chemical side, but the microbiological context will still need to be completed.
 - 4) **Robert Bos** will be provided with a list of participants (see Annex 1) so that one-to-one communication can be started between the two groups.

#52A. *B. thuringiensis israelensis*

Background: Bti is a biopesticide applied to drinking-water containers in order to control the breeding of vectors that may cause a variety of diseases. The GDWQ FTF meeting (Geneva, 2003) recommended that a background document be prepared on Bti.

Expected end-product(s): Background document on Bti, to be included in Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. JMPR has evaluated Bti. The GDWQ WG meeting (Geneva, 2005) agreed to initiate a background document based on the JMPR assessment. Following discussions with the WHO Vector Ecology and Management Programme, the GDWQ WG meeting (Geneva, 2006) agreed on a path forward to illuminate this complex issue.

Plan of work for Micro and Chemical WGs:

- 1) **John Fawell** has prepared a background document based on EHC No. 217 (1999). The conclusion is that Bti is not considered to pose a hazard to humans through drinking-water; therefore, it is not considered necessary or appropriate to establish a guideline value. However, the product, through formulations, may be contaminated with microbes, which is a separate issue requiring guidance (i.e. advice or generic recommendations on what contaminants should not be found in the product or limits for quality control if contaminants are present).
- 2) **Mark Sobsey** pointed out that there is a need for rigorous QA/QC on the product. Manufacturers have been careless and allowed the pure Bti culture to become contaminated during formulation with other bacteria, including coliforms such as *E. coli* or pathogenic bacteria (such as *Legionella* or mycobacteria). The manufacturer needs to start with a pure culture of Bti, the production system needs to include protection against contamination (including pasteurization of spores to eliminate contamination) and end product quality testing should be carried out. Nevertheless, WHO recommendations should be to enable the end user to check the product. What industry has to do to ensure a good product is their problem. He added that the level of contamination that is unacceptable in a product according to how it's used could be determined if typical application rates were known.
- 3) **Dr Zaim** suggested that pesticide specifications could be linked to the manufacturing process so that the impurity and hazard of the product is linked to the product of a given manufacturer, considering the manufacturing process that the manufacturer uses. Bti is a good example of the need to do this. He questioned whether we should make recommendations on a specific product from a given manufacturer or general recommendations, as it's impossible to deal with all the possible impurities in a variety of products.
- 4) The food production area (foods involving live cultures, such as yoghurt) and vaccine production could be used as examples of approaches to be taken.
- 5) **Angelika Tritscher** is to provide the WG members with the PCS document drafted last year by **Antero Aitio** on Bti, as a good starting point for discussion. WG members are to review the PCS document, and **Mark Sobsey** is to incorporate microbial information into John's background document, in particular the critical contaminants identified in Bti.
- 6) The WG agreed that it cannot provide a guideline that includes manufacturers' specifications, but it can set general recommendations. The WHO/PES group can ask the Chemical WG what limit can be set for a specific contaminant additional to those already discussed if there is potential for contamination of a particular product.

- 7) It was agreed that a fasttrack action plan needed to be developed, involving a work subgroup that included the Micro WG, outside experts, and WHO groups (food safety?), as this issue cannot be tackled in isolation. This one will set a precedent and policy for future similar pesticides.
- 8) There will be a joint meeting with FAO on Bti in June. The recommendation from this WG will be that the manufacturer's proposal for approval of their product is, in the WG's opinion, not acceptable. What is needed is performance targets and a QA/QC programme under which performance targets would be applied. WHO may have to provide guidance on how to improve this, which will take some time, as it's breaking new ground. The Vector Ecology and Management Programme representatives expressed a wish that this conclusion be recorded, as development of specifications has been delayed for two years already (although the WG can establish a specification that does not address microbial contaminants), and the product is being used widely. The Secretariat has to be responsible if country use has consequences. When information is available, WHO will address it.
- 9) The WG needs to determine what information JMPR has on Bti and needs to talk to the manufacturers. WHO/PES has access to the full confidential manufacturing process package. It was suggested that **Mark Sobsey** could sign a confidentiality agreement and review the package.
- 10) **Jamie Bartram** advised the WG that he is aware of some food experts who would be able to advise us in this area.

#52B. Methoprene

Background: Methoprene is a chemical pesticide applied to drinking-water containers in order to control the breeding of disease vectors. The GDWQ FTF meeting (Geneva, 2003) recommended that a background document be prepared on methoprene.

Expected end-product(s): Background document on methoprene, based on the JMPR assessment, for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. JMPR has evaluated methoprene. The GDWQ WG meeting (Geneva, 2005) agreed to initiate preparation of a background document based on the JMPR assessment. The GDWQ WG meeting (Geneva, 2006) agreed to revise the draft background document following discussions with the WHO Vector Ecology and Management Programme.

Plan of work for Micro and Chemical WGs:

- 1) **Vera Ngowi** and **John Fawell** will revise the background document based on discussions with the WHO Vector Ecology and Management Programme.
- 2) It is hoped that the background document and summary statement will be finalized by mid-2006, so that they can be reviewed and methoprene can be included in the second addendum.

#52D. Diflubenzuron

Background: Diflubenzuron is a chemical pesticide applied to drinking-water containers in order to control the breeding of disease vectors. The GDWQ FTF meeting (Geneva, 2003) recommended that a background document on diflubenzuron be prepared based on the 2001 JMPR report. In addition, WHO has received a request for consideration of a potable water clearance for diflubenzuron for use in mosquito vector control.

Expected end-product(s): Background document on diflubenzuron, based on the 2001 JMPR report, for publication in the second addendum to Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. JMPR has evaluated diflubenzuron. The GDWQ WG meeting (Geneva, 2005) agreed to initiate preparation of a background document based on the JMPR assessment. The GDWQ WG meeting (Geneva, 2006) agreed to revise the draft background document following discussions with the WHO Vector Ecology and Management Programme.

Plan of work for Micro and Chemical WGs:

- 1) **Vera Ngowi** and **John Fawell** will revise the background document, based on discussions with the WHO Vector Ecology and Management Programme.
- 2) It is hoped that the background document and summary statement will be finalized by mid-2006, so that they can be reviewed and diflubenzuron can be included in the second addendum.

#53. Analytical and Technical Achievability for Microcystin

Background: Section 8.3 of the GDWQ provides information on the analytical achievability of all chemicals in the GDWQ except for microcystin. This needs to be included.

Expected end-product(s): 1) Additional text for section 8.3 (analytical) of the GDWQ, for inclusion in second addendum of Third Edition; 2) revised background document to include new analytical and technical achievability texts, for the second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) reviewed and approved the text for the second addendum and agreed to include analytical and treatment sections in the background document, which will then be marked as an update.

Plan of work for Chemical WG/Analytical:

- 1) **Yasumoto Magara** and **Ingrid Chorus** have prepared a draft on analytical methods for microcystins, and **Peter Jackson** has prepared a draft on treatment technology. **Ingrid** will provide electronic versions of both texts when they are completed. The analytical text is complete, and the technical text is being rewritten and needs to be reviewed when it is done. **Health Canada** provided the name of a reviewer (**Rocio Aranda-Rodriguez**), and **Peter Jackson** will help. The WGs are asked to provide the names of any other potential reviewers.
- 2) When they are complete, **Marla Sheffer** will insert both texts into the background document, which will then be marked as an update.
- 3) A new Table 8.10a “Analytical achievability for cyanobacterial toxins (microcystin-LR) for which guideline values have been established” has been prepared for section 8.3 (and text modified on p. 158 to incorporate this table). Methods in table are PPA (protein phosphatase assay) +; ELISA, +; GC/MS, +; HPLC/UVPAD, ++; LC-MS, ++. These changes will be included in the second addendum.

#54. Materials and Chemicals

Background: The GDWQ FTF meeting (Geneva, 2003) suggested that “additive” chemicals be a focus of activity in relation both to derivation and use of guideline values and to provision of guidance on good practice in control of associated hazards. In addition, it has been suggested that section 8.4 on Treatment needs to be rechecked in terms of its applicability to chemicals used in water treatment and chemicals arising from materials in contact with drinking-water.

Expected end-product(s): 1) Additional text in section 8.4 of GDWQ, for inclusion in first addendum to Third Edition; 2) additional text in section 8.5.4, for inclusion in first addendum to Third Edition; 3) addition of principles of certification to the Fourth Edition

Progress to date: The 1995 Coordinating Committee meeting identified materials and chemicals used in the production and distribution of drinking-water as one of the principal thematic areas that should be addressed by the P&C WG. The development of a monograph on this theme was adopted by the 1996 WG meeting, and work was initiated at a workshop planning meeting in 1997. The 1998 WG meeting reviewed progress and endorsed the approach taken, recommending that a consolidated draft be submitted to selected peer review in late 1998 and an expert meeting be called in early 1999, with the overall objective of peer-reviewed text being available to the next WG meeting. The Berlin Coordinating Committee meeting (2000) reviewed the draft document and recommended that it proceed to peer review. The document was under review at the time of the Chemical Aspects WG meeting in Tokyo in 2002. Text for inclusion in sections 8.4 and 8.5.4 of the first addendum to the Third Edition was prepared and incorporated. The GDWQ WG meeting (Geneva, 2005) agreed to a revised plan of work, which was further modified by the GDWQ WG meeting (Geneva, 2006) in a path forward towards the Fourth Edition.

Plan of work for Chemical and P&C WGs:

- 1) **Joe Cotruvo** provided the WGs with a briefing paper entitled WHO Guideline Values and Approval/Certification for Contaminants Derived from Chemical Additives.
- 2) Principles for certification could be an addition to the Fourth Edition (as opposed to certifying materials and chemicals directly) — i.e. a description of important elements of the certification process for ensuring the adequacy of drinking-water materials. Countries could use these principles or develop their own. A higher-level objective would be to encourage international harmonization. Minimum requirements could be provided — e.g. underlying risk assessments should be based on WHO risk assessments where these are available. A practical way forward is needed.
- 3) The Chemical WG is to reflect if this modification has any consequences on the procedures the WG uses to identify chemicals for evaluation. It could potentially lead to thousands of chemicals being identified. Those of potentially significant health concern need to be identified and addressed through normal channels, and all of the rest of relatively minor significance should not be dealt with.
- 4) It was concluded that perhaps one or two pages of text with the principles for certification enunciated should be included in the Fourth Edition. The longer background document will support the short text in the Guidelines. It should expand on principles and examples of ways of putting them into practice, and it should not be prescriptive.
- 5) **Joe Cotruvo** is to revise the background document, preparing a condensed version and a longer version, and distribute them both for a first round of comments. The texts are to be circulated electronically by **Joe** to WG members, who are asked to track their suggested

changes. Internal review will be carried out first, followed by external review (reviewers to be suggested by WG members), as well as by potential users. **Jamie Bartram** is to review the principles part. **John Fawell**, **Peter Jackson**, **Shoichi Kunikane**, and any other interested WG members are to review the rest by the end of September 2006. Later reviewers are to include **IWA**.

- 6) **Peter Jackson** is to prepare some of the examples of ways of putting the principles into practice (he can use some in the original supporting document, and others).
- 7) The supporting document *Safety of Materials and Chemicals Used in the Production and Distribution of Drinking-water* is no longer to be discussed and will be removed from this agenda item.

#58-1. Nutrient Minerals in Drinking-water

Background: A WHO Expert Workshop on nutritional components of drinking-water was held in November 2003 in Rome. The result of the workshop was a report on “Nutrient minerals in drinking water and the potential health consequences of long-term consumption of demineralized and remineralized and altered mineral content drinking waters.” The workshop concluded that drinking-water could be a significant contributor to daily dietary nutrition in cases of dietary insufficiency. Calcium and magnesium in hard water have been shown to be associated with reduced ischaemic cardiac mortality in hard water areas. Stabilization of desalinated waters should include the introduction of adequate calcium and magnesium where practical. It was concluded that drinking-water may be important as a source of skeletal fluoride, and it has been suggested that there is a minimum level of fluoride in water below which net loss of fluoride from the skeleton may occur.

Expected end-product(s): 1) Publication of Nutrient Minerals in Drinking-water meeting report in 2005; 2) eventual revision of background documents on fluoride, hardness and selenium to take beneficial effects into consideration (for more details, refer to relevant agenda items); 3) addition of text to Policies and Procedures Manual to reflect new approach on essentiality

Progress to date: 1) The Nutrition report was submitted to WHO departments in February 2004 for comments. 2) The Chemical Aspects WG has not previously considered the essentiality of minerals in sufficient depth and has decided to progressively start taking essentiality and potential beneficial effects into consideration. This decision has arisen because of increasing evidence that in populations that are marginal for nutrition for a particular mineral, concentrations in drinking-water may be important. It is therefore important to achieve a suitable balance for essential minerals between protection against adverse effects and the potential for beneficial effects. 3) The beneficial effects issue has been carried forward into the respective agenda items on fluoride (#71), hardness (#58-3) and selenium (#79). 4) Text has been prepared for inclusion in the Policies and Procedures Manual. 5) The GDWQ WG meeting (Geneva, 2005) was informed that the Nutrition report is now ready for final editing and publication, and they expressed their support for the proposed plan of work. 6) The GDWQ WG meeting (Geneva, 2006) approved the text for inclusion in the Policies and Procedures Manual and referred other actions to other agenda items involving individual nutrient minerals. As a result, the agenda item can be removed from the plan of work (but see also agenda items #58-2 and 58-3).

Plan of work for Chemical WG:

- 1) The coordinators are **John Fawell** and **Joe Cotruvo**, with input from the **WHO nutrition group**.
- 2) **PCS** provided the WG with a copy of the report of a Joint FAO/WHO Technical Workshop on Nutrient Risk Assessment, entitled A Model for Establishing Upper Levels of Intake for Nutrients and Related Substances.
- 3) Text needs to be added to the Policies and Procedures Manual to mention that the aspect of essentiality needs to be checked for each new chemical and dealt with if it is applicable. **John Fawell** has prepared the text (G3.10), which will be moved to the Allocation factors section (G3.3).
- 4) Other actions have been referred to other agenda items involving individual nutrient minerals. As a result, there is no longer a need for this agenda item, and *it will be removed from the plan of work* once the required text on essentiality has been added to the Policies and Procedures Manual.

#58-2. Infant Formula

Background: WHO Headquarters received a written communication suggesting that WHO should render a rough guidance for the dimensions of acceptable intakes of essential elements in infant formula for the first six months of life. It was noted that for certain chemicals (e.g. manganese, molybdenum), drinking-water may be a significant contributor to overall intake, particularly for formula-fed infants. Reconstitution of infant formula with drinking-water may in some cases lead to “overnutrition” — in other words, the use of drinking-water at the guideline values for various minerals may lead to an exceedance of the nutritional requirements.

Expected end-product(s): Not known at this time

Progress to date: This was one of the subjects of the Expert Workshop on Nutrition held in Rome in November 2003 (see agenda item #58-1). The GDWQ WG meeting (Geneva, 2004) decided that it would need input from the WHO nutrition group before deciding whether to undertake this initiative. The GDWQ WG meeting (Geneva, 2005) agreed on a revised plan of work to begin the discussion process. The WHO nutrition group carried out useful discussions with the GDWQ WG meeting (Geneva, 2006) and agreed to establish a liaison between the two groups should the topic of infant formula become a priority.

Plan of work for Chemical WG:

- 1) If the WHO nutrition group gets into the area of infant formula, it will work together with the Chemical WG (currently, the nutrition group’s emphasis is on breastfeeding). However, infant formula may become a priority soon because of the HIV epidemic and its association with breastfeeding. In such a case, a liaison will be established between the two groups.
- 2) The item is to stay on the rolling revision. The WHO nutrition group will follow up on progress in this area at next meeting and will contact the WG through **Jamie Bartram** or directly in the meantime.

#58-3. Hardness

Background: The term hard water is an indication of the presence of usually calcium and magnesium carbonates that reduce the lathering of soaps or precipitate soap residues onto

sinks and bathtubs and reduce washing efficiency. These are negative aesthetic effects that can be reduced by either central softening treatment (precipitating calcium and magnesium carbonates) or home water softening (cation exchange replacement of calcium and magnesium with sodium or sometimes potassium using ion exchange resins).

There is a considerable body of evidence that indicates that there may be a lower risk of ischaemic cardiovascular disease mortality in populations consuming hard water. One example is a January 2004 BBC news release describing the findings of a study in Finland, in which for every unit increase in water hardness there was a 1% decrease in the risk of having a further heart attack in 19 000 men who had suffered heart attacks. These beneficial effects have not been detected in all epidemiology studies, but the overall weight of evidence indicates that the effect is probably causal. It can potentially be explained by water contributing a relatively small incremental amount (perhaps 10–30 mg) of calcium or magnesium to the total daily intake of large numbers of people whose total dietary intake is suboptimal. The known roles of calcium and magnesium ions in the nervous system and muscle movement add biological plausibility to the concept.

WHO Headquarters received an inquiry from British Water regarding the relative importance of magnesium and calcium in regard to cardiovascular disease. It was suggested that water hardness should not be reduced below a minimum level of hardness, to be determined. This applies to softened and desalinated water (see agenda item #17) and water treated by reverse osmosis.

Expected end-product(s): Background document taking into account beneficial effects associated with hardness, to be published in Fourth Edition

Progress to date: A brief discussion paper on water hardness was prepared. The GDWQ WG meeting (Geneva, 2004) agreed that future meetings will further examine the hypotheses concerning the beneficial effects of hardness and determine whether they should be reflected in guidance for hardness or recommended compositions of calcium and magnesium in drinking-water as a contributor to reduced risks of ischaemic cardiovascular disease. The GDWQ WG meeting (Geneva, 2005) agreed that further progress on this issue will await the hardness symposium, to be held in April 2006. The GDWQ WG meeting (Geneva, 2006) received an update on the conclusions of the hardness symposium and agreed to move forward with a background document on hardness for the Fourth Edition.

Plan of work for Chemical WG:

- 1) **Joe Cotruvo** provided the WG with a draft report of the symposium on the health aspects of calcium and magnesium in drinking water, the “hardness” symposium, held in Baltimore, Maryland, in 2006. The proceedings will be available within a few months. The WHO expert meeting occurred in Washington at PAHO following the symposium. The report is being drafted and will be available in the summer of 2006.
- 2) Information will be provided to **John Fawell** towards the preparation of a background document for the Fourth Edition. **Joe Cotruvo** will collaborate. No guideline will be proposed, but there will be extensive discussion on essentiality.
- 3) The desalination agenda item (#17) is related to this one, and the two subjects should be cross-referenced.

#60. Arsenic

Background: There is overwhelming evidence from epidemiological studies that consumption of elevated levels of arsenic through drinking-water is causally related to the development of cancer at several sites, particularly skin, bladder and lung. In several parts of the world, arsenic-induced disease, including cancer, is a significant public health problem. In the Third Edition of the GDWQ, a provisional guideline value for arsenic was set at the practical quantification limit of 0.01 mg/litre, based on concern regarding its carcinogenicity in humans. Some recent publications seem to indicate that there is not any quantifiable bladder cancer risk from exposure to typical low-level arsenic in water (<50 µg/litre) and that studies reported from Taiwan, China, may have been misinterpreted, leading to overestimates of the projections to low-dose exposures.

Estimated end-product(s): Expanded summary statement on arsenic for publication in second addendum to Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) revised the plan of work.

Plan of work for Chemical WG:

- 1) **John Fawell** has prepared an extended summary statement on arsenic, which contains a much more detailed discussion regarding using the guideline value for setting national standards. John is to incorporate **Jamie Bartram**'s comments on the arsenic extended summary statement.
- 2) There is a need for more epidemiological data from Bangladesh and the USA on cancers associated with exposures before a task force can be convened. It was pointed out that cardiovascular effects are also associated with arsenic exposure. A JECFA evaluation on arsenic was done in the 1980s and needs to be redone, including management guidance, but resources are still not there.
- 3) It was recommended that the special consultation task force on arsenic remain on the agenda until new data become available for evaluation.
- 4) A current status paper is needed for presentation at the FTF meeting. **John Fawell** will prepare it with **Guy Howard**. **Michèle Giddings** is to provide John with Health Canada's supporting document. **Ambika Bathija** can provide information on USEPA's evaluation of epidemiological studies. **John** will liaise with **Angelika Tritscher**.
- 5) **Marla Sheffer**, with **John Fawell**'s assistance, is to combine the new summary statement, once revised, with the current one in chapter 12 of the GDWQ so that it will fit with others in the second addendum.

#61. Atrazine

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that atrazine be referred to JMPR as part of the rolling revision, based on new data from the USA. An evaluation of the new data, which is not yet available, is required. JMPR has never evaluated atrazine, as it is a herbicide and unlikely to occur in food. However, it is likely to occur widely in water.

Expected end-product(s): Background document on atrazine, possibly for Fourth Edition of GDWQ, but probably post-Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work, the first step being to check the occurrence data to determine if there is a need for an evaluation. The GDWQ WG meeting (Geneva, 2005) agreed that atrazine is widespread in water and revised the plan of work to address the issue. The GDWQ WG meeting (Geneva, 2006) was advised that atrazine is now on JMPR's agenda for evaluation in 2007.

Plan of work for Chemical WG:

- 1) Atrazine is now on JMPR's agenda for evaluation in 2007. There has been confirmation from Syngenta that they are willing to provide the data. **Angelika Tritscher** will discuss format and timelines with them. Atrazine and its metabolites are both of concern, and both need to be evaluated. This requirement will be put into the call for data.
- 2) **Michèle Giddings** is to provide **Angelika Tritscher** with the Canadian study on atrazine levels in water.
- 3) **Joe Cotruvo** noted that a new risk assessment on triazines was upcoming from the USEPA and suggested that the guideline value for atrazine may need to be reviewed on the basis of the new USEPA report. **Ambika Bathija** has noted that the cumulative risk from the triazine class of pesticides and their degradates was finalized by the USEPA on 6 April 2006. The USEPA's conclusion was that "the cumulative risks associated with these pesticides are below the Agency's level of concern."
- 4) **Angelika** will update the group at the next meeting (but note that JMPR doesn't meet until September 2007, so there may be nothing to report).

#63. Boron

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that boron be added to the rolling revision on the basis of new data from the USA. The new United States review has been completed, but is not yet published.

Expected end-product(s): Background document for Fourth Edition

Progress to date: The need to review boron in the rolling revision will be considered once new data become available. The GDWQ WG meeting (Geneva, 2006) decided to reconsider boron for the Fourth Edition.

Plan of work for Chemical WG:

- 1) The desalination group (see agenda item #17) recommended that boron be reconsidered, as it is a water reuse and desalination issue. It is also used as a herbicide, so that ecological aspects could be included in the assessment. It is also a chelating agent in detergents and so can get into surface water through that use. Boron also occurs in natural mineral waters (used by the bottled water industry). Finally, an IRIS report on boron has recently been published.
- 2) **John Fawell** is to prepare a background document for the next meeting. **Ambika Bathija** will investigate the status of the new United States review.
- 3) It was also noted (see agenda item #134) that there is a discrepancy between the Codex value for borate and the WHO drinking-water guideline for boron. Boron may be an issue, because the Codex number is higher than the WHO guideline value and therefore may not be protective of health. As the boron guideline value is now under consideration for revision, Codex may wish to wait before changing the borate guideline. These views can be passed on by **WSH** to the Secretary of the Codex Alimentarius Commission (CAC), Joint FAO/WHO Food Standards Programme, Rome.

#64. Bromate

Background: WHO Headquarters received a communication in 2004 suggesting that bromate may need to be revisited as part of the rolling revision on the basis of new data that might become available in a few years. The American Water Works Association Research Foundation (AWWARF) supported a workshop in 2005, organized by Joe Cotruvo and Dick Bull, to develop a comprehensive health research strategy on bromate in drinking-water, which will be released in 2005. In addition, the GDWQ WG meeting (Geneva, 2004) recommended that the background document and summary statement on bromate be revised to indicate that sodium hypochlorite solutions may be a source of some bromate. Electrolysis of seawater to produce hypochlorite as is practised in some desalination plants is a major source of bromate in finished water. Finally, the phrase “The guideline value is provisional because of limitations in available analytical and treatment methods and uncertainties in the toxicological data” in the summary statement does not reflect precisely the text in the background document. The two need to be reviewed for consistency,

Expected end-product(s): Revised background document and summary statement, for inclusion in first addendum to Third Edition

Progress to date: If new data from the USA become available (time frame is 2007), the WG will consider the need to put the chemical on the rolling revision. The GDWQ WG meeting (Geneva, 2004) agreed that the minor revisions to the background document and summary statement would not require a peer or public domain review. The revisions were published in the first addendum. The GDWQ WG meeting (Geneva, 2005) agreed that the WG should continue to monitor new studies on bromate and keep it on the rolling revision. The GDWQ WG meeting (Geneva, 2006) was updated on recent bromate studies.

Plan of work for Chemical WG:

- 1) **Joe Cotruvo** informed the WG about the status of new bromate studies. Bromate is chemically reduced under acidic conditions in the stomach and is rapidly decomposed in the blood. A dedicated issue of *Toxicology* (17 April 2006) based upon the expert workshop provides detailed discussions of the mechanism of bromate toxicity and carcinogenicity at high doses and a detailed research strategy to resolve the risks at low, environmentally relevant doses. A pharmacokinetic study has been designed by Joe Cotruvo and Dick Bull, and the work is expected to be completed within two years.
- 2) **Joe** will update the WG on these studies at the next meeting.

#66. Chromium

Background: The provisional guideline value of 0.05 mg/litre for chromium was retained in the Third Edition. The chromium background document is very old, and the basis for the derivation of the guideline value is unclear. The GDWQ FTF meeting (Geneva, 2003) recommended that chromium be added to the rolling revision on the basis of new National Toxicology Program (NTP) studies. The NTP studies are not yet completed; completion is expected in 2006. A CICAD on trivalent chromium compounds is expected in 2006 based on an Agency for Toxic Substances and Disease Registry (ATSDR) report from the USA.

Expected end-product(s): Revised background document and summary statement, for publication in Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed that the need to review chromium in the rolling revision will be considered once new data become available. The GDWQ WG meeting (Geneva, 2006) recommended that the WG await the finalization of the CICAD, and perhaps the report of the NTP studies, before revising the guideline value.

Plan of work for Chemical WG:

- 1) **John Fawell** prepared a briefing note on chromium.
- 2) An issue of concern is whether or not chromium(VI) is completely reduced to chromium(III), an essential nutrient, in the human stomach. This may depend on dose and the acidity level in the stomach and needs to be considered.
- 3) The draft CICAD on chromium is about to go to peer review. The Final Review Board meeting is scheduled for the end of 2006 or early 2007.
- 4) There is an NTP study (two-year) on chromium(VI) under way. No final summaries have been issued, and there are no data available so far. The USEPA has established a maximum contaminant level (MCL) of 100 µg/litre for total chromium. An ATSDR document is also available, which forms the basis of the CICAD.
- 5) It was recommended that the WG await the finalization of the CICAD before revising the guideline value, although the group may actually need to wait until the NTP studies are reported.

#67. Copper

Background: Recent studies in rabbits have suggested a link between copper in drinking-water and Alzheimer's disease. Levels in the rabbits' drinking-water were well below the current WHO guideline of 2 mg/litre, based on acute gastrointestinal effects; however, it has not been established whether rabbits are an appropriate model. In addition, a communication received by WHO Headquarters suggested the need to review the guideline value and text on copper with regard to toxicity in the preparation of formula for bottle-fed infants.

Expected end-product(s): None

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to monitor studies relating to the health effects of copper and to consult with infant nutrition experts. The GDWQ WG meeting (Geneva, 2005) decided that the issue would be better dealt with by the WHO nutrition group. The GDWQ WG meeting (Geneva, 2006) met with the WHO nutrition group and requested that they follow up on progress in the infant formula area at the next meeting and review the current background document on copper.

Plan of work for Chemical WG:

- 1) There are no new studies that WG members are aware of.
- 2) The **WHO nutrition group** will follow up on progress in the infant formula area at the next meeting (see agenda item #58-2) and will contact the WG through **Jamie Bartram** or directly in the meantime.
- 3) The Chemical WG asked the **WHO nutrition group** to review the current background document on copper, which has a guideline that is concentration-based (gastrointestinal effects).

#68. Cyanide (Cyanogen Chloride)

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that the background documents for cyanide and cyanogen chloride be updated based on the new CICAD, when available. The final draft of CICAD No. 61 on hydrogen cyanide and cyanides (human health aspects) is now available. However, as short-term exposures may be of concern for these substances, the Chemical Aspects WG will await development of methodology on calculating acute reference doses before preparing a revised background document.

Expected end-product(s): 1) Revised background document and summary statement for second addendum to Third Edition; 2) revised text for the Policies and Procedures Manual

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) agreed to initiate the preparation of a background document and to develop a policy for the derivation of acute guidance values. The GDWQ WG meeting (Geneva, 2006) agreed that the background document, after revision to take into account comments provided at the meeting, will be sent for public domain comment and will be included in the second addendum.

Plan of work for Chemical WG:

- 1) **John Fawell** is to prepare text for the Policies and Procedures Manual regarding the WG's position that each chemical should be evaluated for the need for an acute guidance value and what procedures should be followed to derive such a value.
- 2) **John Fawell** prepared a background document based on the CICAD. Data did not allow JMPR's Guidance on Setting Acute Reference Doses to be used in this instance. The no-observed-adverse-effect level (NOAEL) is taken directly from the CICAD.
- 3) The WG decided to use an uncertainty factor of 100 because sufficient data are lacking to support changing it from default. However, the background document will state that this is a very conservative value because of the similarity of mode of action and toxicity between animals and humans. The final guideline value will be 0.3 mg/litre.
- 4) There will be another version of the document for long-term exposure to cyanide that can be used with or as part of the cyanogen chloride document.

#71. Fluoride

Background: The GDWQ FTF meeting (Geneva, 2003) noted that when the NAS report on effects on bone becomes available, the need for review of fluoride will be reconsidered.

Expected end-product(s): Revised background document, for Fourth Edition; expanded summary statements for Volume 1, for second addendum of Third Edition

Progress to date: The NAS report was released in 2006. It does not generally provide major new information but suggests that high fluoride intakes may also correlate with an increased risk of bone fracture in later life. The GDWQ WG meeting (Geneva, 2004) agreed that if the background document is to be revised at that time, it will take essentiality into account. The GDWQ WG meeting (Geneva, 2005) agreed to formally place fluoride on the rolling revision and developed a plan of work. The GDWQ WG meeting (Geneva, 2006) approved the expanded summary statement on fluoride, with amendments, for inclusion in the second addendum and suggested a path forward for preparation of a revised background document for the Fourth Edition.

Plan of work for Chemical WG:

- 1) **John Fawell** prepared an extended summary statement on fluoride in drinking-water.
- 2) **Poul Petersen** informed the WG that salt and milk are commonly fluoridated in various countries around the world. These are the only two forms of food that are fluoridated. He also noted that low concentrations of fluoride protect against dental caries at all ages.
- 3) Joyce Donahue's (USEPA) comments on John's extended summary were received and discussed. In addition, Poul Petersen's review of the document was discussed. John Fawell will revise the summary statement taking all of the comments into consideration.
- 4) Where food is high in fluoride (e.g. high tea consumption, high rice consumption where rice cooked in water high in fluoride), national authorities could modify the guideline to take local conditions into consideration.
- 5) **Jamie Bartram** argued that it is more important to evaluate a community's dental health than to worry about a fluoride guideline in drinking-water. If a population suspects it has too much exposure to fluoride, then the state of their teeth should be checked.
- 6) The guideline stays at 1.5 mg/litre, but if the community displays signs of dental fluorosis, the authorities should investigate all potential sources of fluoride and reduce intake (lowering guideline, reduced food intake where fluoride levels are high).
- 7) Re John's briefing note entitled "Fluoride and the USNRC Review": The new review and data do not suggest any change to the guideline value; however, there is a need to update the background document and to extend the discussion of the approach to modifying the guideline value according to local circumstances. **John Fawell** is to complete the background document by the end of this year for review, so that it can be incorporated in the Fourth Edition.
- 8) The WGs agreed to defer the discussion on the approach to be taken for chemicals with beneficial as well as detrimental effects until the next meeting.
- 9) The consideration of fluoride in the nutritional aspects of minerals in drinking-water also suggested that very low fluoride (e.g. desalinated water) results in a net loss of fluoride from bone and also suggested a minimum fluoride level of 0.2 mg/litre for remineralizing desalinated water (i.e. it may be necessary to add fluoride back to the water if the fluoride level is less than 0.2 mg/litre). This needs to be looked at again and incorporated into the background document for consistency. **John** is to follow this up with **Poul Petersen** and his group.
- 10) Fluoride additives (e.g. fluosilicic acid) all end up as free fluoride. The bioavailability of fluoride from naturally and artificially fluoridated water is the same, regardless of the water's hardness. A sentence or two needs to be added to the summary statement to address additives (**Peter Jackson** to do this).

- 11) The summary statement is to be merged with the current summary statement so that the format more closely resembles the current format (**Marla Sheffer** to do, with **John Fawell**'s assistance).

#74. Iodine

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that iodine be referred to JECFA because of toxicological concerns regarding the use of iodine as a disinfectant in emergency situations and that a background document on iodine be prepared as part of the rolling revision. A CICAD on iodine, based on an ATSDR report, is in the drafting process.

Expected end-product(s): Revised background document (taking essentiality aspects into consideration as well as updated toxicological information) for second addendum to Third Edition or for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed on a plan of work, which was revised by the GDWQ WG meeting (Geneva, 2005). The first step is to review the CICAD draft, which had not been finalized by the time of the GDWQ WG meeting (Geneva, 2006), for the next meeting.

Plan of work for Chemical WG:

- 1) **Lesley Onyon** reported that the CICAD draft is about to be sent for final editing. The draft will be shared with **John Fawell** and **Joe Cotruvo** once it is finalized (i.e. ready for editing). John is concerned about the issue of iodine vs. iodide. Iodine is what is used as a disinfectant in emergencies, POU devices, etc., not iodide salt. This issue will need to be examined carefully.
- 2) The WG was asked to revisit the phrases "lifetime disinfection" and "permit recommendation." As these phrases are no longer used in the iodine summary statement (they have been replaced by "long-term disinfection" and "derivation of a guideline value is inappropriate"), this can be removed from the plan of work.

#77. Molybdenum

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that molybdenum be considered in the rolling revision in order to deal with the issue of infant exposure.

Expected end-product(s): None

Progress to date: The GDWQ WG meeting (Geneva, 2004) decided that it needed advice from the WHO nutrition group before deciding on a plan of work for the molybdenum and infant nutrition issue. The GDWQ WG meeting (Geneva, 2005) reiterated this decision, and the GDWQ WG meeting (Geneva, 2006) met with the WHO nutrition group to discuss the issue.

Plan of work for Chemical WG:

- 1) The WG agreed that the question on infant exposure to molybdenum should be addressed and asked the WHO nutrition group to consider it. The WHO nutrition group will advise the WG on any progress in the area of infant formulas at the next meeting.
- 2) In the discussion on selenium (agenda item #79), it was noted that if a background document on molybdenum is to be prepared, it should be worked on together with selenium to ensure that they are treated in the same way.

#78. Nickel

Background: The GDWQ FTF meeting (Geneva, 2003) noted that a new study reports significant addition of nickel to drinking-water through household appliances such as kettles and that results from a new reproductive effects study were likely to become available soon. The meeting recommended that the WG coordinator for additives consider aspects of exposure and their control and that WHO/PCS be asked to lead the updating of the risk assessment.

Expected end-product(s): 1) Revised background document and summary statement for publication in first addendum to Third Edition; 2) addition to Policies and Procedures Manual concerning the lack of need for an uncertainty factor when using a critical study based on a sensitive human population; 3) revised background document and summary statement for publication in the second addendum to Third Edition; 4) addition to Policies and Procedures Manual concerning how to derive an allocation factor (non-default) from the TDI using exposure data.

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed that the background document and summary statement should be revised. Once revised, they will be sent for peer review and simultaneously posted on the Internet for public domain comment. The GDWQ WG meeting (Geneva, 2005) agreed that the revised background document should be published in the first addendum. The GDWQ WG meeting (Geneva, 2006) agreed to reopen this agenda item in light of comments received on the published document. The revised background document will be peer and public domain reviewed once complete.

Plan of work for Chemical WG:

- 1) The Policies and Procedures Manual has been amended to address the lack of need for an uncertainty factor when using a critical study based on a sensitive human population.
- 2) The nickel agenda item has been reopened as a result of comments received from the Danish EPA and USEPA on the published document.
- 3) The NOAEL should be changed to 1.1 from 2.2 mg/kg body weight per day. It was explained that the 2.2 mg/kg body weight per day value was the USEPA's draft position at the time of the last meeting, but it has since changed. The WG agreed on this change.
- 4) There was considerable discussion on the allocation factor to be used in deriving the guideline value. Nickel in food may be not bioavailable. The TDI is 11 µg/kg body weight, or 660 µg/day for a 60-kg person. Nickel concentrations are measured in water at the tap (to account for nickel in the distribution system). Evidence available seems to support an allocation factor of 20% (20% of the TDI of 660 µg/day is 132 µg/day, which leaves a large safety margin of allowance for other intakes), which is also our new "default" allocation factor. The guideline won't change, as both the animal and human studies will give the same guideline value now.

- 5) The background document will be revised by **John Fawell**. It will then need to be peer reviewed again. **WSH** is to add a sentence to the web page stating that the current version on the web is under revision. The summary statement will be revised for the second addendum (**Marla Sheffer**). John noted that the nickel document should have been sent out for review again after the last WG meeting because the guideline value was changed at the meeting.
- 6) **John Fawell** is to add a paragraph to the Policies and Procedures Manual explaining how to derive an allocation factor (non-default) from the TDI using exposure data, as this seems to be causing some confusion among WG members.

#79. Selenium

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that selenium be considered in the rolling revision based upon its nutrient value and probable anticancer benefits. There is a relatively narrow range between doses essential to humans and those associated with adverse effects. However, there are studies indicating anticarcinogenic effects from consumption in the 100–300+ µg/day range. The health-based guideline value of 10 µg/litre would give an intake (based on 2 litres consumption) lower than the recommended daily intakes for men and women (70 and 55 µg/day, respectively).

Expected end-product(s): Revised background document, including input from nutrition experts, for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. A paper on selenium has been prepared, which will form the basis of a new background document. The guideline value may need to be revised. The GDWQ WG meeting (Geneva, 2005) agreed to a revised plan of work. The GDWQ WG meeting (Geneva, 2006) agreed that a revised background document should be prepared by the end of 2006.

Plan of work for Chemical WG:

- 1) **John Fawell** has prepared a briefing note on selenium (taken from the discussion section of the review paper prepared by **Fiona Gore**, **John**, and **Jamie Bartram** and reviewed by Gerald Combs). A formal revision of the guideline for selenium on the basis of new data is recommended, with a new background document and guideline, for final agreement, by the end of 2006. The paper suggests that the current guideline value be revisited with a view to an increased value, after consideration of bottle-fed infants, but it should be designated as provisional on the grounds of uncertainties in the data on the upper bound of safe intakes. It is important that care be taken in the presentation of the guideline, since there are populations that are marginal or deficient in selenium. It would be inappropriate to suggest that water should be treated to remove selenium or a supply abandoned when the overall exposure to selenium would suggest that the water could be a beneficial source of the element. **John** and **Fiona Gore** are to collaborate on preparation of the background document.
- 2) If a background document on molybdenum is to be prepared, it should be worked on together with selenium to ensure that they are treated in the same way.
- 3) The WHO nutrition group was asked to review the materials prepared on selenium.

#80. Trichloroacetic Acid

Background: WHO Headquarters received a communication suggesting that trichloroacetic acid may need to be revisited as part of the rolling revision on the basis of new data that might be available in 2005.

Expected end-product(s): Pending

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed not to add trichloroacetic acid to the rolling revision until new data suggest the necessity to update the guideline. The GDWQ WG meeting (Geneva, 2005) agreed that new data to become available in 2006 should be assessed to determine if the data would affect the guideline value. The GDWQ WG meeting (Geneva, 2006) was updated on current activities and will reconsider the guideline at the next meeting.

Plan of work for Chemical WG:

- 1) **Joe Cotruvo** and **Ambika Bathija** updated the WG. The USEPA is revising its guideline value, as trichloroacetic acid may now be considered a non-threshold human carcinogen. The report is going to external peer review (it is being prepared for IRIS). Final review and revisions will be done probably later this year. **Ambika** will bring the USEPA document to the next meeting for reconsideration of the guideline value.

#82. Trihalomethanes

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that the THMs document be revised as part of the rolling revision process.

Expected end-product(s): Pending

Progress to date: The background document was approved by the GDWQ WG meeting (Geneva, 2004) and published as part of the first addendum. The GDWQ WG meeting (Geneva, 2005) agreed that a significant new study on bromodichloromethane (BDCM), with results expected by the end of 2005, should be assessed to determine whether there is a need to revisit the guideline. The GDWQ WG meeting (Geneva, 2006) agreed that BDCM needed to be put back on the agenda, and a briefing note will be prepared for the next meeting.

Plan of work for Chemical WG:

- 1) **Joe Cotruvo** reported that there is no evidence of carcinogenicity of BDCM in male and female rats in a recent NTP study. Therefore, the WG agreed to put BDCM back on the rolling revision, as the WHO guideline for BDCM is based on a carcinogenic end-point.
- 2) **Ambika Bathija** is to prepare a briefing note on BDCM for the next meeting (**Nancy Chu** may be asked to prepare it).

#84. Carbaryl

Background: Carbaryl has not been evaluated in the GDWQ. The GDWQ FTF meeting (Geneva, 2003) recommended that a background document on carbaryl be prepared based on the 2001 JMPR report. The JMPR report on carbaryl was completed in 2001.

Expected end-product(s): Short background document for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2004) and the GDWQ WG meeting (Geneva, 2005) agreed to review the occurrence data for carbaryl in order to determine whether it satisfies the criteria for inclusion and should be added to the rolling revision. The GDWQ WG meeting (Geneva, 2006) agreed that a short background document based on the 2001 JMPR report should be prepared for the second addendum.

Plan of work for Chemical WG:

- 1) **Vera Ngowi** and **John Fawell** will prepare a short background document based on the 2001 JMPR report. No guideline value will be derived (as there is no evidence to show that it occurs in water), but a health-based value will be provided if the toxicological data support it.
- 2) **Professor Magara** will provide a short section on analytical methods and analytical achievability.
- 3) **Marla Sheffer** is to prepare a short summary statement for carbaryl for the second addendum.
- 4) **Angelika Tritscher** noted that ADIs should be presented as a range (e.g. 0–0.3 mg/day). She also requested that the choice of allocation factor be clearly justified (10% when high exposure from food, otherwise 20% default).

#85. Cyindrospermopsin

Background: Cyindrospermopsin is a toxin produced by cyanobacteria, or blue-green algae, that has severe effects on the liver and other organs. The GDWQ FTF meeting (Geneva, 2003) recommended that a background document on cyindrospermopsin be prepared. Toxicity data for cyindrospermopsin are now available, but their adequacy for the preparation of a background document is uncertain.

Expected end-product(s): 1) Revised text on treatment for second addendum; 2) background document for publication in Fourth Edition or later

Progress to date: It was agreed that cyindrospermopsin meets the criteria for deciding whether to review a chemical according to the Policies and Procedures Manual. WHO/PCS was asked to evaluate the available literature on cyindrospermopsin and to report back to WG members as to whether data are sufficient to perform a toxicological assessment. The GDWQ WG meeting (Geneva, 2006) reiterated the need for WHO/PCS to evaluate the available toxicological literature.

Plan of work for Chemical WG:

- 1) The **PCS** Secretariat had been asked to do a literature search to see what information is available on cyindrospermopsin and to provide their recommendations to WG members as to whether there are sufficient data to conduct an assessment and, if so, whether this would be feasible through either JECFA or the CICAD process. PCS passed on this request to the International Agency for Research on Cancer (IARC), which decided that there were not enough data on carcinogenicity to classify cyindrospermopsin. No one looked at normal toxicological data.
- 2) The WG decided to request that **PCS** do what was asked of them last time — to provide advice on the toxicology. An international review needs to be generated before we can proceed further. **WSH** will formally request that PCS follow up on this (see Annex 10).

- 3) The text in the Guidelines needs to be updated for the second addendum. Cylindrospermopsin occurs dissolved in water, so it may need separate consideration in treatment. **Ingrid Chorus** will provide the necessary changes to the text.

#86. Dichlorvos

Background: Although the Berlin Coordinating Committee meeting (2000) suggested that dichlorvos is unlikely to occur in drinking-water and therefore should not be included in the GDWQ, the Chemical Aspects WG meeting in Tokyo (2002) recommended that it be considered as part of the rolling revision process based on the 1993 JMPR assessment.

Expected end-product(s): Short background document for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2004) and the GDWQ WG meeting (Geneva, 2005) agreed to review the occurrence data for dichlorvos in order to determine whether it satisfies the criteria for inclusion and should be added to the rolling revision. The GDWQ WG meeting (Geneva, 2006) agreed that a short background document on dichlorvos should be prepared for the second addendum.

Plan of work for Chemical WG:

- 1) JMPR will review dichlorvos in 2011.
- 2) **John Fawell** has prepared a short background document based on the 1993 JMPR report. It will be published as part of the second addendum.
- 3) **Professor Magara** will provide a short section on analytical methods and analytical achievability. **Marla Sheffer** is to prepare a short summary statement for dichlorvos for the second addendum.
- 4) Angelika Tritscher noted that ADIs should be presented as a range (e.g. 0–0.3 mg/day). She also requested that the choice of allocation factor be clearly justified (10% when high exposure from food, otherwise 20% default).

#87. Dicofol

Background: Although the Berlin Coordinating Committee meeting (2000) suggested that this chemical is unlikely to occur in drinking-water and therefore should not be included in the GDWQ, the Chemical Aspects WG meeting in Tokyo (2002) recommended that it be considered as part of the rolling revision process based on the 1992 JMPR assessment.

Expected end-product(s): Short background document for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to review the occurrence data for dicofol in order to determine whether it satisfies the criteria for inclusion and should be added to the rolling revision. The GDWQ WG meeting (Geneva, 2006) agreed that a short background document on dicofol should be prepared for the second addendum.

Plan of work for Chemical WG:

- 1) JMPR is to review dicofol in 2010.
- 2) **John Fawell** has prepared a short background document for the second addendum based on the 1992 JMPR assessment.
- 1) **Professor Magara** will provide a short section on analytical methods and analytical achievability.
- 2) **Marla Sheffer** is to prepare a short summary statement for dichlorvos for chapter 12 of the second addendum.
- 3) **Angelika Tritscher** noted that ADIs should be presented as a range (e.g. 0–0.3 mg/day). She also requested that the choice of allocation factor be clearly justified (10% when high exposure from food, otherwise 20% default).

#90. Nitrobenzene

Background: Nitrobenzene has not been evaluated in the GDWQ. The GDWQ FTF meeting (Geneva, 2003) recommended that a background document on nitrobenzene be prepared based on EHC 230, published in 2003. The coordinator of industrial sources has reviewed the EHC.

Expected end-product(s): Background document for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) decided that a background document cannot be prepared, as data are inadequate to determine a NOAEL for humans for the end-point of concern (methaemoglobinaemia) and there are no data on occurrence of nitrobenzene in drinking-water. The GDWQ WG meeting (Geneva, 2005) determined that nitrobenzene does occur in drinking-water, although at low levels. The GDWQ WG meeting (Geneva, 2006) agreed to prepare a background document on nitrobenzene for inclusion in the Fourth Edition.

Plan of work for Chemical WG:

- 1) **John Fawell** prepared a briefing note based on the EHC on nitrobenzene. There is little indication of nitrobenzene concentrations in surface water, groundwater or drinking-water, although older evidence suggests that it was only found occasionally and in trace concentrations. Nevertheless, there could be higher concentrations in industrial areas, even though recent exposure data are not available. A health-based value, as opposed to a formal guideline value, could be derived for guidance purposes. A short-term health-based value may also be required in the case of spills.
- 2) **Professor Magara** volunteered **Dr Hirose** to prepare a background document on nitrobenzene for the next meeting.

#91. Petroleum Products

Background: Petroleum oils have not been evaluated by the GDWQ. The GDWQ FTF (Geneva, 2003) recommended that a background document on petroleum oils be published in the first addendum to the Third Edition.

Expected end-product(s): Background document and summary statement for inclusion in the first addendum to the Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) has approved the background document on petroleum oils, as amended. The GDWQ WG meeting (Geneva, 2005) noted that the document has undergone peer and public domain review and will be published shortly. The GDWQ WG meeting (Geneva, 2006) noted that a slight revision to the document may be required for the second addendum, after which the item can be removed from the plan of work.

Plan of work for Chemical WG:

- 1) A late change made to the background document may require an additional change to the text. **Marla Sheffer** and **John Fawell** will liaise to solve this problem. *Once the issue has been resolved, this item can be removed from the plan of work.*

#92. Sodium Dichloroisocyanurate

Background: Sodium dichloroisocyanurate is used as a disinfectant in water. It dissociates in water to form cyanuric acid. The GDWQ FTF meeting (Geneva, 2003) recommended that sodium dichloroisocyanurate be referred to JECFA and added to the rolling revision of the GDWQ. A guideline value for use in emergency situations would reassure those who need to use the disinfectant.

Expected end-product(s): 1) A background document and summary statement on sodium dichloroisocyanurate for publication in second addendum; 2) revised text in sections 4.5 and 6.2 of GDWQ for inclusion in second addendum or Fourth Edition; 3) amendments to the supporting document *Water Treatment and Pathogen Control: Process Efficiency in Achieving Safe Drinking-water* (second edition, due in 2008)

Progress to date: JECFA's review was completed in June 2003, and a TDI has been derived from which a guideline value can be calculated. The GDWQ WG meeting (Geneva, 2005) agreed to a revised plan of work. The GDWQ WG meeting (Geneva, 2006) agreed that the background document could be sent out for review after internal peer review comments had been taken into consideration.

Plan of work for all WGs:

- 1) **John Fawell** and **Peter Jackson** prepared a background document based on the JECFA review. An 80% allocation factor was used. John is to check the ADI to see if it is 2 or 2.0. The guideline value will be rounded to 40. The background document will then be reviewed and included in the second addendum.
- 2) The analytical section needs to be added (**Professor Magara** and **John Fawell**). Test kits for cyanuric acid need to be included in this section, as they can be used in emergency situations and point of use devices.
- 3) The results of the review are to be reflected in the emergencies section of chapter 6 of the GDWQ. The text should explore monitoring implications, especially as application in small systems and emergencies increases demand for simple monitoring, whereas monitoring for chlorine residual is inappropriate. In addition, text needs to be added in section 4.5 on Management of community and household water supplies. **John Fawell** is to prepare this additional text for the second addendum (or Fourth Edition?).
- 4) In discussions, it was noted that this issue is of concern because industry may see the addition of sodium isocyanurate to the GDWQ as a green light for its use as a drinking-water disinfectant (whereas it should be used in emergencies primarily). The WGs do not

want manufacturers to go around saying that WHO has endorsed its use as an overall disinfectant for potential use in small supplies, private supplies and household systems.

- 5) The main concern relates to cyanuric acid buildup, which can prevent chlorine efficacy in standing systems. In addition, environmental contamination from the buildup of cyanuric acid is possible. **Mark Sobsey** is aware of a peer-reviewed paper on biodegradation of the compound, which he will forward to **John Fawell**. The paper suggests that cyanuric acid may be more easily degraded than previously thought. It was agreed that a brief sentence on environmental concerns should be added, as well as information on monitoring using test kits.
- 6) As there is special interest in this disinfectant's use, particularly for small communities and in emergencies, **Jamie Bartram** suggested that manufacturers that have contacted WHO for information be briefed with a briefing note summarizing the conclusions at this meeting. RegNet can be used to alert regulators.
- 7) **John Fawell** and **Peter Jackson** will revise the document in light of discussions.
- 8) A summary statement will be prepared for the second addendum (**Marla Sheffer**).

#93. Temephos

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that temephos be referred to JMPR with high priority (as it is a WHO/PES pesticide applied to water for public health purposes) and that a background document be prepared as part of the rolling revision.

Expected end-product(s): Background document on temephos, publication date unknown

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to add temephos to the rolling revision and has decided on a plan of work. No progress had been made on this item by the time of the GDWQ WG meeting (Geneva, 2005). The GDWQ WG meeting (Geneva, 2006) agreed to prepare a background document following discussions with the WHO Vector Ecology and Management Programme.

Plan of work for Chemical WG:

- 1) Temephos has been added to the 2006 JMPR agenda as a result of a request by the DWQC. Data have been received from the manufacturer, and a working paper is in preparation.
- 2) A background document will be prepared by **Vera Ngowi** and **John Fawell** once the JMPR evaluation has been completed.

#96. Risk Assessment of Pesticide Residues in Water and Food

Background: At a Symposium on Risk Assessment of Pesticide Residues in Water and Food, held in New Delhi in October 2003, several issues were raised that do not appear to be fully covered in the GDWQ. These included effects on the fetus, uncertainty factors of 10, and issues with breakdown products of pesticides. The meeting was asked to review a one-page summary elaborating on these issues.

Expected end-product(s): None

Progress to date: This item was deferred because the one-page summary was not available. The GDWQ WG meeting (Geneva, 2006) agreed to delete this item from the plan of work.

Plan of work for Chemical WG:

- 1) The conclusions and recommendations from the Symposium on Risk Assessment of Pesticide Residues in Water and Food, held in New Delhi on 28–29 October 2003, were presented to the WG for information purposes. *This item can be deleted from the plan of work.*

#98. Pesticides Assessed by JMPR

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that several pesticides be referred to JMPR with varying levels of priority. These were pentachlorophenol (medium), alachlor (high), ametryn (high), chlorotoluron (low), cyanazine (low), diazinon (low), dichlobenil (medium), 1,2-dichloropropane (low), 1,3-dichloropropene (low), diuron (medium), MCPA (low), methoxychlor (high), metolachlor (low), molinate (high), pendimethalin (no priority set), simazine (high), dichlorprop (low), mecoprop (medium) and 2,4,5-T (medium).

Expected end-product(s): Revised background documents on those pesticides that have been recently evaluated by JMPR

Progress to date: The list of JMPR reports (published and in progress) is on the Internet. The *Inventory of IPCS and other WHO pesticide evaluations and summary of toxicological evaluations performed by the Joint Meeting on Pesticide Residues (JMPR): Evaluations through 2002* is also available in hard copy and electronically at <http://www.who.int/pcs/>. The GDWQ WG meeting (Geneva, 2005) decided to update only those background documents for pesticides in the above list with recent JMPR evaluations. The GDWQ WG meeting (Geneva, 2006) reiterated the need for occurrence data before requesting JMPR to evaluate a pesticide and asked that a brief justification be prepared for asking JMPR to evaluate simazine in 2008.

Plan of work for Chemical WG:

- 1) Simazine occurs in drinking-water: **John Fawell** and **Vera Ngowi** are to provide a brief half-page clear justification for asking JMPR to evaluate simazine in 2008 (occurrence in drinking-water for example). Syngenta is the manufacturer of both simazine and atrazine. It has been very cooperative and has asked the WG what sorts of data are required.
- 2) It was reiterated that unless there is evidence of occurrence, we do not ask JMPR to evaluate a pesticide.
- 3) **Vera Ngowi** is to collect occurrence data on ametryn and other high-priority chemicals listed above for the next meeting.
- 4) **Angelika Tritscher** provided copies of the JMPR inventory through to 2005 for WG members.
- 5) **Professor Magara** provided a “wish list” of pesticides (herbicides, fungicides, insecticides) used in Asia, together with their maximum concentrations and detection frequency, for future consideration by the WG. This list should be discussed at the next WG meeting.

#99. Methodology for Extrapolating to GVs from Database on Sensitive Biochemical End-points

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that guidance on methodology for extrapolating to guideline values from databases on sensitive biochemical

end-points should be referred to WHO/PCS, as it applies to a broader range of issues than just drinking-water. In other words, it is important to decide what assessment factors should be applied to take these sensitive biochemical end-points into consideration and what weight should be given to those biochemical end-points whose clinical relevance to human health is uncertain, some of which are used to derive a NOAEL.

Expected end-product(s): Additional text to be inserted in Policies and Procedures Manual

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to consult with PCS on a case-by-case basis when these issues arise. The GDWQ WG meeting (Geneva, 2005) agreed to drop this item from the plan of work once the additional text had been prepared for the Policies and Procedures Manual. The GDWQ WG meeting (Geneva, 2006) approved the text for Policies and Procedures Manual and agreed that the agenda item can be removed from the plan of work.

Plan of work for Chemical WG:

- 1) The WG will consult with PCS on a case-by-case basis. This needs to be reflected in the Policies and Procedures Manual. **John Fawell** has prepared the appropriate text for the Manual (it will be moved under Uncertainty factors).
- 2) *This agenda item can be removed from the plan of work.*

#100. Exposure Data

Background: The GDWQ FTF meeting (Geneva, 2003) recommended that WHO give consideration to ways in which better exposure (occurrence) data can be obtained (e.g. from governmental and other non-public files) and referred this issue to the rolling revision. The Chemical Aspects WG needs to discuss ways in which WHO can obtain better exposure data.

Expected end-product(s): Addition of text to Policies and Procedures Manual

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed on a plan of work, which was revised by the GDWQ WG meeting (Geneva, 2005). The GDWQ WG meeting (Geneva, 2006) agreed that once the Policies and Procedures Manual had been revised, this item could be deleted from the plan of work.

Plan of work for all WGs:

- 1) Requests have been put out for exposure data, but it is too early to determine how useful it will be. Requests are put out on a case-by-case basis.
- 2) Text will be added to the Policies and Procedures Manual by **John Fawell** to explain that we do this as a means of eliciting occurrence data. Once this has been done, *this item can be deleted from the plan of work.*

#101. Radon

Background: Radon may be present in indoor air, as it may enter through the foundation or through the water supply drawn from some groundwaters. It can then be taken up by both ingestion through drinking-water and inhalation of indoor air. The GDWQ FTF meeting (Geneva, 2003) recommended that the WHO Radiation and Environmental Health Programme prepare guidance on the inhalation of radon from drinking-water sources. The

WHO Radiation and Environmental Health Programme has proposed a special project on radon in drinking-water that may impact on the guideline.

Expected end-product(s): 1) Additional paragraphs on treatment of radon and mitigation measures, for second addendum; 2) updated guidance in section 9.5 of GDWQ on radon risk assessment and management, for inclusion in Fourth Edition; 3) updated section 9.5 for Fourth Edition

Progress to date: The WHO Radiation and Environmental Health Programme is about to embark on a project in collaboration with the USEPA, Health Canada and others. The GDWQ WG meeting (Geneva, 2004) recommended that the study focus on exposures in developing countries with different indoor inhalation conditions due to less use of showers and more highly ventilated spaces, since most water inhalation calculations have been done under North American-type conditions. No progress had been made on this by the time of the 2005 GDWQ WG meeting. The GDWQ WG meeting (Geneva, 2006) met with representatives of the Radiation and Environmental Health Programme and decided on a path forward for both the second addendum and Fourth Edition.

Plan of work for Chemical WG and Radiation Programme:

- 1) The WG decided not to add the single sentence on radon treatment and instead to add a two-paragraph section in section 9.5 (page 207) of the GDWQ (see below; this will possibly be incorporated with new text on mitigation measures).
- 2) **Mike Repacholi** informed the group that intake through drinking-water is a relatively small percentage of total intake; in cases where radon is in drinking-water, this suggests a geological source, so that there are probably high levels in basement air. The Radiation and Environmental Health Programme is doing a global burden of disease assessment of radon and will be able to update section 9.5.2 in about a year or so. A new section (9.5.3 or 9.5.4) on mitigation measures in groundwater will be prepared, taking into account **Peter Jackson's** text on treatment. This will be included in the second addendum.
- 3) The Radiation and Environmental Health Programme will update the entire radon section for the Fourth Edition based on the results of their own study, as well as many other studies that are to be published in the next year or so (UNSCEAR, ICRP, etc.).
- 4) For Peter Jackson's text: add (see section 9.5.4) at the end of the sentence in 9.5.3 (treatment of the water source...), and Peter's text goes in next (new) section. (Note, however, that this may be revised by Mike Repacholi's group.)

#103. NDMA

Background: *N*-Nitrosodimethylamine, or NDMA, can be formed during the treatment of drinking-water. Concentrations of NDMA in drinking-water above 40 ng/litre have been measured, although lower concentrations are more common. NDMA is clearly carcinogenic, with a strong likelihood that the mode of action for the induction of tumours involves direct interaction with genetic material.

Expected end-product(s): 1) Background document and summary statement, for publication in the second addendum to the Third Edition; 2) addition of NDMA to Table 8.25, for second addendum

Progress to date: As NDMA clearly satisfies one of the criteria for inclusion in the GDWQ as outlined in the Policies and Procedures Manual ("evidence for occurrence in drinking-

water, combined with evidence of actual or potential toxicity”), the GDWQ WQ meeting (Geneva, 2004) agreed that NDMA should be added to the rolling revision for consideration at the next meeting. The GDWQ WG meeting (Geneva, 2005) agreed to prepare a background document for publication in the second addendum. The GDWQ WG meeting (Geneva, 2006) was unable to decide on the approach to use in the guideline value derivation for NDMA and requested that the document be sent for review with a specific question regarding the validity of the use of an animal-to-human adjustment factor. The background document will be revisited as soon as this guidance becomes available.

Plan of work for Chemical WG:

- 1) Table 8.25 of Volume 1 will need to be amended to add NDMA (and source of table will be changed from “from IPCS” to “based on IPCS”), for the second addendum.
- 2) Health Canada has prepared a background document. Two options were proposed. The only difference between the two options was the use of an animal-to-human body weight adjustment factor. The biological basis for this adjustment factor is not clear to the group, but it is a new approach. This method is based on empirical observations that metabolism, clearance and cancer potencies scale across species with the ratio of body weights raised to the $\frac{1}{4}$ power.
- 3) PCS offered no specific guidance on the use of scaling factors under these circumstances. Nevertheless, the WG would like to know WHO’s position on whether allometric scaling factors should be used and under what circumstances, as their use needs to be scientifically justifiable (i.e. are there clear metabolic differences between species?). The WG is requesting advice from PCS in general and in this instance. **Lesley Onyon** is to ask PCS experts (Andy Renwick, perhaps Bette Meek) for their opinion. She may also raise the issue at the Risk Assessment Steering Group meeting next month.
- 4) **Dr Jim Fitzgerald** has offered to review the document; **Michèle Giddings** will send him the document with the two options outlined and ask for his opinion.
- 5) **Michèle Giddings** will obtain (from Mike Walker at Health Canada) the USEPA (2002) reference that was cited in reference to the use of this allocation factor so that it can be carefully reviewed for a scientific justification of the use of the factor. **Ambika Bathija** may be able to personally contact the author of the document once he or she has been identified.
- 6) The background document will be revisited by WG members as soon as the above guidance becomes available.

#104. Pirimiphos-methyl

Background: WHO Headquarters has received a request to consider pirimiphos-methyl as a WHO/PES larvicide for application to drinking-water containers in order to control the breeding of disease vectors.

Expected end-product(s): Background document and summary statement, based on 1992 JMPR report, for inclusion in the second addendum to Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to add pirimiphos-methyl to the rolling revision and adopted a plan of work. The GDWQ WG meeting (Geneva, 2005) agreed to initiate development of a background document. The GDWQ WG meeting (Geneva, 2006) agreed that the background document should be revised to take into consideration discussions with the WHO Vector Ecology and Management Programme.

Plan of work for Micro and Chemical WGs:

- 1) **John Fawell** prepared a background document on pirimiphos-methyl, based on the 1992 JMPR report. It will be revised to take into consideration discussions with the WHO Vector Ecology and Management Programme.
- 2) **Professor Magara** is to provide a section on analytical methods and analytical achievability.
- 3) It was noted that pirimiphos-methyl is on the 2006 JMPR agenda for an acute toxicity evaluation (but it was not added to the agenda at this group's request). JMPR will consider drinking-water in their discussions.
- 4) It was noted that WHO recommendations are for the technical material, not for formulations, and that it is difficult to specify behaviour of use in detail. It was suggested that the WG should develop a guideline based on the maximum dose of pesticide as a worst-case scenario and ask national authorities to ensure that the level in drinking-water is not higher than that level (see further discussions on this under agenda item #52).
- 5) This WG should tell the WHO/PES group if pirimiphos-methyl should be used or not. Pirimiphos-methyl is an organophosphate; as people may be exposed to other organophosphates, pirimiphos-methyl is probably not the safest product to use. WHO should provide this information to national authorities (this is where the ranking of pesticides, which WHO/PES suggested this WG should do, becomes useful). If there is potential for exposure to other organophosphates from other sources, then it should be recommended that pirimiphos-methyl shouldn't be used under these circumstances. This would probably encourage companies to start producing slow-release, effective, low-risk formulations.
- 6) One manufacturer has provided WHO/PES with the full data package on its own product, including toxicological data that have not been peer reviewed.

#105. *Blastocystis*

Background: The GDWQ WG meeting (Geneva, 2004) identified *Blastocystis* as an important omission from chapter 11 of the Third Edition of the GDWQ.

Expected end-product(s): Fact sheet for inclusion in chapter 11 of GDWQ, second addendum to Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to add *Blastocystis* to the rolling revision and agreed on a plan of work. A fact sheet was completed and endorsed by the GDWQ WG meeting (Geneva, 2006) for public review, leading to its inclusion in the second addendum.

Plan of work for Micro WG:

- 1) The fact sheet has been completed and reviewed by WG members and will be posted on the web for public review.

#106. *Leptospira*

Background: The GDWQ WG meeting (Geneva, 2004) identified *Leptospira* as an important omission from chapter 11 of the Third Edition of the GDWQ.

Expected end-product(s): Fact sheet for inclusion in chapter 11 of GDWQ, second addendum to Third Edition

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to add *Leptospira* to the rolling revision and agreed on a plan of work. A fact sheet was completed and endorsed by the GDWQ WG meeting (Geneva, 2006) for public review, leading to its inclusion in the second addendum.

Plan of work for Micro WG:

- 1) The fact sheet has been completed and reviewed by WG members and will be posted on the web for public review.

#109. Harmonization of Use of Term “Risk” and “Risk Levels”

Background: The GDWQ WG meeting (Geneva, 2004) noted that the use of the terms “risk” (which means probability of an adverse effect) and “risk levels” needs to be carefully considered and harmonized in regard to microbial, chemical and radiological risks. In particular, the difference between “best estimates” of risk as opposed to “maximum potential” risks requires clarification.

Expected end-product(s): Revised text in chapter 8 of GDWQ (for second addendum) and throughout GDWQ (for Fourth Edition) and in Policies and Procedures Manual

Progress to date: It was agreed in principle that the text for the GDWQ chapters on chemicals and radiological hazards should be harmonized to state that the risk values are not intended to indicate actual cancer cases to be expected but rather are a metric for comparing relative risks among chemicals. It was also agreed that the term “risk” should be used to refer to the quantitative probability of an adverse effect occurring, rather than in the more general, qualitative sense, throughout the Fourth Edition, and that the term “level of risk” should no longer be used.

Plan of work for Chemical and Micro WGs and Radiation Programme:

- 1) A sentence will be added to section 8.2.4 of the GDWQ (and to the Policies and Procedures Manual) to the effect that the actual risk is likely to be lower than the quantitative probability and may even be as low as zero. The text has been prepared and adopted by the WGs for the second addendum.
- 2) The Fourth Edition will be edited to ensure consistency in the use of the term “risk” and to edit out use of the term “risk level” (as “level” is redundant).

#110. Linearized Multistage Model and Dose–Response Modelling

Background: The GDWQ WG meeting (Geneva, 2004) expressed concern that different guideline values for chemicals are being derived based on the same study because of the use of different assumptions and inputs for the linearized multistage model. In a related matter, CAC held an expert consultation in September 2004 on dose–response modelling in general, to determine if there is any scientific consensus on the use of the models for chemicals.

Expected end-product: New text for Policies and Procedures Manual

Progress to date: The GDWQ WG meeting (Geneva, 2004) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2005) revised the plan of work. The GDWQ WG meeting (Geneva, 2006) agreed to revised text for the Policies and Procedures Manual and decided

that a review of the IPCS document on dose–response characterization, when finalized, should be carried out to see if it would necessitate any changes to this text. It was agreed that this item could then be removed from the plan of work.

Plan of work for Chemical WG:

- 1) **John Fawell** has revised the text in section G4 of the Policies and Procedures Manual to reflect comments at the WG meeting.
- 2) The IPCS document on dose–response characterization should be looked at when finalized to see if it would necessitate any changes to this section. *Once this is done and any necessary revisions to the Policies and Procedures Manual have been made, this item can be removed from the plan of work.*

#114. Arsenic Monograph

Background: Arsenic in drinking-water is of significant concern in several geographic areas and is recognized as a priority issue for health.

Expected end-product(s): Management guidance document on arsenic

Progress to date: The 1998 WG meeting adopted the target of production of a monograph on arsenic in drinking-water as a high priority. Following the WG meeting, the UN Administrative Committee on Co-ordination (the body responsible for coordination among UN agencies) subcommittee on water resources adopted a closely related objective. Efforts have been made to merge these two initiatives and ensure a single multi-agency product. At the Chemical Aspects WG meeting in Tokyo (2002), it was noted that the draft monograph was available on the web site and that there were unresolved issues regarding the analytical methodology for arsenic. The preparation of the monograph is progressing. The monograph was not discussed at the GDWQ WG meeting (Geneva, 2004). The monograph, which is about 800 pages in length, is now ready for editing and should be finalized later this year. The GDWQ WG meeting (Geneva, 2006) agreed that the monograph should be completed and that information on arsenic should be updated annually on the web.

Plan of work for Chemical WG:

- 1) It was agreed by all WGs that this item should no longer be deleted from the plan of work. **Guy Howard** suggested and the group agreed that this monograph should be completed. The end product will be completed by August 2006 (will be distributed by CD and published on the WSH web site). Furthermore, a small expert group will be established that reviews new available evidence on a yearly basis and updates the web/CD text, as the topic is moving so quickly (the areas of toxicology, epidemiology and hydrogeology are rapidly changing). **Guy** is coordinating the review group.

#117. Various Pesticides with Requests for Guideline Values

Background: WHO has received a communication from the India Bureau of Standards indicating interest in establishing limits for a number of pesticides not currently addressed in the GDWQ.

Expected end-products: Pending

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to request occurrence data on those pesticides for which no guidelines have been derived. The GDWQ WG meeting (Geneva, 2006) reiterated the need for occurrence data and asked that WSH request it from the initiating government.

Plan of work for Chemical WG:

- 1) The WG requests **WSH** to request occurrence data from the initiating government on those pesticides on this list for which there are currently no guidelines. Those pesticides are alpha HCH, beta HCH, delta HCH, alpha endosulfan, beta endosulfan, endosulfan sulfate, monocrotophos, ethion, phorate and butachlor.
- 2) If occurrence data are provided, **Vera Ngowi** and **John Fawell** will determine whether JMPR has evaluated the pesticide of interest. If a JMPR evaluation is available, **Vera** will prepare a background document based on the JMPR evaluation.

#119. Beryllium

Background: WHO has received correspondence noting that although the GDWQ state that beryllium is unlikely to be present in drinking-water, over the past five years in Europe, geological studies show concentrations ranging from <0.005 to 2.7 µg/litre (median 0.01 µg/litre) across Europe.

Expected end-products: Background document, possibly for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. The GDWQ WG meeting (Geneva, 2006) expressed the need for occurrence data before a background document can be prepared.

Plan of work for Chemical WG:

- 1) **John Fawell**'s briefing note states that the correspondence mentioned above cannot be located and that unless data are forthcoming to show that beryllium is present at significant concentrations in at least some drinking-water supplies, we will not set a formal guideline value.
- 2) **Ambika Bathija** will ask **Joyce Donahue** to send compliance monitoring data from 16 states for beryllium to John.
- 3) A CICAD has been prepared on beryllium. A guideline value of about 12 µg/l could be derived based on this CICAD.
- 4) **WSH** is asked to identify the source of the request so that it can be followed up on.

#120. Certification of Compliance with GDWQ

Background: On several occasions, WHO has been approached regarding the correct procedure for certification of a water or water system as being compliant with the GDWQ. EMRO is one region that has requested guidance in this area. Advice from WHO/Legal has been sought.

Expected end-products: Additional text in Fourth Edition (section 1.2.9, Certification agencies)

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work, and the GDWQ WG meeting (Geneva, 2006) revised the plan of work.

Plan of work for all WGs:

- 1) **Jamie Bartram** informed the WGs that **WSH** needs 3–4 months of staff time to complete this plan of work. The first issue will be developing the criteria for certification of the water supplier, and the second step will be a meeting with WHO legal staff to review the criteria and implications for WHO. A presentation of the results will be made to the next WG meeting. The aim is to have appropriate text developed for the Fourth Edition.
- 2) WHO should stick to certifying things that are unique to the Guidelines (e.g. WSPs), not areas that are already dealt with by national bodies.
- 3) **Guy Howard** volunteered to coordinate the process of establishing a set of minimum criteria for WSP certification, liaising with those WG members identified at the previous meeting (**Shoichi Kunikane, Joe Cotruvo, John Fawell, Peter Jackson, Yasumoto Magara, Michèle Giddings, Feroze Ahmed**). He will also contact **Annette Davison** and **Dan Deere**.
- 4) **Shoichi Kunikane** has prepared text on certification for laboratories, which was provided to WG members.

#121. Novaluron

Background: Novaluron, an insect growth regulator, has been evaluated by WHO/PES for use as a mosquito larvicide. In addition, the WHO specifications for novaluron TC and EC, for quality control and international trade, have been published and are available on the WHO home page on the Internet. Noting the potential use of the product in potable water for mosquito larviciding, WHO/PES recommends the assessment of the human toxicity and ecotoxicity of the compound and the establishment of a drinking-water quality guideline. WHO/PES strongly recommends that WHO recommendations and water quality guidelines for use of larvicides in potable water be linked to WHO specifications.

Expected end-products: Background document on novaluron, for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to formally add novaluron to the rolling revision. The GDWQ WG meeting (Geneva, 2006) agreed to revise the draft background document following discussions with the WHO Vector Ecology and Management Programme.

Plan of work for Chemical WG:

- 1) **John Fawell** prepared a background document on novaluron based on the JMPR draft assessment (for restricted circulation only). He will revise the document based on discussions with the WHO Vector Ecology and Management Programme.
- 2) **Professor Magara** is to provide a section on analytical methods and analytical achievability.
- 3) **Marla Sheffer** will prepare a summary statement for chapter 12 of the second addendum.
- 4) The background document and summary statement will be posted for peer and public review.

#122. Bonn Charter and the GDWQ

Background: Tom Williams of IWA gave a presentation to the GDWQ WG meeting (Geneva, 2005) on the Bonn Charter for Safe Drinking-Water, which is relevant to organized distribution systems only (not community and household supplies). IWA (whose members

work in the water section) and WHO (public health promotion) are in partnership to promote the GDWQ (for all three types of systems). There will be a workshop held in Beijing in 2006. There is a series of publications published by IWA on behalf of WHO, which will be consolidated. A web site will be set up to disseminate the Bonn Charter worldwide.

Expected end-products: One-page text explaining relationship between Bonn Charter and the GDWQ

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. IWA and WHO prepared a pamphlet in 2005 that articulates the relationship between the Charter and the GDWQ, and involvement of WGs in the development of the “toolbox” has been achieved through IWA’s participation in WSPortal. The GDWQ WG meeting (Geneva, 2006) agreed to delete the agenda item from the rolling revision.

Plan of work for all WGs:

- 1) **Tom Williams** informed the WGs that the pamphlet explaining the relationship between the Bonn Charter and the GDWQ has been prepared and provided a copy to all WG members. Reaction to it has been positive.
- 2) Involvement of WGs in the development of the “toolbox” has been achieved through IWA’s participation in WSPortal. IWA Headquarters and members will continue to work with WHO in the development of tools (i.e. publications).
- 3) Other work includes the development of proposals for pilot projects (ACP region — African, Caribbean and Pacific countries — for implementation of WSPs and framework).
- 4) The pilot projects in the above item will be reported on under agenda item #3 (Use of GDWQ), and *this item can be removed from the rolling revision.*

#123. Guidance on Developing National Standards from GDWQ

Background: WHO has received several requests from the WHO regions (e.g. WPRO, EMRO) for guidance concerning how to develop national standards from the Guidelines. In response to this request, a document had been prepared by CEPIS (Guidelines for Drinking Water Quality Standards in Development Countries) in 2002 with a focus on Latin America and based on the Second Edition of the GDWQ.

Expected end-products: 1) Revised text in chapter 1 of the GDWQ for the Fourth Edition; 2) guidance document on how to develop national standards from GDWQ (publication date unknown)

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work, and a path forward was agreed by the GDWQ WG meeting (Geneva, 2006).

Plan of work for all WGs:

- 1) The need for guidance on developing national standards from the Guidelines was reiterated in plenary discussions on the “flavour” of the Fourth Edition. It was decided that text informing various user groups how to use the Guidelines would be inserted into the introductory chapter of the Guidelines.
- 2) There was no further discussion on the need for a guidance document on how to develop national standards from the GDWQ. This topic will be raised again at the next meeting.

#124. Network of Drinking-water Regulators

Background: WHO has been asked to develop a network of drinking-water regulators. Regulators want the ability to exchange their experiences within the regulatory community and the ability to have frank discussions with other regulators about how to respond quickly to emerging issues that demand a regulatory response.

Expected end-products: Unknown

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to a plan of work. The GDWQ WG meeting (Geneva, 2006) was updated on progress made in this area.

Plan of work for all WGs:

- 1) **Jackie Sims** reported to the WGs on the status of the network. There is general agreement that the network needs to go ahead. Preparations are currently under way for the first meeting, to be held in February 2007. The focus will be clearly on drinking-water regulators; other aspects of regulation, such as sanitation, will be considered at a later stage. Seed funding has been received from the United Kingdom and Sweden to set up preparatory activities and the first meeting. At a preliminary planning meeting, to be held probably at the end of August, the agenda for the first meeting will be set. The aim is primarily to locate and profile drinking-water regulators globally, to identify gaps in their capacity to deliver their function and to establish a series of case-studies on good/bad practice. The programme of work and progress on the network will be reported to the WGs at the next meeting.
- 2) Jackie Sims is finding it difficult to locate and contact drinking-water regulators in developing countries. Regional Offices have not provided constructive help in this regard. WG members are asked to inform her if they know of any drinking-water regulators in these areas. It was pointed out that in developing countries, there is more interest in establishing water supply than in regulation.
- 3) It was suggested that the network be used for outreach to potential regulators in developing countries; although regulators may not exist in developing countries, there may be interest in establishing them there.
- 4) It was emphasized that all activities have to do with water quality, not with water supply.
- 5) This network is in line with the Millennium Development Goals, which call for better water policy and regulation.

#125. Nematodes

Background: Several WHO regions (e.g. EMRO) have inquired about nematodes in drinking-water. The Third Edition does not specifically deal with nematodes in any detail. The meeting was asked to consider this issue.

Expected end-products: Fact sheet on nematodes, for inclusion in the second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. The GDWQ WG meeting (Geneva, 2006) agreed that the fact sheet should be posted for review purposes once internal review comments had been taken into consideration.

Plan of work for Micro WG:

- 1) **Takuro Endo** prepared a fact sheet on nematodes for inclusion in chapter 11 of the GDWQ.
- 2) The WG is to provide comments to Takuro Endo by the end of July 2006.
- 3) The revised fact sheet will be posted for peer and public review.

#127. Bromate in Bottled Water

Background: EMRO sent an inquiry in respect to guidance for high levels of bromate found in some bottled waters and waters disinfected with hypochlorite produced by electrolysis of seawater and brines.

Expected end-products: Revised text in chapter 6 of GDWQ, second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. The GDWQ WG meeting (Geneva, 2006) approved the revised text for the second addendum and agreed to remove this item from the plan of work once the second addendum is published.

Plan of work for Chemical WG:

- 1) The revised text will be incorporated in the second addendum. Once the second addendum has been published, *this agenda item can be removed from the plan of work.*

#128. Potassium

Background: Potassium water softeners are being used as an alternative to sodium water softeners, as the perception is that potassium is better for health. However, some people with specific diseases or on certain medications are susceptible to hyperkalaemia, and some mention of this needs to be made. There is currently no background document or summary statement for potassium in the GDWQ.

Expected end-products: New background document and summary statement on potassium, for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. A briefing note on potassium was prepared for discussion by the GDWQ WG meeting (Geneva, 2006). It was agreed that a background document and summary statement should be prepared for publication in the second addendum.

Plan of work for Chemical and P&C WGs:

- 1) **John Fawell** prepared a discussion paper on potassium, based on Health Canada's draft supporting document.
- 2) It was agreed that **John Fawell** will draft a new short background document on potassium, with a brief summary of available data and with no derivation of a health-based value. This background document will be reviewed by both the Chemical and P&C WGs. The **WHO nutrition group** could also be asked to review the document, as potassium is an essential element. John needs input from **Joe Cotruvo** on concentrations in relation to hardness, etc. The drafting is to be done by September, at which time it will be circulated to the WGs for review.
- 3) **Marla Sheffer** will draft a summary statement based on the background document once it is drafted. Both will need to be posted for peer and public review. Both are intended for publication in the second addendum.

- 4) The ETV (now called Technology Performance Evaluation, or TPE) project (for the Fourth Edition), which will deal with POU treatment devices, will include comments on potassium in water softeners, etc. (see agenda item #36).

#129. Boil Water Instructions

Background: WPRO expressed concern about inconsistent instructions regarding boil water instructions from various agencies (e.g. USEPA advises a one-minute rolling boil and three minutes at high altitudes) and requested that WHO prepare a separate fact sheet with WHO guidance on this issue.

Expected end-products: 1) Additional text on boiling in Volume 1 of the GDWQ for the first addendum; 2) fact sheet providing guidance on boiling water

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. The GDWQ WG meeting (Geneva, 2006) agreed that a fact sheet providing guidance on boiling should be prepared.

Plan of work for Micro and P&C WGs:

- 1) **Mark Sobsey** communicated with the United States government, indicating that there are many different guidance values for boiling times in the USA. The WG recommended that Mark Sobsey be the liaison for WHO on this matter.
- 2) The WG recommends that **Mark Sobsey** and **David Cunliffe** develop a fact sheet on guidance on boiling, which includes the data on responses of waterborne pathogens to heat exposure in water, based on a compilation of the literature. The target date for compiled data is the end of September 2006. The draft fact sheet will follow shortly thereafter.

#130. Pyriproxyfen

Background: The GDWQ WG meeting (Geneva, 2005) agreed that allocation factors of 20% rather than 10% should be used for WHO/PES pesticides, which are deliberately added to water for public health purposes. Pyriproxyfen is the only WHO/PES pesticide for which there is currently a guideline value and which uses an allocation factor of 10%.

Expected end-products: Revised background document and summary statement, for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. The GDWQ WG meeting (Geneva, 2006) agreed to revise the draft background document following discussions with the WHO Vector Ecology and Management Programme.

Plan of work for Chemical WG:

- 1) **John Fawell** will revise the background document on pyriproxyfen based on discussions with the WHO Vector Ecology and Management Programme.
- 2) **Peter Jackson** has prepared a treatment section, but he really didn't find any data on this pesticide (not included in hard copy provided yet). Instead, he provided very general information. It was questioned whether it was appropriate to provide treatment for a WHO/PES pesticide that is deliberately added to water for public health purposes. A section on use for vector control in drinking-water sources also needs to be prepared.

- 3) It was agreed that two guideline values are needed, one for usage as public health purposes and one for pesticide use in agriculture.

#131. Nitrate/Nitrite

Background: The GDWQ WG meeting (Geneva, 2005) identified the need for a fact sheet or expanded summary statement with additional information on management issues related to nitrate/nitrite.

Expected end-product(s): 1) Expanded summary statement for Volume 1 for second addendum of Third Edition; 2) revised background document for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to formally place nitrate/nitrite on the rolling revision and developed a plan of work. The GDWQ WG meeting (Geneva, 2006) approved the expanded summary statement on nitrate for the second addendum.

Plan of work for Chemical WG:

- 1) **John Fawell** prepared an expanded summary statement on nitrate. The WG approved the expanded summary statement. It includes information that is not in the background document. It doesn't need peer review because the background document and JECFA document on which the additional information in the summary statement is based have both been reviewed.
- 2) **John Fawell** is to check to ensure that the USEPA's request for more clarity on the statements given on p. 417 with respect to (a) the sum of ratios of concentrations and (b) chronic exposure of nitrate are addressed in the expanded summary statement.
- 3) **Marla Sheffer** will merge the expanded summary statement with the currently existing summary statement, with **John Fawell**'s assistance.
- 4) New information from the JECFA document (e.g. on nitrous oxide) needs to be incorporated in the background document for the Fourth Edition. The background document is to be revised by **John Fawell** for the Fourth Edition.
- 5) **WSH** is to add a comment on the rolling revision page for nitrate that the background document is currently under revision.

#132. Small Community Systems

Background: There was a meeting in Iceland in January 2005 on Small Community Systems, and there will be a follow-up meeting in Alice Springs, Australia, in July 2005. The first meeting corroborated the need for work on small community supplies and to develop an international network for sharing information on small systems on a global basis. Tools and approaches to be discussed in more depth at the Australia meeting include a decision-making tool that Australia has been working on, criteria for pilot studies, management structures, models of community engagement, identifying suitable test kits and the need for a generic framework for addressing small supplies within the overall water safety framework. After the Australia meeting, which will involve SEARO and WPRO, it is proposed to go to other regions (perhaps Marrakech and Peru). Funding is an issue.

Expected end-product(s): Pending

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to follow progress on the issue, and the GDWQ WG meeting (Geneva, 2006) received an update report.

Plan of work for all WGs:

- 1) **Jackie Sims** reported that there have been two full meetings on small community water supply management. She provided WG members with meeting reports from the Meeting on Small Community Water Supply Management in Reykjavik in January 2005 and the International Meeting on the Management of Water Quality in Rural and Remote Communities in Alice Springs in July 2005. The next meeting will be held in Canada (September 2006).
- 2) The output of these meetings is related to updating Volume 3 of the GDWQ. In Alice Springs, six priority tasks were established: 1) development of a pilot questionnaire to help identify existing management practices (management structures, delivery systems, capacity building), 2) development of generic tools to support implementation of WSPs, 3) development of a database of health evidence to support decision-making on community water supplies, 4) development of surveillance and verification tools and test kits, 5) set of standardized definitions and terminology, and 6) establishment of an international collaborative network.
- 3) Health Canada has funded this task to the end of 2009. New Zealand may also be interested in providing funding.
- 4) There are three work packages: 1) cost-effectiveness/cost-benefit analysis, which will help in the development of the health evidence database; 2) communication and reporting requirements; and 3) recommending optimum management practices for community supplies.
- 5) The collaborative workspace has been established; work has begun on developing standardized terms and definitions (lexicon); and work has started through the EU proposal on developing robust water quality test kits for use in small community supplies (for the field and especially for emergencies).
- 6) **David Cunliffe** reported that the workplan leading into the next meeting in Canada involves a call for existing WSPs, assessment tools used in various countries and a review of tools, so that generic issues common to groups of countries can be raised. The review is to be completed by the end of this month; the next task is to attempt to identify common issues and circulate to the group for comment. The aim is to have the report completed in time for the meeting in Canada.
- 7) There was considerable discussion on the availability of simple, cheap, adequate field test kits. It was agreed that many compound kits are inadequate for the needs of small communities, and that better kits could be made in collaboration with with the manufacturers.
- 8) **Ricardo Torres** should be involved in the needs assessment.
- 9) **Guy Howard** stated that guidance on how to implement WSPs in small systems is needed, that updating of Volume 3 is not a high priority and that the group should talk to existing manufacturers of field test kits. **Jackie Sims** agreed that the priority is WSPs established in small communities; the network is a way to work towards this. Eventually Volume 3 will need to be revised. She and others have been in touch with manufacturers.

#133. Bottled Water in Emergencies

Background: WHO has received a comment objecting that there is no mention of the role of bottled water in emergency situations.

Expected end-product: Revised text in chapter 6 for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2005) decided on a plan of work. The GDWQ WG meeting (Geneva, 2006) approved the text for the second addendum and agreed that this item can be removed from the plan of work once the second addendum has been published.

Plan of work for P&C WG:

- 1) New text has been drafted to address bottled water for emergencies, to go into the second addendum in section 6.2.1. The WG accepted the text that was drafted by **Mark Sobsey**. It was recommended that this text go in as bullet point number 3, before those existing bullet points on treatment.
- 2) *Once the second addendum has been published, this agenda item can be removed from the plan of work.*

#134. CAC Standards and GDWQ

Background: It has been drawn to WHO's attention that the text of the GDWQ implies that both the CAC standard for bottled/package water and the CAC standard for mineral waters refer to the GDWQ, whereas only the bottled/package water standard refers to the GDWQ.

Expected end-product: None

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. The GDWQ WG meeting (Geneva, 2006) asked WSH to relay their opinion to CAC regarding how to handle discrepancies between the Codex Standard and the WHO GDWQ.

Plan of work for WSH:

- 1) It was confirmed that references to the GDWQ are made in both CAC standards — one is a direct reference and the other indirect. Therefore, there is no need to revise the text for the second addendum.
- 2) A letter from CAC was distributed requesting the Committee's views on the need to amend the health-related limits for certain substances in the Codex Standard for Natural Mineral Waters in light of discrepancies between the Codex Standard and the WHO GDWQ. It was noted by the Chemical WG that Codex standards should just cross-reference to the latest edition of the GDWQ, as they would otherwise be out of date as we update our guidelines. It is recommended that the CAC text state that "Except where stated otherwise, the standards follow the GDWQ." This should be done in both the mineral waters and bottle/package water Codex standards. Guideline values are used only for health-based concerns (aesthetic parameters would not be included in this).
- 3) The opinion of this Committee is to be relayed to Secretary of CAC, Joint FAO/WHO Food Standards Programme, Rome, by **WSH**.
- 4) See agenda item #63 for concerns regarding the borate guideline, which should also be passed on to the Codex Secretary.

#135. Pharmaceuticals in Drinking-water

Background: Pharmaceuticals (e.g. antibiotics, endocrine disruptors) have been detected and confirmed in all components of the water cycle in Europe and were raised as a concern by EURO. Professional organizations such as EUREAU and the Rhine Water Works as well as wastewater treatment companies have also expressed concern on the topic. Even though human risk assessments have shown that low concentrations of pharmaceuticals in drinking-water have a negligible health risk, long-term exposures have not been evaluated, especially in debilitated or immunosuppressed populations. Antibiotics in the water cycle raise a particular concern because of the potential to promote resistance in bacteria in the aquatic environment.

Expected end-product: Pending

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on the need to keep up to date in this area and to start gathering relevant information. The GDWQ WG meeting (Geneva, 2006) agreed to actively consider the issue.

Plan of work for Chemical WG:

- 1) **John Fawell** prepared a briefing note on the current situation.
- 2) **Peter Jackson** has prepared several pages of text on the removal of pharmaceuticals during drinking-water treatment. This is very useful text and will be incorporated into whatever document is prepared in the future.
- 3) No summary statement is to be prepared at this time.
- 4) The USEPA has suggested that a formal task force for the risk assessment of pharmaceuticals in drinking-water be established; a briefing note from USEPA was circulated to WG members. An informal discussion will be held to inform next year's meeting. The task force will wait until the white paper (see next point) is ready. John Fawell's background paper will be made available to this informal group. **Professor Magara** has some relevant information to contribute to the discussion.
- 5) The USEPA will hold an international workshop on PPCPs (pharmaceuticals and personal care products) in December in Washington, D.C. This workshop will generate a white paper. **Penny Ward** is to be the point of contact for PCS and all WGs. EURO advisor **Roger Aertgeerts** would also be very interested in participating.
- 6) **Ambika Bathija** distributed a brief summary of two United States Geological Survey studies carried out in 2004 and 2000 in which the presence of PPCPs was investigated in water samples collected throughout a single drinking-water treatment facility and in streams.
- 7) The WG needs to investigate the research schedule of the Global Water Research Coalition in this area.
- 8) It was concluded that there is no value in attempting to set guideline values for specific pharmaceutical residues. Nevertheless, it may be appropriate for WHO to provide a short overview, couched in very careful terms in view of the constantly expanding database and the danger of appearing complacent. However, there is perhaps a need to provide some information in order to counterbalance some of the more inaccurate statements being made, such as that we have no toxicological data on these compounds and the effects in humans are unknown. It is considered appropriate to keep this topic under review to determine whether there is a need for a more detailed evaluation in the future.

#136. Corrosion Control

Background: Corrosion is defined as “the deterioration of a material, usually a metal, that results from a reaction with its environment.” In drinking-water distribution systems, the material may be a metal pipe or fitting, the cement in a pipe lining, an asbestos-cement pipe or a polyvinyl chloride pipe. The corrosion of drinking-water materials can result in elevated levels of contaminants in the drinking-water supply. Water purveyors need advice on how to control corrosion from plumbing and water distribution systems and reduce exposure to such contaminants as lead and copper, which can present a health risk.

Expected end-product: 1) Revised text in GDWQ, for second addendum or Fourth Edition; 2) revised summary statement on lead for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to postpone agreement on a plan of work until the Health Canada document has been prepared. The GDWQ WG meeting (Geneva, 2006) decided that the information on corrosion control could find a home in several supporting documents, that Volume 1 should be revised for the second addendum or the Fourth Edition and that the summary statement on lead should be revised to incorporate guidance on corrosion management.

Plan of work for Chemical and P&C WGs:

- 1) **Michèle Giddings** prepared a briefing note on corrosion control.
- 2) There is some text on corrosion control in the GDWQ; a stand-alone document would be useful. Water quality and materials are both important. Lead is not the only concern; several substances in the GDWQ have the potential to corrode (e.g. copper, zinc). Terminology needs to be carefully used — lead in plumbing has a low rate of corrosion, but is a contamination problem (i.e. need to differentiate between corrosion and leaching).
- 3) It was suggested that information on corrosion control could find a home in the document *Water Safety and Buildings* (coordinated by **Yves Chartier**) or the *Safe Piped Water* book (when updated).
- 4) **Michèle Giddings** is to look at the pages on corrosion control in Volume 1 of the GDWQ, the Safe Plumbing book, and the updated treatment book to see if there’s enough information out there or if a new stand-alone document is needed. Michèle will look at what’s in the current Volume 1 and see if it can be revised for the second addendum (and if staffing resources are available). Otherwise, it will be done for the Fourth Edition. **Peter Jackson** and **Professor Magara** will review the revised pages of Volume 1 when Health Canada has prepared them.
- 5) There was a request to add lead to the agenda — specifically, whether there should be a longer summary statement on lead, as there are increasing scientific advances/evidence on the effectiveness of corrosion control through centralized drinking-water treatment in controlling lead in tap water from household distribution pipes. It was decided that an expanded summary statement was not really necessary, as lead is not a significant health concern in drinking-water. However, it was decided that a statement on corrosion management/control could be added to the summary statement for the Fourth Edition. **John Fawell** will do this.

#137. Microrisk Project

Background: An offer of cooperation has been received from investigators working on the above project, which should provide information relevant to the GDWQ and WSP

application. The aim of the project is to combine microbial risk assessment from catchment to consumer with a risk management approach.

Expected end-product: Published report on the project; content of report to be considered in future review of other supporting documents, such as that on Water Treatment and Pathogen Control

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on an initial plan of work. The GDWQ WG meeting (Geneva, 2006) was updated on progress made to date.

Plan of Work for Micro WG:

- 1) **Ana Maria de Roda Husman** contacted the coordinator of the project, **Gertjan Medema**.
- 2) The final report will be circulated to the WG when it is available.

#138. GDWQ Training Pack

Background: The WHO GDWQ training pack provides information for use in the planning and delivery of seminars, workshops and training courses in surveillance, control and improvement of water quality. The pack includes a presentation and practical exercises and is designed to cover a broad range of water-related topics so that appropriate elements can be selected in response to local circumstances and priorities. It has been mentioned that the current format of the training pack is not easy to use.

Expected end-product: Revised training pack

Progress to date: A note has been placed on the web indicating that the existing training pack is currently being revised. The draft training pack is now ready for review.

Plan of work for all WGs:

- 1) **Kathy Pond**, **Steve Pedley** and **Suresh Kumar** have revised the training pack. The first draft of the revised training pack is currently being reviewed at Industry Council for Development (which has agreed to sponsor the updating of the training pack). WG members (**Feroze Ahmed**, **David Cunliffe**, **John Fawell**, **Health Canada**) are also asked to review it. Reviewers of the training pack should include **S.G. Mahmoud** from Bangladesh as well as **Sam Godfrey** from UNICEF (Uganda). **Oliver Schmoll** will distribute the material on CDs to potential reviewers within a week.
- 2) Reviewers are asked to submit their comments on the training pack to **Kathy Pond** within three months. Kathy is asked to revise the draft by the next meeting.
- 3) The revised training pack will be trialled in Malaysia in a proposed two-day workshop, to be conducted by the University of Malaya and Ministry of Health, Malaysia, designed to give an overall introduction to the WHO GDWQ and to identify the roles of participants in implementing the GDWQ. This workshop will be held later this year.
- 4) **Dan Deere** has produced various training materials on GDWQ and WSPs for GDWQ dissemination workshops for WPRO in South-east Asia; they also include WSP training materials. Although several countries may have training materials available, it was pointed out that the training pack is specific to the GDWQ and does not deal just with WSPs.
- 5) **Suresh** and **Kathy** hope to develop interactive user-friendly software. Australia already has a software package, so **Kathy** is asked to liaise with **Dan Deere**.

#139. Total Trihalomethanes

Background: The Second Edition of the GDWQ stated that authorities should not add up the guidelines of the individual THMs to derive a guideline for total THMs, as the four THMs have basically similar mechanisms of action. As the four THMs, as evaluated in the Third Edition, appeared to have different mechanisms of action, this statement was deleted from the Third Edition. However, it now appears that the four THMs may indeed have similar mechanisms of action.

Expected end-product: Revised text in THMs background document and summary statement, for second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed on a plan of work. The GDWQ WG meeting (Geneva, 2006) agreed to amend the current text in the THMs background document for the second addendum.

Plan of work for Chemical WG:

- 1) **Michèle Giddings** prepared a briefing note.
- 2) The WG agreed to add back text (to both the background document and the summary statement) reading “Authorities wishing to use a guideline value for total trihalomethanes should not simply add up the guideline values for the individual compounds in order to arrive at a standard, because the four compounds are basically similar” (or “similar in structure”). It will be kept like this until the review of BDCM has been completed, as BDCM is no longer considered to be a possibly genotoxic carcinogen. The NTP released a final report of the BDCM bioassay that concluded that there was no indication of carcinogenicity under the study conditions (see agenda item #82).

#140. Chemical Background Documents Specification Sheet

Background: The format for the chemical background documents is continually being revised, as needed.

Expected end-product: Revised specification sheet for Policies and Procedures Manual

Progress to date: The specification sheet for chemical background documents in the Policies and Procedures Manual is continually being revised to accommodate changes.

Plan of work for Chemical WG:

- 1) Under 6.1 Analytical methods and analytical achievability, information on field test kits should be included where available.
- 2) Under 6.2, Treatment and control methods and technical achievability, Municipal-scale and residential-scale treatment technologies should be described where such information is available.
- 3) Under 7, Guideline value, advice on application of the guideline (e.g. if substance found in groundwater and use surface water source, don't worry about it) can be added.
- 4) *Once the Policies and Procedures Manual has been updated, this agenda item can be removed from the plan of work.* It can be reopened if any new changes to the specifications are required in the future.

#141. Perchlorate

Background: The United States is considering setting a standard for perchlorate in drinking-water, and Japan has also started to collect information on its concentration in drinking-water, as it has found surface water to be heavily contaminated (up to 25 µg/litre) with perchlorate in some areas, from manufacturers, fireworks and other sources. An official request was made by Japan for WHO to develop guidance concerning perchlorate in drinking-water.

Expected end-product: Background document, possibly for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2006) agreed to add perchlorate to the rolling revision.

Plan of work for Chemical WG:

- 1) The WG agreed that a shorter background document might be applicable here, as perchlorate may be present in water as a result of spills in this instance. It may also form naturally globally.
- 2) **Ambika Bathija** is to prepare a briefing note for next meeting, with input from **Shoichi Kunikane**.

#142. Sodium

Background: Correspondence has been received noting that although the GDWQ state that no health-based guideline can be proposed for sodium because no firm conclusions can be drawn concerning the possible association between sodium in drinking-water and the occurrence of hypertension and that concentrations in excess of 200 mg/litre may give rise to an unacceptable taste, the United Kingdom, in implementing the EU Drinking Water Directive to national regulations, transposes sodium, at 200 mg/litre, from an indicator parameter to a mandatory parameter “to protect against infant hypernatraemia and those on a salt-restricted diet.” The correspondence notes that recent studies have demolished the idea that scientists agree that universal sodium restriction is appropriate.

Expected end-product: Background document, probably for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2006) agreed on a path forward.

Plan of work for Chemical WG:

- 1) The Chemical WG has requested that **WSH** request that WHO medical personnel provide a medical consensus on the relationship between sodium and hypertension and hypernatraemia.
- 2) Once this information is provided, it will be used to update the background document on sodium, probably for the Fourth Edition (depends on when input from WHO is received).
- 3) **John Fawell** has questioned the interpretation of the United Kingdom regulation as given in the correspondence received. This will need to be investigated further at the next meeting.

#143. Linkage between Fluoride and Iodine Deficiency Disorder

Background: WHO has received a communication that points out the linkage between excess fluoride ingestion and thyroid hormone derangements in children in non-iodine-deficient

areas in India. The WGs are asked to review the evidence from the study and to recommend whether or not this item should be dealt with on the rolling revision.

Expected end-product: None

Progress to date: The GDWQ WG meeting (Geneva, 2006) agreed that this item should not be added to the rolling revision.

Plan of work for Chemical WG:

- 1) The paper was reviewed, and it was concluded that it was not relevant to a drinking-water WG. It was recommended that WSH pass it on to the fluoridation group at WHO (**Poul Petersen**).
- 2) *This agenda item will not be added to the plan of work.*

#144. Avian Influenza

Background: A WG member has suggested that the WGs review the issue of avian influenza (H5N1) in drinking-water because of possible increased risk to water supplies caused by animal sources of the virus. WHO has published a document “Review of latest available evidence on risks to human health through potential transmission of avian influenza (H5N1) through water and sewage.” The WGs are asked to decide whether there is a need to deal with the issue in the rolling revision.

Expected end-product: Pending

Progress to date: The GDWQ WG meeting (Geneva, 2006) agreed to add this item to the agenda as a watching brief.

Plan of work for P&C and Micro WGs:

- 1) **Lisa August** reported on the new WHO initiative on bird flu. There is already a review paper on the waterborne risks associated with bird flu. Additional documents are in progress, including those dealing with recreational water, hygiene issues, other exposure scenarios and risk assessments. WHO wants to partner with other units within WHO where there is overlap and complementary coverage of the topic. This includes the Occupational and Environmental Health Programme and linkage to activities in UNICEF. There are efforts planned and in progress to work on these collaborations. The goals of these efforts are a series of reviews and Qs and As documents in case there is an actual pandemic. There will be another document on respiratory transmission of faecal viruses, which will be a revision of a document prepared by Mark Sobsey and Scott Mescke in 2003, initially in response to concerns about faecal droplet transmission of the SARS virus.
- 2) The WG concluded that this item should remain on the agenda as a watching brief. It will not be considered for the Fourth Edition, unless new evidence suggests greater risks created by the emergence of a human pandemic virus transmissible through water.

#145. HIV and Drinking-water

Background: An external communication was received noting that two new studies on HIV and drinking-water are available. The WGs are asked to review new evidence from studies and to recommend whether or not this item should be dealt with on the rolling revision.

Expected end-product: None

Progress to date: The GDWQ WG meeting (Geneva, 2006) decided that this item should be addressed through agenda item #7 on vulnerable and susceptible groups.

Plan of work for P&C and Micro WGs:

- 1) The WGs propose that this item be addressed through the WG effort on vulnerable and susceptible groups (agenda item #7).
- 2) *This agenda item will not be added to the rolling revision.*

#146. Alachlor

Background: The risk assessment for alachlor was conducted in 1993. The guideline value for alachlor was set on a different basis from the (newer) WHO Pesticide Classification. The WGs are asked to decide whether this discrepancy needs to be resolved. It is also noted that one of the criteria used for deciding whether to revise the review for a constituent already considered in the GDWQ is the listing of a chemical in relevant PIC or POP listings.

Expected end-product: Updated background document for the Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2006) decided to add alachlor to the rolling revision and suggested a plan of work.

Plan of work for Chemical WG:

- 1) The Rotterdam Convention on Prior Informed Consent (PIC) considered alachlor using newer assessments, resulting in discrepancies between it and the GDWQ background document, as the older assessments relied on for the GDWQ background document (prepared in 1993) are outdated.
- 2) Alachlor and methoxychlor are both high-priority chemicals, but the Committee has agreed not to ask JMPR to evaluate them unless there is good evidence that they occur in water.
- 3) We need to look at occurrence data and use in developing countries before deciding whether the background document needs to be updated to take the above into account. If a guideline value is required (i.e. if it occurs in drinking-water), then the science needs to be re-examined (otherwise, no guideline value is needed).
- 4) A briefing note is to be prepared by **John Fawell** and **Vera Ngowi** for the next meeting. WG members are asked to provide them with any available occurrence data. An occurrence check is also currently on the listserve.
- 5) The background document and summary statement need to mention that alachlor is a PIC chemical, so **PCS** is asked to provide the appropriate wording.

#147. Lindane

Background: The risk assessment for lindane was conducted in 2003, based on a 2002 JMPR report. Lindane is currently nominated for addition to the list of POPs under the terms of the Stockholm Convention. One of the criteria used for deciding whether to revise the review for a constituent already considered in the GDWQ is the listing of a chemical in relevant PIC or POP listings. The current risk assessment was undertaken with regard to significant long-term environmental and health effects. Lindane is also used for public health purposes.

Expected end-product: Revised summary statement and background document, for second addendum, if lindane is added to the POPs list

Progress to date: The GDWQ WG meeting (Geneva, 2005) agreed to amend the summary statement and background document for lindane if it is added to the POPs list.

Plan of work for Chemical WG:

- 1) The WG noted that lindane is being considered for the POPs list. If it is added, this will need to be noted in the background document and summary statement.
- 2) Listing of a chemical in POPs listing means that this WG should revise the review for a constituent already considered in the GDWQ. However, the lindane guideline is already based on the most recent JMPR assessment (2002), so no further action in this regard is necessary.
- 3) PCS is asked to inform the WG about lindane's nomination status.

#148. Differences between EU DWD and WHO GDWQ

Background: In the context of reviewing methods for target setting and progress monitoring, Member States of the EU question whether targets should be set against the quality criteria contained in the EU Drinking-water Directive or against the WHO GDWQ. WHO EURO requests advice from the DWQC on this matter.

Expected end product: None

Progress to date: The GDWQ WG meeting (Geneva, 2006) drafted an appropriate response to the inquiry.

Plan of work for all WGs:

- 1) In reviewing the enquiry, the group noted that the Guidelines were derived from critical assessment of health-related evidence. It furthermore noted that the Guidelines encouraged their adaptation to account for local social, cultural, economic and environmental concerns and provided outline guidance on associated issues.
- 2) The European Commission had formally recorded that the WHO GDWQ were used as the "scientific point of departure" for development of the corresponding European Directive. A workshop to look at the revision of the Directive had made recommendations that would suggest the continuation of such a relationship.
- 3) There are differences between the European Directive and the WHO GDWQ, both in approach and in specific guideline values. The Committee considered that these differences and the processes leading to them reflected adaptation to European circumstances as advocated in the Guidelines. An example of this relates to pesticides, where WHO guideline values provide health-based guideline values for individual

pesticides, whereas the EU Directive provides a uniform non-health-based limit value that reflects the cultural unacceptability of pesticides in drinking-water in Europe.

4) *This agenda item will not be added to the rolling revision.*

#149. Chlorine Residuals

Background: It has been brought to the Committee's attention that there is a lack of clarity when comparing statements in different sections of the GDWQ with regard to recommended residual chlorine levels at the point of delivery: Chapter 6.2.3 states that "Minimum target concentrations for chlorine at point of delivery are 0.2 mg/litre in normal circumstances and 0.5 mg/litre in high-risk circumstances." Table 8.27 states: "For effective disinfection, there should be a residual concentration of free chlorine of ≥ 0.5 mg/litre ..." The 0.2 mg/litre target in normal circumstances occurs only in the "emergencies and disasters" section of the GDWQ and nowhere else. The statement of Table 8.27 reads misleading, as the 0.5 value is a target for treatment; and not for the point of consumption.

Expected end-product: Revised text for the second addendum

Progress to date: The GDWQ WG meeting (Geneva, 2006) decided on a plan of work.

Plan of work for Chemical WG:

- 1) Include a sentence in Table 8.27 that "Chlorine residual should be maintained throughout the distribution system."
- 2) It was suggested that the statement in Table 8.27 be complemented by a recommended minimum concentration at point of delivery of 0.2 mg/litre.
- 3) It was pointed out that Member States were misinterpreting the guidelines and applying a maximum of 0.5 mg/litre, so that there was no chlorine in the distribution system. There is a need to clarify the text.
- 4) It was also pointed out that point of delivery and point of consumption are two separate issues, and this may be confusing the two of them. It is important to ensure that the text isn't muddled when the above changes are made.
- 5) **Oliver Schmoll** is to make the necessary changes, for the second addendum.

#150. Zoonosis Fact Sheets

Background: Various fact sheets have been produced on waterborne zoonoses (not in the GDWQ context). Blastocystis (agenda item #105) and leptospira (agenda item #106) are currently under development. *Ascaris* and bovine spongiform encephalitis (BSE) are currently not on the rolling revision. It has been suggested that the range of organisms covered in chapter 11 could be reviewed as part of preparation for the Fourth Edition, particularly reviewing the need for additional fact sheets (e.g. for schistosomes and *Franciscella tularensis*). For tularaemia, it is noted that there is new evidence from a waterborne outbreak in Turkey. The WG is asked to review the need for new fact sheets and, if so, agree on a plan of work.

Expected end-product: New fact sheets for the Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2006) agreed that consistency between the scope of organisms mentioned in the GDWQ and those for which fact sheets have been prepared needs to be improved.

Plan of work for Micro WG:

- 1) Consistency between the scope of organisms listed in Table 7.1, Figure 7.1 and the fact sheets in chapter 11 could be improved. In addition, several zoonosis fact sheets were provided for consideration for inclusion. As well, there are some new ones for the second addendum, as well as some that are not included in the second addendum. The WG needs to address all of these issues for the Fourth Edition and ensure consistency and coverage of the current range of organisms (tularaemia, for example), as well as cross-check the table, figure and fact sheets.
- 2) The WG also identified the need to be more explicit in explaining how reference pathogens were selected in chapter 7. This will be done for the Fourth Edition.

#151. Silver

Background: One of the regions suggested that the Chemical Aspects WG could provide default provisional guideline values for some of the chemicals, such as iodine and silver, that are mentioned in the GDWQ but for which no guideline is yet provided. Iodine is being considered elsewhere (see agenda item #74).

Expected end-product: 1) Revised Table 7.6 in chapter 7 for Fourth Edition; 2) background document for Fourth Edition

Progress to date: The GDWQ WG meeting (Geneva, 2006) decided to add silver to the rolling revision.

Plan of work for all WGs:

- 1) There is considerable interest in promoting the use of silver for household POU systems. The uses and efficacy of different forms of silver as a disinfectant need to be investigated. It was also noted that a hydrogen peroxide and silver combination has been proposed for use in public water systems.
- 2) It was agreed that silver, as a water treatment additive, should be added to the rolling revision, and all WGs are asked to cooperate in the preparation of a briefing note for next meeting.
- 3) It was also noted that Table 7.6 in chapter 7 needs to be broken up, to separate disinfection from coagulation etc.
- 4) There is a critical need for development of a document with credible disinfection performance data (C×T values) for silver species as part of development of a guideline, and also for use in the WHO home water treatment and ETV/TPE initiatives.
- 5) **Joe Cotruvo, John Fawell, Mark Sobsey and David Cunliffe** will cooperate on these actions.

10. CLOSING SESSION

Dr Maria Neira, the Director of Public Health and the Environment at WHO, provided a briefing on the new focus of the department. The change in the department's name from Protection of the Human Environment to Public Health and the Environment is not just a cosmetic change, but reflects a change in fundamental philosophy. The department is the prevention arm of WHO, and it is now much clearer that the main focus of the department is

on protecting public health by acting at an environmental level. Addressing issues related to water sanitation and health to protect public health is one important part of the department's focus. The department's strategic directions include an evidence-based approach, revitalizing its role in risk assessment and risk management, linking disease prevention to determinants of those diseases, the concept of healthy settings (e.g. at work, at school or at home), preparedness and response to environmental disasters and, finally, new and emerging issues (e.g. nanotechnology).

Dr Neira thanked participants for their contribution to the GDWQ in particular and in helping to further the new agenda of the department. She then closed the meeting.

ANNEX 1: List of Participants

Expert Consultation for 2nd Addendum to the 3rd Edition of the Guidelines for Drinking-water Quality

15–19 May 2006

List of Participants

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- Dr Jagdish Barot (New Delhi, India)

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- Mr Terrence Thompson (Manila, Phillipines)

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- Mr Ricardo Torres
- Mr Ricardo Rojas

ANNEX 2: Agenda and Timetable

Expert Consultation for 2nd Addendum to the 3rd Edition of the Guidelines for Drinking-water Quality

15–19 May 2005

Draft agenda

1. Welcome.
Introduction of participants.
2. Objectives of the meeting.
Election of chairperson and rapporteur.
3. Video link with each Regional Office; feedback from Regional Offices on principal concerns.
4. Update on overall Plan of Work as agreed at the Expert Consultation for addenda to the 3rd edition of the GDWQ (2005), to account for new information based on comments received and regional meetings.
5. Review of documents and comments on work in progress.
6. Confirm plan of work.
7. Conclusions and agreement of implementation of plans.
8. Closure of meeting.

**EXPERT CONSULTATION FOR ADDENDA TO THE 3RD EDITION
OF THE GUIDELINES FOR DRINKING-WATER QUALITY**

Meeting Timetable

15–19 May 2006, Geneva

Time	Monday (15 May)	Tuesday (16 May)	Wednesday (17 May)	Thursday (18 May)	Friday (19 May)
08:30-09:00		Daily preparatory meeting of chairs and rapporteurs	Daily preparatory meeting of chairs and rapporteurs	Daily preparatory meeting of chairs and rapporteurs	Daily preparatory meeting of chairs and rapporteurs
09:00-10:30 (session 1)	09:00-10:00: Welcome & introduction Intro of meeting objectives Election of chairs / rapporteurs <i>ALL WG (Room M 505)</i>	Review of work in progress <i>ALL WG (Room M 505) (a)</i>	Nutrition related agenda items <i>CHEM WG (Room M 505) (e)</i> Review of work in progress <i>P&C + MICRO WG (Room M 205) (j)</i>	WHOPES related agenda items <i>CHEM (+ MICRO) WG (Room M 505) (g)</i>	Strategic planning for the fourth edition <i>ALL WG (Room M 505)</i>
10:30-11:00	10:00-10:30: Morning coffee (<i>Room E 230</i>)	Morning coffee	Morning coffee	Morning coffee	Morning coffee
11:00-12:30 (session 2)	10:30-12:00: Video conference with WHO Regional Offices (SEARO, WPRO, EMRO) <i>ALL WG (Room E 230)</i>	Review of work in progress <i>CHEM WG (Room M 505) (k)</i> <i>P&C + MICRO WG (Room M 205) (f)</i>	Review of work in progress <i>CHEM WG (Room M 505) (b)</i> <i>P&C + MICRO WG (Room M 205)</i>	Review of work in progress <i>CHEM WG (Room M 505) (h)</i> <i>P&C + MICRO WG (Room M 205)</i>	Conclusions and adoption of meeting report Closure of meeting <i>ALL WG (Room M 505)</i>
12:30-13:30	12:00-13:00: Lunch break Chairs and rapporteurs meeting (<i>Room M 505</i>)	Lunch break	Lunch break	Lunch break	Lunch break
13:30-15:00 (session 3)	13:00-14:30: Review of work in progress <i>ALL WG (Room M 505)</i>	Review of work in progress <i>CHEM WG (Room M 505) (d, k)</i> <i>P&C WG (Room M 205) (c)</i> <i>MICRO WG (Room M 105)</i>	Review of work in progress <i>CHEM WG (Room M 505)</i> <i>P&C WG (Room M 205)</i> <i>MICRO WG (Room M 105)</i>	Discussion of new agenda items <i>ALL WG (Room M 505) (i)</i>	WHOPES MEETING (Room M 105)
15:00-15:30	14:30-15:00: Afternoon tea	Afternoon tea	Afternoon tea	Afternoon tea	

Time	Monday (15 May)	Tuesday (16 May)	Wednesday (17 May)	Thursday (18 May)	Friday (19 May)
15:30-17:00 (session 4)	15:00-17:00: Video conference with WHO Regional Offices (AMRO) Review of work in progress <i>ALL WG (Room E 230)</i>	Review of work in progress <i>CHEM WG (Room M 505) (k)</i> <i>P&C WG (Room M 205)</i> <i>MICRO WG (Room M 105)</i>	Review of work in progress <i>ALL WG (Room M 505)</i>	Consolidation and preparation of the meeting report	

- (a) Jackie Sims (WSH) to join session for items 124 and 132
- (b) Mike Repacholi (RAD) to join session for item 101
- (c) José Hueb (WSH) to join session for items 5 and 35; Jackie Sims (WSH) for item 32
- (d) Poul Petersen (HPR) and Fiona Gore (OEH) to join session for item 71
- (e) Bruno de Benoist and Erin McLean (both MNM) to join session for items 58-1, 58-2, 58-3, 67, 77 and 79; and Fiona Gore (OEH) for item 79
- (f) Bruce Gordon (WSH) to join session for items 23, 28A and 36; and Jackie Sims (WSH) for item 28A
- (g) Angelika Tritscher (PCS), Robert Bos (WSH) and Morteza Zaim (VEM) to join session for items 52, 52A, 52B, 52D, 93, 104 and 121
- (h) Angelika Tritscher (PCS) to join session for items 60, 61, 74, 84, 86, 87, 92, 96, 98 and 117
- (i) Lisa August (WSH) to join session for avian influenza
- (j) Yves Chartier (WSH) to join session for items 4 and 41
- (k) Carolyn Vickers/Lesley Onyon (PCS) to join session for items 66, 68, 90 and 103

ANNEX 3: Report of an Advisory Consultation to the WHO Rolling Revision on the GDWQ Addressing Guidelines for Point-of-Use (POU) Drinking-Water Treatment Technology Evaluation (11 May 2006, Geneva)

Summary of discussion and agreed actions:

The objective of the meeting was to critically review the draft document “Household water treatment technology verification,” taking into account already received written comments. It was agreed that meeting participants would go over key issues, leaving those revising the text to address comments on details.

Following the consultation, there was general agreement on the purpose of the document and its intended audience; on the approach for elaborating protocols; on the approach for establishing performance requirement benchmarks and the need for progressive improvement; and on the structure and presentation of the document. The role of WHO’s name in certification was discussed, but it was felt premature to identify a clear way forward, as further discussions are needed (including with WHO Legal).

Participants agreed that the proposed guidelines on point-of-use (POU) technology evaluation should adhere to the following principles:

1. Consistency of approach with the Third Edition of the WHO Guidelines for Drinking-water Quality (GDWQ), in particular: a) encouragement of incremental improvements in drinking-water quality; and b) application of the concept of tolerable risk and health-based targets.
2. Set forth a framework that would produce replicable and comparable results, be as simple as possible to use and not demand excessive resources to apply.
3. Appropriate for, and applicable to, varying national/local circumstances — either by using proposed a priori water quality assumptions (if water quality has not been or cannot feasibly be tested due to resource limitations) or by applying the Guidelines framework to known pathogens of interest in adequately characterized source waters.

It was agreed that the primary drafters, Mark Sobsey and Joe Brown, University of North Carolina, would revise the document, incorporating the recommendations in this report, together with the detailed written comments, and have the report completed by fall 2006. Certain participants agreed to provide close support for this process, including Tom Clasen, London School of Hygiene and Tropical Medicine, and others.

Background:

There is a clear need and growing demand for establishing international performance guidelines for POU systems (alternatively referred to as household-level water treatment technologies): firstly, because many of the technologies in use cannot be tested using existing guidelines; and secondly, while implementation of household water treatment systems is growing, there is widespread confusion relating to the capabilities of technologies. This has led to uncertainty among consumers, policy-makers, regulators, standards-setting organizations and implementers, many of whom have requested guidance from WHO on

POU technology evaluation. WHO has responded by taking up this issue in the context of the GDWQ, where it was introduced into the rolling revision process.

Recommendations:

1) Audience and purpose of document

a) Audience

There was consensus among reviewers that the intended audience needed to be clarified and narrowed. In particular, there was uncertainty on whether the document was aimed directly at implementers and manufacturers, possibly opening the door to certification from “WHO,” or was directed at regulatory authorities to support the development of national standards.

Agreed:

Following discussion, there was agreement that the immediate target audience for the document would be the following, in order of importance:

1. National-level certification organizations
2. Regulatory authorities
3. Those involved in research and development, including research institutions and independent certification organizations
4. Manufactures and implementers.

A fifth potential audience, specifiers of technologies, was proposed.

The indirect audience would be the end beneficiaries (i.e. users of POU technologies) and purchasers or selectors of POU technologies (e.g. implementing nongovernmental organizations, government procurers).

There was agreement that the level of detail/sophistication of the text would need to be made more consistent and appropriate for the target audiences above.

b) Purpose of document

In response to the need and demand expressed above, it was felt necessary to translate the risk-based approach in the GDWQ into a practical, adoptable format that could be applied to POU technology evaluation. It was emphasized that the document would not be presenting rigid “standards,” but rather adaptable “guidelines.” It was also felt that the document should strike a balance between being clear and prescriptive while being flexible and adaptable.

Agreed:

- The document would provide guidance, most immediately to national-level certification agencies and independent organizations, in both developed and developing countries, on how to evaluate a technology’s suitability to treat drinking-water of varying quality. It would provide guideline values, expressed in terms of log reduction values (LRVs), for pathogen reduction benchmarks and would offer key principles/minimum criteria to be incorporated into testing protocols.
- The document would benefit from a “mission statement” including intended audience and purpose, possibly drawing on the following proposed text: *To facilitate and encourage development, improvement, promotion, and knowledgeable purchase and use of POU technologies appropriate to health improvements in different settings*

through an international point of reference on technology assessment, health-based benchmarks and consumer information.

- Guidelines would be elaborated on safe storage only if a storage component is part of the POU technology.

2) Approach for elaborating protocols

The draft document outlines procedures to evaluate the capacity of POU systems to adequately treat source water of variable quality. Participants discussed whether it was more appropriate and feasible to provide complete, precise and highly detailed testing protocols or to provide broader-level guidance (in the format of key principles or minimum criteria). It was acknowledged that these would need to be elaborated in sufficient detail such that evaluators and certifiers of POU products following these guidelines could achieve them with reproducible and comparable results. It was also acknowledged, however, that certain factors (different POU products, existing national standards, variations in local source waters, etc.) underscored the need for a flexible, adaptable approach.

It was recognized that the guidelines should take into account variations in source water quality, including variations in constituent pathogens and turbidity. It was also noted that many local authorities would not have the skills or resources to comprehensively monitor water quality and identify key pathogens. This would be made especially difficult given seasonal variations. Moreover, allowing too much flexibility would undermine replicability and comparability of results, potentially permitting abuse. Therefore, it was felt critical to put forth a technology evaluation framework with clear a priori assumptions on source water quality, detailing pathogen concentrations that would provide the basis for LRV performance benchmarks. While it was acknowledged that the organisms proposed as representatives for each pathogen class may not always be locally relevant (*Campylobacter jejuni*, rotavirus and *Cryptosporidium parvum*), it was agreed that they were appropriate choices from which to derive performance benchmarks for each pathogen class because they were well characterized and of high public health importance. However, it was stressed that direct testing of these pathogens would require sophisticated laboratory capacities and that more practical alternatives could be used instead, particularly when doing technology evaluation in a field setting. This is outlined in the table below.

Reference pathogens and surrogates

Reference organism	Pathogen class		
	Bacteria	Virus	Protozoa
Organism that would provide the theoretical basis for the establishment of LRV benchmarks for each pathogen class	<i>C. jejuni</i>	Rotavirus	<i>C. parvum</i>
Alternative organisms or surrogates that could be applied in lab and field testing	<i>V. cholerae</i> , <i>E. coli</i>	Polio, bacteriophages (MS2), others	<i>E. histolytica</i> , spore-forming bacteria, inert particles (for occlusion technologies)

Agreed:

- To provide a set of required basic principles, or minimum criteria, to guide national-level certification agencies in the development or revision of protocols for testing POU technologies in the laboratory and field

- To provide additional guidance and criteria to support the specific evaluation of “leading” POU technologies
- To review and strengthen field testing protocols
- To set protocols that would test the POU technology through the product life cycle
- To elaborate (in a second document) additional application of the guidelines (e.g. advice on using the document to select POU technologies according to local conditions)
- To maintain a priori assumptions on source water quality, in two categories of source or input water (test water 1 and 2, turbid and non-turbid)
- To review the phrasing of source water (e.g. “apparently bad” or “high risk” and possible replacement with “unknown and uncharacterized source water”)
- To permit the use of non-default water quality assumptions only if a clear, defensible characterization of local source waters accompanied the technology evaluation
- To more precisely characterize source water challenge conditions (pH, total dissolved solids, particulates, etc.).

3) Performance benchmarks and the need for progressive improvement

Participants reviewed the approach for establishing LRV performance benchmarks. While it was acknowledged that the quantitative microbial risk assessment (QMRA) method used to derive benchmarks was an imperfect tool, it was preferred over the epidemiological approach, which has shown variable and inconsistent results. The need for harmony with the GDWQ was agreed, including:

- Maintaining the health-based micro-DALY concept of tolerable risk; and
- Encouraging incremental improvement through intermediate performance benchmarks (encourage the use of technologies that are not the “gold standard,” but that can nevertheless contribute to substantial health gains).

It was felt important to recognize that certain technologies that may not achieve “safe” or “improved” status (often falling short in one pathogen class) might nonetheless have demonstrated health impacts, and their use should be encouraged. However, given the important contribution of pathogens from all categories (bacteria, viruses and protozoa) to waterborne disease, it was proposed that a certain minimal level of performance in each pathogen class would be required.

Agreed:

- Clear performance benchmark guidance should be proposed, with a limited degree of flexibility to allow adaptability to local circumstances
- Three performance benchmarks, comprising 1) performance leading to “safe,” as defined by the GDWQ; 2) an intermediate level of performance to encourage incremental improvement; and 3) a minimum allowable requirement (i.e. 1, 2, 3 star technologies)
- The “safe” performance benchmarks will be based on the LRVs required to attain the micro-DALY level of risk from high-risk source water (based on assumptions of source water pathogen concentrations or knowledge of local water quality)
- The minimum acceptable benchmark will require:

- 1) a minimal level of efficacy against each of the three pathogen classes (i.e. a LRV of 0 in one pathogen class is unacceptable — at least a fraction of a log reduction is required);
 - 2) a minimum aggregate DALY reduction taking into account all pathogen classes (i.e. flexibility would be maintained by offsetting an underperformance against one pathogen class, by stronger performances against the other two)
- Intermediate performance benchmarks would need to be derived by translating DALY reductions into practical LRV targets, as per the table below, while accounting for practical concerns.

Summary table to be filled out pending calculations

Technology “rating”	LRV benchmark for bacteria	LRV benchmark for viruses	LRV benchmark for protozoa	Aggregate DALY risk reduction benchmark
3 star (treats water to GDWQ “safe levels”)	Must achieve, e.g., ≥ 5 LRV for high-risk or questionable water sources	Must achieve, e.g., ≥ 8 LRV for high-risk or questionable water sources	Must achieve, e.g., ≥ 4 LRV for high-risk or questionable water sources	
2 star (meets intermediate criteria)	Must achieve minimum LRV (as determined by minimum DALY risk reduction)	Must achieve minimum LRV (as determined by minimum DALY risk reduction)	Must achieve minimum LRV (as determined by minimum DALY risk reduction)	Must achieve minimum aggregate DALY reduction
1 star (meets minimum criteria)	Must achieve minimum LRV (as determined by minimum DALY risk reduction)	Must achieve minimum LRV (as determined by minimum DALY risk reduction)	Must achieve minimum LRV (as determined by minimum DALY risk reduction)	Must achieve minimum aggregate DALY reduction

Participants discussed performance descriptors for the POU products (e.g. “one star,” “two star,” and “three star”) at length, agreeing that this nomenclature would be revised and that end labelling recommendations would be introduced into the revised document.

4) Use of WHO name and role in certification (pending WHO Legal)

Discussion centred on what role WHO could and should play in terms of certification of POU products. For example, would there be added value if WHO’s name were used in conjunction with that of a national certifier (provided that certifier had established testing procedures that conformed to WHO Guidelines)? Participants agreed that this type of labelling could lead to greater harmonization among certification agencies and more consistency in product performance. At the same time, participants expressed considerable concern about the risks to WHO from abuse of its name in connection with POU products.

Three potential modalities were discussed:

1. WHO could adopt a public domain position outlining required specifications (e.g. specifications for insecticide-treated bednets, which brought quality control to a previously fragmented industry)
2. WHO and certifiers interact on a case-by-case basis to ensure conformity with guidelines (e.g. in the case of the WHO Pesticide Evaluation Scheme (WHO/PES), manufacturers disclose confidential information to a WHO certifying committee, and information on which companies were certified is made publicly available)

3. WHO could create a light structure that oversees certifiers.

Agreed:

- The model most appropriate would be for POU certification agencies to certify according to protocols they develop based on WHO criteria. WHO could provide the web site that has a central repository of certifiers conforming to WHO guidance.
- Clear certification statements were needed to relay efficacy to consumers.
- Additional issues relating to certification need to be followed up in detail, after a further revision of technology evaluation guidelines, including how to address the issue of certifying the manufacturing process, ensuring quality control, and specific labelling requirements, along with verification and enforcement.

5) Structure and presentation of document

It was agreed that the document needed to be significantly shortened, with much of the detail, including theoretical background and derivation of numbers, annexed.

Agreed:

- Limit the discussion on individual technologies — however, the characteristics of the technologies should show up in the protocol principles.
- Limit discussion on QMRA, health-based targets and derivation of LRVs, referencing applicable pages in the GDWQ.
- Improve logical flow.

* * * * *

Agenda

Thursday, 11 May 2006, WHO, Geneva
Room M505

Objective: To critically review the draft document “Household water treatment technology verification,” together with comments received from experts, and propose recommendations for revisions

Expected outcomes: Agreement on: a) purpose of document and audience, b) on approach for elaborating protocols, c) approach for establishing performance requirement benchmarks and the need for progressive improvement, d) use of WHO name and role in certification (pending WHO Legal), e) structure and presentation of document

Time	Agenda item
	Opening
08:30 – 08:45	Opening and introduction of meeting objectives (Jamie Bartram)
08:45 – 09:00	Introduction of meeting participants (Jamie Bartram)
09:00 – 09:05	Election of chair and rapporteur (Jamie Bartram)
09:05 – 09:15	Consideration and adoption of agenda (Chair)

Time	Agenda item
09:15 – 09:35	Introduction to existing point-of-use standards and protocols (Nikki Beetsch)
09:35 – 09:45	Low-cost household water treatment technologies and factors influencing adoption (Susan Murcott)
09:45 – 10:15	Overview of the draft technology verification document (Mark Sobsey)
10:15 – 10:30	Summary of comments received (Joe Brown)
10:30 – 11:00	<i>Morning coffee</i>
11:00 – 11:15	Discussion: reaction to morning session (Chair)
	Reconfirmation of purpose
11:15– 11:30	Purpose of document and intended audience (Chair)
	Elaboration of testing protocols
11:30 – 11:45	Appropriateness of proposed lab-based protocols – e.g. should we define precise, comprehensive protocols; or a framework of required “principles” together with illustrations on how they should be applied in practice
11:45 – 12:15	Technology specific comments: chlorination, ceramic filters, biosand filters, solar disinfection etc.
	Performance requirement benchmarks and progressive improvements
12:15 – 12:30	Introduction to GDWQ risk-based approach (Ahmed Feroze)
12:30 – 13:00	Encouraging incremental improvement: defining intermediate and “safe” performance requirements
13:00 – 14:00	<i>Lunch</i>
14:00 – 14:30	Choice of reference pathogens and surrogates, and source water definitions - proposed flexibility for organism selection
14:30 – 14:45	Agreement on next steps for elaboration of protocols and standards
	Certification issues: role of WHO, use of name
14:45 – 15:00	Relate to ongoing “certification” issues associated with WHO Guidelines (Oliver Schmolli)
15:00 – 15:30	Proposed certification statements and labelling; how to make statements relevant to users
15:30 – 16:00	<i>Afternoon tea</i>
	Structure and presentation of document
16:00 – 16:30	How to best “package” document for intended audience
16:30 – 16:45	Omissions, superfluous text and additional concerns
16:45 – 17:00	Closing
17:00	Next steps and wrap-up

List of participants

Name	Organization
Feroze Ahmed	Department of Civil Engineering, BUET, Dhaka, Bangladesh
Jamie Bartram	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Nikki Beetsch	NSF International, Ann Arbor, MI, USA
Katherine Bliss	Office of International Health Affairs, State Department, USA
Joe Brown	University of North Carolina, Chapel Hill, NC, USA
Thomas Clasen	London School of Hygiene and Tropical Medicine, London, UK
Bruce Gordon	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland

Name	Organization
Stephen Gundry	University of Bristol, Bristol, UK
Masaki Itoh	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Shoichi Kunikane	Department of Water Supply Engineering, National Institute of Public Health, Wako, Japan
Jorge Latorre Montero	University Valle/Cinara, Faculty of Engineering, Cali, Columbia
Susan Murcott	Massachusetts Institute of Technology, Cambridge, MA, USA
Federico Properzi	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Oliver Schmoll	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Mark Sobsey	University of North Carolina, Chapel Hill, NC, USA

Input via written comments:

Joseph Cotruvo, Joe Cotruvo and Associates and NSF International, USA

Daniele Lantagne, Centers for Disease Control and Prevention, USA

Stephen Luby, International Centre for Diarrhoeal Disease Research, Bangladesh, Centre for Health and Population Research, Bangladesh

Martin Page, University of Illinois, USA

ANNEX 4: Minutes of the Expert Meeting on “Water Safety Plans: Achievements and Future Needs” (12 May 2006, Geneva)

Meeting agenda:

Time	Agenda item	Comments
08:15-08:30	Opening and introduction of meeting participants Introduction of meeting objectives (Jamie Bartram)	Video link to NZ and AUS
08:30-09:15	Contributions from New Zealand and Australia to agenda items below	Room E 230
09:15-10:00	Is there a viable approach to global monitoring of water safety in organized piped supplies? – Introduction to the vision (WHO and IWA) – Discussion of potential partners and ways forward	Room E 230
10:00-10:30	<i>Morning coffee</i>	
10:30-11:15	Review of experiences of WSP implementation – The Bangladesh experience (Guy Howard and Feroze Ahmed) – USEPA WSP demonstration projects in India and Jamaica (Stephanie Adrian) – The German pilot study (Ingrid Chorus and Oliver Schmoll) – Brief report on WSP activities in Japan (Shoichi Kunikane) – Brief review of WSP implementation activities elsewhere – Round-table discussion of lessons learnt from various implementation activities <i>[Remind issues from NZ and AUS]</i>	Room M 505
11:15-12:00	Regulatory aspects of WSP implementation – UK Drinking Water Inspectorate’s perspective (David Drury) – USEPA’s perspective (Roger Gorke) – Introduction to the joint WHO and EU WSP project (Roger Aertgeerts) – Round-table discussion on perspectives and regulatory needs <i>[Remind issues from NZ and AUS]</i>	
12:00-13:00	<i>Lunch break</i>	
13:00-14:30	Tools supporting WSP development – Small community water supply management network (David Cunliffe) – WSPortal (Tom Williams) – The Bonn Charter (Tom Williams) – WSP Handbook (Guy Howard) – Canadian PC-based risk assessment tool (Michèle Giddings) – Special application tools (Yves Chartier and Masaki Itoh) – Quantitative health risk assessment (Feroze Ahmed and Guy Howard) – Round-table discussion on availability and adequacy of tools supporting (a) rural/small supplies and (b) urban/centralized supplies <i>[Remind issues from NZ and AUS]</i>	
14:30-15:00	<i>Afternoon tea</i>	
15:00-16:30	What is the future plan of work in the WSP arena? – Round-table discussion on identifying future needs for moving the WSP approach successfully ahead (“strategic planning”) <i>[Remind issues from NZ and AUS]</i>	

Meeting participants:

Name	Organization
Stephanie Adrian	Office of International Affairs, Environmental Protection Agency, Washington, DC, USA
Roger Aertgeerts	European Centre for Environmental Health, Rome, Italy
Feroze Ahmed	Department of Civil Engineering, BUET, Dhaka, Bangladesh
Jamie Bartram	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Katherine Bliss	Office of International Health Affairs, State Department, USA
Yves Chartier	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Ingrid Chorus	Federal Environment Agency, Department for Drinking Water and Bathing Water Hygiene, Berlin, Germany
David Cunliffe	Department of Health, Environmental Health Service, Adelaide, Australia
David Drury	Drinking Water Inspectorate, London, UK
Michèle Giddings	Health Canada, Water Quality and Health Bureau, Ottawa, Canada
Bruce Gordon	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Roger Gorke	Office of Water, Environmental Protection Agency, USA
Guy Howard	Department for International Development (DFID), Country-Led Approaches and Results Team, Policy Division, Glasgow, UK
Masaki Itoh	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Shoichi Kunikane	Department of Water Supply Engineering, National Institute of Public Health, Wako, Japan
Jorge Latorre Montero	University Valle/Cinara, Faculty of Engineering, Cali, Columbia
Oliver Schmolli	Water, Sanitation and Health, World Health Organization, Geneva, Switzerland
Mark Sobsey	University of North Carolina, Chapel Hill, NC, USA
Tom Williams	International Water Association, London, UK
<u>Thru video link</u>	
Simon Buckley	The Australian Agency for International Development, Canberra, Australia
Michael Taylor	Public Health Directorate, Ministry of Health, Wellington, New Zealand

Purposes of the meeting:

- To discuss global monitoring approaches on how “water safety” in utility piped supplies can be effectively measured;
- To review achievements and experiences in the WSP arena, including regulatory aspects;
- To review tools supporting WSP development in practice;
- To identify key elements of the future plan of work in the WSP arena.

Rapporteur: Ingrid Chorus

Item #1: Video conference with Michael Taylor (New Zealand) and Simon Buckley (Australia)

Experience in New Zealand (Michael Taylor): In New Zealand, WSPs are called “Public Health Risk Management Plans (PHRMP).” Recent success in improving quality is attributed to the emphasis on grading of drinking-water supplies, with grades from A to E that are published in local media. To ensure consistent results, this is based on regular

training of staff, for which assessors meet at least twice a year for a week's training. The actual activity of grading requires at least half a day per water supply, including discussing answers to a range of questions.

So far, the system has functioned on a voluntary basis, but now the approach is in parliament for legislation. Overall, the voluntary approach combined with publication of results has been highly successful, and legislation is considered necessary only for less than 10% of the water supplies, which proved resistant to this milder form of pressure for improvement. A further incentive for water supplies is that a WSP is a prerequisite for capital assistance funding. Particularly very small water supplies are keen on the risk management approach. However, their main problem is lack of information and advice on technical aspects of water supply. The approach in New Zealand is based on persuasion and support, particularly towards facilitating collaboration between small supplies, towards learning from each other and towards identifying the most important risks for the specific supply.

The International Organization for Standardization (ISO) activities are considered important, but have not yet been included. Tools are available, particularly specific guidance for small supplies.

Problems identified with the experience gained include:

- Provision of “model plans” as templates runs a risk of “copy and paste” of hazards that do not represent a risk in a given supply, rather than setting specific risk assessment.
- A tendency has been observed that water suppliers take the risk assessment table of the respective PHRMP as constituting their plan, neglecting the management plan for controlling risks.
- A trend to engage private consultants is being observed and considered not helpful, as involving the technical staff and operators is absolutely essential for a plan to work in practice.

Experience of AUSAID (Simon Buckley): This includes work with small supplies in the Pacific Island project (which is also supported by the EU and interlinks with the WHO WPRO). A key driver is that investments increasingly depend on demonstration of good evidence that they will improve public health and thus have economic impact. In the discussion, Roger Aertgeerts strongly supported this message with experience from the European Region. Small investments in improving management potentially generate huge benefits and may be far more cost-effective than large investments in improving technology.

The AUSAID Safe Water Guide document targets the political as well as the technical level, is very accessible and “whets peoples’ appetite” for risk-based approaches. This suggests that an international body of guidance, similar to the AUSAID Guide, would be useful. As the Australian government is doubling its investments in support by 2010, this opportunity could be used for the further development of such guidance materials.

Discussion outcomes in relation to both contributions:

- Compiling a more globally applicable guide document, i.e. reflecting experience from a wider variety of settings, would be very useful.
- An important element of the WSP approach is its global value: there is no difference between developing and developed countries in the need for improving system understanding. This overall assessment is shared particularly for smaller supplies. The discussion also emphasized the importance of the wide applicability of the WSP approach, including non-piped and household supplies.
- Roger Aertgeerts pointed out that in the European Region, the WSP approach is important because water that meets the EU DWD standards may be legally acceptable yet not be safe. Furthermore, the region's largest problem is the rehabilitation of infrastructure, and risk-based priority setting is critically important for achieving this effectively.
- It was suggested that a coalition of like-minded donors be brought together to push a joint initiative to mainstream the risk-based approach. The World Bank is very interested in best practice commitments for their investments. Jamie Bartram reports that although anecdotal evidence indicates that WSPs do increase the efficiency of investments towards meeting the target of reducing public health burdens, this as well as the economic benefits needs to be assembled more visibly.

Item #2: Is there a viable approach to the global monitoring of water safety in utility piped supplies?

A first approach to reporting: Jamie Bartram outlined how WSPs directly relate to the Millennium Development Goals (MDGs). Assessing global progress towards improving safety is difficult, but a window of opportunity for monitoring global water safety is emerging. This rather technical issue needs to be put onto the international political stage, e.g. at the Commission for Sustainable Development (CSD) meeting in 2008.

The present approach, run by WHO and UNICEF as a joint monitoring programme, uses a series of household surveys conducted in a range of countries. Questions address the portion of households that receive their water from “improved” or “unimproved” sources. This shows that about 50% of all households receive piped supply to the household, but does not provide information on the safety of this water. The acute question is how to embed the assessment of safety into this ongoing survey. Discussions in the recent World Water Forum in Mexico have concluded to use the GDWQ as the point of reference for a definition of “safe water.” For piped supplies, discussions with IWA have suggested to use the Bonn Charter (through IWA and the wider community of supporters of this charter) by a concept of voluntary sign-up to the Charter, linked to a system of anonymous reporting — anonymous in order to encourage honesty and to achieve results also in cultures where reporting is less established. This is expected to provide data from piped supplies, i.e. at most for 50% of the world's population. IWA would support the collection of these data and hold the data. To demonstrate viability of the approach, some pilot countries are to be identified to test the level of reporting that could be achieved. CSD 2008 could target a first assessment of the concept. To achieve this tight schedule, it is suggested to move ahead with a small number of specific countries, with each developed country teaming up with a developing country.

Role of the Bonn Charter: Tom Williams explained how water suppliers formally adopt the Bonn Charter. An element is the commitment of water suppliers to provide data, through national associations of water suppliers, with IWA currently building partnerships at the country level (rather than at that of individual water supplies).

Discussion outcomes:

- Difficulties using government information routes: Roger Aertgeerts reports experience from the European Region in collecting information on water supply and safety in the context of the *Protocol for Water and Health* with a 4-page questionnaire (plus 12-page guidance on how to answer the questions). The questionnaire includes, for example, the performance of a utility for continuity of supply. About 17 countries have responded and supplied information on the quality, but questions on access and continuity of supply mostly lacked response. Governments indeed are supportive, but the demands on the time of the people to produce the replies as well as of those on harmonizing them are extremely high. Many, particularly federal, countries do not have central reporting systems, and if so, they are collecting different data or are using different formats.
- The discussion clarified that the IWA-WHO approach would clearly be restricted to households with access to piped supplies and concentrate on collecting data directly from suppliers and urban utilities, bypassing their reporting duties to their surveillance authorities. Presenting the data will need to very clearly emphasize that this will not include the subset of rural scattered and household supplies.
- What parameters should be reported? For this reporting purpose, a set of indicator parameters will be needed, plus parameters reflecting whether a risk management plan is in place and working. Very clear guidance will be needed on what to report in cases of divergence between national standards and WHO guideline values. Reporting of data will need to include reporting the level of confidence in the data.

Item #3: Review of experiences of WSP implementation

The Bangladesh experience (Guy Howard and Feroze Ahmed): Pilots showed that local and regional experience is of limited value as model or template. Models always do need to be adapted locally. They also showed that for rural supplies with diffuse responsibility, a fair amount of time is needed up front. Peer review processes on an annual basis were found to be a useful interim step towards auditing, and this can include external peers, e.g. from the university and other countries.

There is a strong need for clear guidance on what constitutes a health risk and what does not. The discussion of experience reported from Bangladesh showed that regardless of the setting (i.e. developing or developed countries; large or small supplies), in analysing hazards and assessing risks, lists of potential hazards tend to become very long if expertise to assess relevance is lacking.

USEPA demonstration project on WSPs in India and Jamaica (Stephanie Adrian): In Hyderabad, India, a workshop is being held in May 2006 that introduces the WSP concept to water and health professionals. Sam Godfrey of UNICEF was instrumental in the planning process. It is expected that a subsequent workshop will be held in late summer 2006 to further the WSP in Hyderabad. A pilot WSP project is being developed in Spanish Town, Jamaica. A partnership comprising PAHO (WHO), the United States

Centers for Disease Control and Prevention (CDC) and the USEPA has joined to promote the development and implementation of WSPs for the improvement of public health in Latin America and the Caribbean. To date, a WSP Task Force is being set up, and the next step will be to begin assigning roles for the members of the team and initiating the assessment of the system.

The German WSP pilot study (Ingrid Chorus and Oliver Schmolz): This study conducted WSP trials with five larger utilities, which were visited three times to assist their attempt to test the concept by starting the development of their own WSP. It also conducted a three-day workshop with 13 small supplies and the respective health authorities responsible for their surveillance. Furthermore, the German Drinking-water Suppliers' Association (DVGW) assessed to which extent the German system of technical rules encompasses WSP aspects. The overall target was an assessment by practitioners of what would change if the WSP concept were to be implemented in Germany, of the practicability of the concept and of potential benefits as well as drawbacks. It was emphasized that the result of this assessment was completely open, i.e. that the project was not a promotion exercise. Important outcomes of the project were as follows: (i) a large degree of overlap with current practice, with the elements of hazard analysis, risk assessment and system performance being new and largely experienced as positive; (ii) surprisingly, all 13 small supplies assessed the concept very positively and emphasized that regulatory implementation would be needed to make it work in practice, while the larger utilities prefer to avoid a legal requirement of WSP development; (iii) control measures and their monitoring tend to be well developed (in the larger utilities), and little further benefit is perceived in the WSP approach. Interestingly, scepticism was voiced towards pre-defined corrective action as being too prescriptive and "one-track-minded" for complex problem situations; (iv) periodic review was considered beneficial; (v) an opportunity for improved information management and communication was perceived, although there was also scepticism about the benefit of extensive documentation; (vi) concern was voiced of legal requirements being made too detailed and extensive; (vii) the WSP concept should not lead to increased consultancy business; (viii) terminology was found to be important, and DVGW suggests using the term "Water Safety Concept," as "Plan" tends to be understood as something generic to be used 1:1.

WSP activities in Japan (Shoichi Kunikane): Japan is conducting a three-year research study on WSP development in five large municipal water supplies and is developing guidelines on WSP development. All involved are very aware of the necessity of introducing WSPs, with a systematic approach from source to tap being seen as the most important benefit and the novel element in Japanese drinking-water hygiene. Implementation is found difficult under the current regulatory framework, because so many regulations and guidelines are already in place. Harmonizing the concepts is targeted for 2005–2007, financed by the Ministry of Health and organized by a committee for guideline development in the Japan Water Works Association. A particular aspect is that Japan has approximately 8500 small-scale supplies, i.e. serving populations of less than 5000.

Issues identified in the overall discussion:

- The need for integrating the development of WSPs into ongoing developmental projects (or vice versa) was highlighted.
- The UN Secretariat raised emergency and contingency plans as an issue that should be related to the WSP concept.
- WSP exercises tend to raise the issue of documentation, and a need for guidance on the adequate extent of documentation is perceived.
- Experience with WSP development in different nations highlights the major relevance of terminology and careful translation. The various shades of meaning of the word “control” are just one example.
- The discussion around the issue of “review” or “auditing” of a WSP highlighted a need for avoiding being prescriptive for this step. Whereas regular formal audits might be useful for some (possibly chiefly larger) utilities, many small ones appear to be better served by a less formal review, e.g. by the health authority. Formal audits raise a range of questions, including “who audits the auditors?” It was agreed that in general guidance documents, “review” would be a more adequate term than “audit.”

Item #4: Regulatory aspects of WSP implementation

UK Drinking Water Inspectorate’s perspective (David Drury): The Drinking Water Inspectorate expects all 26 private water companies in England and Wales to develop WSPs; at least 10 companies have already made good progress. This move should put more emphasis on investigating improvements in the catchment rather than investing in further treatment. Stakeholders are being brought together more than before; water suppliers are putting more emphasis on raw water quality, as, in the past, the focus on end-point monitoring has lost system understanding.

Output of WSPs will be required to inform water companies’ business plans in 2008 for the Inspectorate’s support of further investment in drinking-water-related improvements. England and Wales is amending its own drinking-water regulations to incorporate a more risk-based approach by the end of 2006. It is important for water companies to understand that WSP implementation covers all of a company’s operating processes and procedures, not just those linked to water quality parameters, and involves everyone from the managing director to the technicians. This is being experienced as very useful.

Problems encountered by the regulator in the implementation of WSPs by water companies include reluctance to be transparent about gaps identified in the WSP exercise; consumers are not viewed as stakeholders; public and political pressure still emphasizes end-point monitoring, because 99.9% compliance is a popular message; and pressure groups are still pushing for monitoring of more parameters rather than accepting the risk-based approach. (In the discussion of this, Michèle Giddings reports the opposite from Canada, i.e. a strong move of environmental groups towards pushing towards protecting the system rather than upgrading treatment.)

New regulations covering the approximately 70 000 private water supplies in the UK (i.e. those not supplied by a water company) will be introduced soon. For non-commercial supplies to fewer than 50 people or 10 m³/day, an entirely risk-based approach is being implemented.

The USEPA's perspective (Roger Gorke): For protection against terrorist attacks, all large systems are required to go through a system assessment, and indeed the process of assessing risk is very similar to that needed for developing a WSP (although part of the hazards identified will be different). While developing a WSP is voluntary, there is doubt about benefits of making them mandatory. Tribal areas are seen as good areas for national WSP pilots.

Introduction to the joint WHO–European Commission WSP project (Roger Aertgeerts): The aim of the project is to review what has or has not been done to date towards WSP implementation in water utilities of different scales. Other stakeholders will be involved as observers (e.g. EUREAU). The findings are intended as background for the revision of the EU Drinking Water Directive. The EC is interested in including new member states and candidate countries. The kick-off meeting is on 22 May in WHO EURO, Copenhagen.

Overall discussion on regulatory aspects: The discussion suggested that the Regulators' Network, to be established in early 2007, needs to be involved in promoting the approach.

Item #5: Tools supporting WSP development

International network on small community water supply management (David Cunliffe): A first meeting of the network took place in Reykjavik, Iceland, in January 2005 and included representatives from 10 countries from all six WHO regions (country and organizational representatives). A follow-up meeting in Alice Springs, Australia, in July 2005 included 21 countries. A common network workspace is now established through WHO web site.

The overall target is to support implementation of the WSP concept with a web-based portal for the specific audience of community supplies that typically have poor access to information. This includes (i) facilitating communication by providing access to technical guidance and management tools; (ii) a questionnaire to gather information on management structures with the aim of providing opportunities to identify other supplies in similar situations; (iii) providing generic tools for translating WSP principles into a site-specific plan, by using existing material as a starting point, e.g. a software tool from Australia as well as models from other countries, including New Zealand, Bangladesh, UK, Canada and Iceland; (iv) a database to support cost–benefit analyses; (v) surveillance and verification tools, i.e. rapid, robust and reliable test kits for the field; this includes both an inventory and a “needs lists”; and (vi) a glossary of standard terms and definitions.

Jackie Sims is the WHO coordinator of the network; the network workspace is accessible through the WHO Water, Sanitation and Health homepage.

WSPortal (Tom Williams): The WSPortal is a WHO web portal launched at the World Water Forum in Mexico for collecting practical guidance for the effective development of WSPs, including case-studies as well as tools for developing plans and/or their elements. The intention is not to create a comprehensive, self-sustained web tool, but rather a portal leading to other web sites and materials. An interactive site, e.g. including a chat room, is envisaged. It is expected to assist in identifying gaps, i.e. issues for which

tools are needed. The need for straightening out of the typical “early-stage bugs” in the system was flagged, while overall the high value of the portal was emphasized.

The Bonn Charter (Tom Williams): The Charter has proved to be a very accessible document. A series of articles — the “Bonn Principles Series” — is being planned, addressing each of the nine Principles. The format will be similar to that of Water 21. Authors will be commissioned for each article.

The WSP Handbook (Guy Howard): A handbook, currently in preparation, focuses on utility systems. For these, it takes users through the steps of developing a WSP in a very concise fashion and tries to provide short examples to illustrate key points. A few full case-studies — as summaries of real WSPs — are given at the end. These are summaries, and while a strong need for published case-studies is perceived, with WSPs the “devil is in the detail,” so their value for users remains to be seen. The document is currently in the stage of peer review. A need for more guidance specifically on conducting risk assessment was voiced in the discussion, and this might be addressed by peer review. Further suggestions include cross-linking to the WSPortal as well as providing more detailed information in a CD delivered with the document. The CD would “whet appetites” for updates on the WSPortal. The high value and strong need for the document were emphasized, and the group recommends publishing it soon rather than trying to keep perfecting it.

A Canadian province’s PC-based risk assessment tool (Michèle Giddings) is a very easy to use electronic risk management tool for site-specific assessments of small drinking-water systems. The tool was developed building upon existing risk assessment tools (e.g. Australia, New Zealand and UK). It can be used on-site and will automatically calculate grades and risk categories, although for flexibility (i.e. to include on-site expert judgement) it provides an option for moving the final grade up or down one level. It further suggests options for management. The tool will identify priorities for action to address risks from the source right through to the tap. The tool is intended to be used by public health inspectors/drinking-water experts together with the responsible operator. The tool is currently being piloted, and results will be compared with inspector/paper-based assessments. The presentation on the system will be uploaded to the WHO portal for small systems.

Application of this approach in Ontario (the province that developed the tool) is expected to require 2–3 years for the initial assessment of all 18 000 small supplies. The electronic tablets cost \$1800 (Canadian dollars) each. The discussion showed that it would be useful to develop this further for application beyond Canada, particularly in data-poor environments where no online link to server-based information is possible.

Special application tools (Yves Chartier): This tool targets those responsible for water safety installations in large public buildings and gives guidance on how to implement the WSP concept within the building. The discussion emphasizes the importance of this approach to complement the risk management by the utility. A need to connect this to other documents, e.g. on *Legionella* and on plumbing, was identified, and this would be more than just cross-referencing. Rather, the aim would be to bring together the issues of importance for the attention of the water safety manager of the building.

Quantitative health risk assessment (Feroze Ahmed and Guy Howard): A simple, Excel-based model for comparing risks was introduced. Quantitative health risk assessment (QHRA) approaches face the problem of quantifying pathogen occurrence. The approach to addressing this problem taken here is to establish ratios between the occurrence of a set of indicators (e.g. thermotolerant total coliforms) and selected pathogens, which was gleaned from a body of literature including occurrence in sewage. This was then used to calculate DALYs in order to compare risks from pathogens with those from arsenic, for different scenarios of treatment, season and settings. DALY scores can be gleaned from a model curve for arsenic and thermotolerant coliforms. The issue of uncertainty is flagged for transferring the dose–response relationships to other settings, as well as for estimating the dose–response relationship between arsenic and different types of cancer. The exercise proved very useful in Bangladesh in order to identify which types of approaches would provide most health benefit, particularly against pressure towards implementing specific technologies that would locally be quite vulnerable to failure. Furthermore, the outcome triggered communication about filling knowledge gaps. Even though not everyone understood the detail, many project participants could use the tool and had a surprisingly good grip on the underlying concept. The model is meant for use by professionals. The discussion suggests that the model can be improved regionally and locally by using microbial data from the region. Furthermore, the introduction of seasonal patterns into the indicator to pathogen ratios (as well as the variability of this ratio) was suggested.

The discussion flags that the level of risk is defined for each separate contaminant, and the more contaminants are included in the assessment, the lower the allowable burden per contaminant in order to achieve the overall public health target. A useful concept is incremental contribution of parameters to the overall burden, as well as incremental reduction of the burden.

Item #6: Round-table discussion on the future plan of work in the WSP arena

Capacity-building: The lack of competence and capacity is a major constraint to increasing the scale of WSP implementation. More capacity with hands-on experience in developing WSPs is urgently needed. This is currently growing, as experience is emerging from implementation in various regions. A need is perceived for a strong coupling of training with gleaning experience from countries that are making a commitment. Identifying champions and establishing twinning partnerships would be one way forward. A further element is developing good training materials by people with experience who come together to share experience and develop materials further

Capacity-building is equally needed for regulators, public health authorities and potential auditors/reviewers. England and Wales are currently establishing criteria for auditors, and sharing these will be valuable, even if 1:1 transfer to other settings may not be adequate.

Coherence of vision is important, towards consistency of the principles advocated, with many examples of how this has been achieved in a wide range of settings. While flexibility to accommodate for specifics of settings is important, discrepancy of messages on the basic principles should be avoided.

Self-access guidance tools have a strong role even without assistance from experts, and the example from Iceland shows that independently of international capacity-building, experience is being developed by water supplies just “jumping in and doing it.”

Policy advocacy: Donor partnerships are important, and to advocate the WSP approach to donors, it helps to address the targets of the donor organization and then outline how the WSP contributes to reaching these efficiently. Donors might be brought together through UN Water.

High-level sensitive indicators for overall impact, i.e. quality improvement (e.g. reduced rates of failures and events, fewer boil water notices), would help demonstrate improvement through implementation of a WSP. This is of critical importance for CSD 2008 for monitoring progress towards achieving the MDGs.

Stakeholder associations are likely to have an increasingly important role in promoting the approach, as they start including WSPs in their discussions and guidance materials.

Assembling economic arguments is very supportive, both at the utility level and for developmental policy.

Tools for measuring success may be instrumental, once applied in areas where success of WSPs can be shown.

Regulatory implementation: A need for regulation at the national level is perceived, but the big question is how to do this. The other big question is who “checks” the WSP for adequacy, and how.

Tools for advocacy and dissemination: The need for the WSPortal is confirmed, and it is recognized that this would benefit from more interactivity; a need for the small systems network is equally recognized.

Working with universities to include WSPs in their curricula is suggested as one way forward.

A continuing stream of sessions on conferences on risk-based approaches to bring experience together is considered useful (e.g. session at IWA in Beijing in autumn 2006), and it does help create informal networks.

The Protocol for Water and Health signatories meet in January 2007, and if advocacy of the WSP approach can be achieved there, this provides a nice two-year slot for demonstrating quality improvements in consequence of WSP implementation.

ANNEX 5: Revised/Additional Text for the Policies and Procedures Manual

Agenda item no.	Agenda title	Required text	Responsible person
1	Policies and Procedures Manual	Terms of reference for peer reviewers	Oliver Schmoll
		Section F: more specific information on how microbial risk assessments are performed and establishing priorities for which pathogens are selected for QMRA	David Cunliffe
		New category added to flow chart: short background documents on parameters where there is concern over exposure because of, e.g., a spill, but there is no evidence supporting occurrence in drinking-water under normal circumstances	WSH
		G1.15: new paragraph to accommodate the preparation of new shorter background documents (e.g. for certain pesticides) described above	John Fawell
		Need/rationale for expanded summary statements (i.e. need for more management guidance on certain parameters)	John Fawell
		Section I (Radiological Aspects)	WSH and Radiation Programme
52	WHO/PES Pesticides	Text on new approach to be taken with WHO/PES Pesticides	John Fawell
78	Nickel	Explain how to derive an allocation factor (non-default) from the TDI using exposure data	John Fawell
100	Exposure Data	Explain that we put out requests for occurrence data on listserv as a means of eliciting occurrence data	John Fawell
140	Chemical Background Documents Specification Sheet	Amendments to specification sheet noted in agenda item plan of work	WSH

ANNEX 6: Regional Concerns

The following issues were raised by the WHO regions during the GDWQ WG meeting (Geneva, 2006) and were addressed during discussions on the relevant agenda items. Agenda items can be searched using the index at the back of the report. In addition, several of the issues raised by the regions have been added in Section 6, Items Agreed to for Fourth Edition.

AFRO

- no participation

AMRO/PAHO/CEPIS

- clarification of Guidelines is necessary, as they have introduced a lot of new concepts and material, which needs to be made more understandable and user friendly
- structure of guidelines could be improved, simpler language could be used
- developing countries need guidance on how to implement the Guidelines when their technical and economic capabilities are limited (need reassurance that deviations from guideline values are politically acceptable if costs are too high to comply — current guidance about exceeding guideline values needs to be highlighted somehow — and need to know what to do if there are too many parameters to measure and how to decide which ones are most important) (prioritization document supposed to do this for chemicals, provide methodology for countries to select chemical parameters for monitoring)
- need guidance on how to take local circumstances (e.g. geology) into consideration when determining what chemical substances need to be monitored (in particular, how to do this without the interpretation that the country is lowering its standards)
- need a list of basic parameters (chemical and microbiological) that should be measured under any circumstances, but particularly where there is a high occurrence of communicable disease and diarrhoea
- there needs to be guidance (similar to Table 5.2, which is categorization of drinking-water systems based on compliance with performance and safety targets, for *E. coli*), but for chemical parameters
- need guidance on how to use the Guidelines (as many countries simply use Annex 4, the tables of guideline values)
- need more guidance for day-to-day activities in the field

EMRO

- no participation

EURO

- no participation

SEARO

- water quality management for emergency water supply (in case of tsunami, earthquake, etc.)
- guidance for tankered water, which is commonly used but which does not usually meet quality standards
- arsenic guideline (10 vs 50 ppb) in relation to overall burden of disease
- household water treatment verification

- arsenic (Colombia has performed cohort study but won't share results until it is published)
- rainwater harvesting (document by Han Heijnen has August 2007 completion date)
- total dissolved solids (TDS) in desalinated water
- excess fluoride
- water quality surveillance in emergencies
- SODIS (Solar Water Disinfection)
- THMs and chlorination

WPRO²

- need for chemical indicators that can be readily monitored (e.g. ammonia for agricultural pollution) — but will ammonia pick up pesticides used to spray railway lines? (this may not be feasible)
- need for default values for iodine and silver, which are used as disinfectants and do not currently have guideline values
- need for practical advice on maintaining chlorine residual levels without aesthetic or disinfectant by-product problems
- need to include guidelines for acute exposures when information available (for spills, etc.) (note that USEPA has updated its short-term health advisories)
- need for cross-referencing and better promoting WHO's cost-benefit evidence to further promote implementing WSPs and other water quality improvements (P&C WG)
- need health guideline for TDS (e.g. when water too saline for rehydration)
- need chemical guideline values that are less stringent for more remote supplies, where analytical achievability is often limited (similar to case for microbial guidelines) – this needs to be a national decision, WHO sets norms, countries decide what's realistic standard in rural settings, otherwise WHO would be considering health in rural settings less important than health in urban areas: this is covered by flexibility in setting national standards; text to be consolidated for chapter 3
- more guidance needed for remote small supplies (Vol. 3) — particularly how to implement WSPs in small communities (see agenda item on updating Volume 3)
- growing interest in household ETV/TPE (performance of household treatment technology)
- activities carried out by DWQC at country level should be coordinated with regional office

² Most of these requests for additional information and advice emerged from training and dissemination activities carried out by Dan Deere for WPRO. More details on these issues can be found in the meeting folder provided to participants.

ANNEX 7: Revised/Additional Text for the Second Addendum to the Third Edition

Agenda item no.	Agenda title	Required text	Responsible person	Status
1B-1	Allocation Factors for Chemical Guideline Derivation	For chapter 8: preferable to use an allocation factor based on real exposure data; explain why 20% is felt to be more realistic than 10% as a “rule of thumb” allocation factor	John Fawell	Done for Policies and Procedures Manual: this text needs checking of adequacy for inclusion in second addendum
1D	Short-term Exceedances and Guidance Values for Chemicals in Emergency Situations	New text to describe methodology for deriving short-term guidance values and use of JMPR acute reference doses for pesticides (probably in section 8.2)	John Fawell	Done for Policies and Procedures Manual: this text needs checking of adequacy for inclusion in second addendum
5	Emergencies and Disasters	Expand on the content for emergencies and disasters in the WSP chapter	Joe Cotruvo, with input from Guy Howard	Not done
10	Levels of Protection	Revised paragraph in chapter 3	Mark Sobsey	Done
16	Water Safety for Travellers	Revised section 6.3	Mark Sobsey	Done
19	Temporary Water Supplies	Additional text for inclusion in chapter 6	Shoichi Kunikane	Done but needs to be revised
20	Vended Water	Additional text to be included in chapter 6	Jorge Latorre Montero	Done but needs revisions
22	Rainwater Harvesting	Additional text for chapter 6	David Cunliffe, Guy Howard, Feroze Ahmed	Not done
23	Household Water Treatment	An additional table dealing with household water treatment	Mark Sobsey	Not done
36	Technical Performance Evaluation (TPE) (formerly Environmental Technology Verification (ETV))	Brief statements for insertion in sections 1.2.9, 2.3, 3.2.2 (with cross-reference to microbial target derivation), 4.1.7 and relevant sections of chapter 6 (e.g. safe drinking-water for travellers), and possibly a separate new section in the GDWQ on ETV/TPE	Mark Sobsey, Joe Cotruvo	Not done
38	Table 7.1	Revised Table 7.1	Ana Maria de Roda Husman	Done but needs revisions
49	<i>Enterobacter sakazakii</i> in Powdered Infant Formula	Fact sheet for chapter 11	David Cunliffe	Out for review
52	WHO/PES Pesticides	Text on new approach for WHO/PES pesticides	John Fawell	Not done
52B	Methoprene	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
52D	Diflubenzuron	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done

Agenda item no.	Agenda title	Required text	Responsible person	Status
53	Analytical and Technical Achievability for Microcystin	Additional text for section 8.3 (analytical)	Yasumoto Magara, Ingrid Chorus	Done
60	Arsenic	Expanded summary statement	John Fawell, Marla Sheffer	Done, but needs revision and needs to be combined with current summary statement
68	Cyanide (Cyanogen Chloride)	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
71	Fluoride	Expanded summary statement	John Fawell, Marla Sheffer	Done, but needs to be merged with current summary statement
78	Nickel	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
85	Cylindrospermopsin	Revised text on treatment	Ingrid Chorus	Not done
86	Dichlorvos	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
87	Dicofol	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
92	Sodium Dichloroisocyanurate	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
		Revised text in sections 4.5 and 6.2 (or Fourth Edition?)	John Fawell	Not done
101	Radon	Additional paragraphs on treatment of radon and mitigation measures	Radiation Programme (Peter Jackson)	Not done
103	NDMA	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
		Addition of NDMA to Table 8.25	Marla Sheffer	Done
104	Pirimiphos-methyl	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
105	<i>Blastocystis</i>	Fact sheet for chapter 11	David Cunliffe?	Out for review
106	<i>Leptospira</i>	Fact sheet for chapter 11	David Cunliffe?	Out for review
109	Harmonization of Use of Term "Risk" and "Risk Levels"	Revised text in section 8.2.4	John Fawell, Joe Cotruvo	Done
121	Novaluron	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
125	Nematodes	Fact sheet for chapter 11	Takuro Endo	Being revised
127	Bromate in Bottled Water	Revised text in chapter 6	John Fawell	Done
128	Potassium	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
130	Pyriproxyfen	Summary statement for chapter 12	John Fawell, Marla Sheffer	Not done
131	Nitrate/Nitrite	Expanded summary statement	John Fawell, Marla Sheffer	Done, but needs to be merged with current summary statement

Agenda item no.	Agenda title	Required text	Responsible person	Status
133	Bottled Water in Emergencies	Revised text in section 6.2.1	Mark Sobsey	Done
136	Corrosion Control	Revised text (maybe Fourth Edition?)	Michèle Giddings	Not done
139	Total Trihalo-methanes	Revised summary statement	Michèle Giddings	Done
147	Lindane	Summary statement for chapter 12 (only if lindane added to POPs list)	John Fawell, Marla Sheffer	Not done
149	Chlorine Residuals	Revised text	Oliver Schmoll	Not done

**ANNEX 8: Chemical Background Documents and Microbial Fact Sheets
for Inclusion in the Second Addendum to the Third Edition and the
Fourth Edition**

Chemical Background Documents

Agenda item no.	New or revised background document	Expected publication
52A	Bti	4th edition
52B	Methoprene	2nd addendum
52D	Diflubenzuron	2nd addendum
53	Microcystins	2nd addendum (updated analytical and treatment sections only)
58-3	Hardness	4th edition
61	Atrazine	4th edition or post-4th edition
66	Chromium	4th edition
68	Cyanide (Cyanogen Chloride)	2nd addendum
71	Fluoride	4th edition
74	Iodine	2nd addendum or 4th edition
78	Nickel	2nd addendum
79	Selenium	4th edition
84	Carbaryl	2nd addendum (short background document)
86	Dichlorvos	2nd addendum (short background document)
87	Dicofol	2nd addendum (short background document)
90	Nitrobenzene	4th edition
92	Sodium dichloroisocyanurate	4th edition
103	NDMA	2nd addendum
104	Pirimiphos-methyl	2nd addendum
119	Beryllium	4th edition (?)
121	Novaluron	2nd addendum
128	Potassium	2nd addendum
130	Pyriproxyfen	2nd addendum
139	Trihalomethanes	2nd addendum (minor revision only)

Microbial Fact Sheets

Agenda item no.	New or revised fact sheet	Expected publication
40	<i>Cryptosporidium</i>	2nd addendum (as free-standing report)
47	<i>Vibrio vulnificus</i>	4th edition
49	<i>Enterobacter sakazakii</i>	2nd addendum
105	<i>Blastocystis</i>	2nd addendum
106	<i>Leptospira</i>	2nd addendum
125	Nematodes	2nd addendum or 4th edition

ANNEX 9: Action Items for Individual DWQC Members and WHO Secretariat

Action is required from DWQC members, WHO Secretariat and external experts on the following agenda items:

	Agenda items requiring action
WG members	
Dr Feroze Ahmed	12-1, 20, 22, 36, 48, 120, 138
Dr Ambika Bathija	7, 17, 60, 61, 63, 80, 82, 103, 119, 135, 141
Dr Ingrid Chorus	12, 17, 19, 27, 28, 53, 85
Dr Joe Cotruvo	5, 17, 18, 23, 36, 48, 54, 58-3, 64, 74, 80, 120, 128, 151
Dr David Cunliffe	1, 7, 19, 20, 22, 28, 38, 49, 105, 106, 129, 132, 138, 151
Dr Takuro Endo	125
Mr John Fawell	1, 1B-1, 1D, 10, 52, 52A, 52B, 52D, 54, 58-3, 60, 63, 66, 68, 71, 74, 78, 79, 84, 86, 87, 90, 91, 92, 93, 98, 100, 104, 117, 119, 120, 121, 128, 130, 131, 135, 136, 138, 146, 151
Ms Michèle Giddings / Health Canada	11, 12, 17, 20, 60, 61, 103, 120, 136, 138, 139
Dr Akihiko Hirose	90
Dr Guy Howard	5, 12-1, 20, 22, 28, 31, 33, 48, 60, 114, 120
Dr Ana Maria de Roda Husman	7, 10, 22, 38, 40, 47, 48, 137
Mr Peter Jackson	17, 53, 54, 71, 92, 101, 120, 130, 135, 136
Dr Suresh Kumar	12-1, 17, 138
Dr Shoichi Kunikane	19, 24, 34, 54, 120, 141
Professor Yasumoto Magara	84, 86, 87, 92, 104, 120, 121, 135, 136
Dr Jorge Latorre Montero	20, 29, 31, 34
Dr Aiwerasia Vera Festo Ngowi	52B, 52D, 84, 93, 98, 117, 146
Mr Oliver Schmoll	1, 7, 138, 149
Professor Mark Sobsey	16, 18, 23, 36, 46, 47, 48, 50, 52A, 92, 129, 133, 151
WHO Secretariat	
Dr Jamie Bartram / WSH	1, 3, 6, 11, 47, 50, 52A, 54, 58-2, 63, 67, 78, 85, 92, 117, 119, 120, 131, 134, 135, 140, 142
Mr Robert Bos	17, 52
Dr Debbie Chapman	31
Mr Yves Chartier	4, 41, 136
Dr Bruno de Benoist	58-2, 67, 77, 79, 128
Mr Bruce Gordon	23
Ms Fiona Gore	79
Mr Han Heijnen	22
Mr José Hueb	5, 34
Dr Poul Petersen	71, 143
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ANNEX 10: Formal Request for Assistance from PCS

WSH will formalize the request for assistance from **PCS** with respect to agenda item #85 on cylindrospermopsin in a memo to the Coordinator of PCS:

The **PCS** Secretariat is asked to do a literature search to see what information is available on cylindrospermopsin and to provide their recommendations to WG members as to whether there are sufficient data to conduct an assessment and, if so, whether this would be feasible through either JECFA or the CICAD process.

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