Water Safety Plans in Public Buildings

University of East Anglia - Norwich, UK
22-23 March 2005
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**ACRONYMS:**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CCP</td>
<td>Critical Control Point</td>
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<tr>
<td>DWI</td>
<td>Drinking Water Inspectorate</td>
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<tr>
<td>GDWQ</td>
<td>Guidelines for Drinking-water Quality (WHO)</td>
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<tr>
<td>HACCP</td>
<td>Hazard Analysis Critical Control Point</td>
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<td>IHR</td>
<td>International Health Regulations</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WSP</td>
<td>Water Safety Plan</td>
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1. INTRODUCTION

1.1 Summary
The issue of water quality in buildings was identified as a concern at the Final Task Force meeting for the 3rd edition of the Guidelines for Drinking-water Quality. Several countries have expressed interest in the development of guidance on good practice in monitoring and managing water quality in buildings. Available evidence indicates that there is legitimate public health concerns related to a range of hazards; diverse exposure routes; and in some cases relating to sensitive sub-populations. Available evidence suggests that globally, trends in underlying 'driving forces' indicate an increasing trend. Developing countries are a major concern. Available evidence suggests that most risks can be controlled effectively but that appropriate controls are inconsistently applied. The meeting was an initial scoping exercise attended by 14 persons from 6 countries. Individuals from a further 8 countries had expressed interest or connected with the meeting by email or telephone/telephone conference. The meeting moved rapidly. Interest in the theme is high and demand for international guidance also. Consensus was rapidly reached on basic issues and a document specification recommended. The last part of the meeting successfully developed a plan of work including means to engage further countries and stakeholders.

1.2 Objective
To produce a free-standing guidance text describing good practice in monitoring and management of water quality in buildings.

1.3 Scope
- all aspects of water safety/quality (drinking water, pools/spas, air conditioning, plumbed-in devices.
- all types of public (i.e. non-domestic) buildings including health-care facilities, schools, multi-dwelling, hotels, working environments.
- hazard identification, risk assessment, risk management.
- an abstract of the above to update (replace) the corresponding text in the Guidelines for Drinking-water Quality per se.

1.4 Process
- identification of interested/participating countries and relevant expert networks and partner organizations.
- initial telephone/videoconference to discuss and agree this document and agree content and process in full detail, and to identify contributors initially.
- drafts of sections by agreed contributors.
- international meeting of experts to review above and identify additional contributors/peer reviewers.
- technical revision.
- peer review, revision to account for comment received.
- public domain review, revision to account for comments received.
- editing, layout.
- publishing.
2. SUMMARY OF DISCUSSIONS

2.1. Participants

<table>
<thead>
<tr>
<th>Attendees</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Jamie Bartram</td>
<td>Water, Sanitation and Health, WHO - Switzerland</td>
</tr>
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<td>Institute of Health, Department of Environment &amp; Primary Prevention - Italy</td>
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<td>By Conference Call:</td>
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<td>David Cunliffe</td>
<td>Department of Health – South Australia - Australia</td>
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<td>Louise Catling University of East Anglia, Norwich - UK</td>
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<td></td>
<td>Annabelle May Drinking Water Inspectorate, England &amp; Wales - UK</td>
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<td>Helen Risebro University of East Anglia, Norwich - UK</td>
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2.2.First session – Tuesday morning (22/03/05)

General timetable: Water safety framework
Definition and types of buildings
Which hazards are being sought to control?
Population groups to protect
To whom are outputs directed?

Chair: Jeni Colbourne

2.2.1. Boundaries and definitions

The first clear need discussed was for a definition of ‘buildings’
2.2.2 Discussion: types of buildings

Buildings are considered in the European Drinking Water Directive but are only loosely defined as ‘schools, restaurants, hospitals and other similar buildings’. The question of responsibility and legal definitions of a public building was raised with regard to international comparisons.

In French legislation the definition is framed in terms of the users not the owners. The groups are detailed and covered by separate laws (also defined in the fire regulations) as:

- Industry (includes offices) – worker’s law
- Private (home) – private law, users are responsible for the system
- Everything else is public

It is possible to have different laws (e.g. public and workers) applied to different parts of a single building.

In Germany, ‘public buildings’ includes schools etc. The Health department is responsible for the control of public buildings including surveillance. In private buildings the owner is responsible for the water quality and is therefore responsible for the risks and diseases. However, there is no guidance on what to do if there is disease caused by water quality in the home and the owner does nothing to solve the problem.

It is not possible to do a water safety plan (WSP) for each private home. From a health point of view there is still the potential for the water quality to deteriorate in the single household with possible health consequences for both the occupiers and visitors. Guides to plumbing and products exist for individual households which support good practice without a WSP. For apartments and flats someone is responsible for managing the building as a whole. It would therefore be possible and appropriate to have that manager conduct a water safety plan.

Single private dwellings are not included in the Australian building WSPs as they are low-risk groups and difficult to reinforce (DC). After discussion it was agreed that those buildings which have a person other than the occupant (a third party) who assumes responsibility for the building are included in the guidelines, but if the occupier assumes responsibility the building is not covered here. One type of communication for the homeowner would not be how to set up a whole WSP, but the common problems in the domestic household and how best to tackle them (e.g. described in a leaflet). The WSP could however still apply to the architects of single homes.

Agreed principles

The explanation should be based on the different types of buildings as this can be more easily transferred for application in different countries with different regulatory frameworks etc. It was agreed that principles rather than exact definitions were to be used. It was raised that it was not necessary to distinguish between private and public buildings, rather it is the use of the building that is important.

It was agreed to focus on buildings with foundations to avoid the definition becoming too broad. An agreed principle was therefore the consideration of buildings that are fixed and do not move.

Exclusions and cross-over subject areas

A number of areas were highlighted where legislation and/or guidance already exists, or is the process of being created. A number of these areas will be included in this document with cross-reference to such existing guidance. Figure 1 illustrates a number of such points raised at the meeting.
The potential hazards posed by closed spaces were discussed with regard to their inclusion in this document. However, ships, planes, trains etc (conveyances) occupy a very different position to buildings as considered by the WHO as they exist in both national and international space. The formal role of the WHO is therefore different as the International Health Regulations (IHR) guides exist for conveyances. WHO therefore has a legal standing as well as an advisory position.

There is also separate guidance for water safety in emergencies (including refugee camps etc.).

Humidifiers, fire-fighting, sprinklers and dialysis needs are considered elsewhere so cross-referencing is required.

In principle, these exclusions and cross-referenced areas will need to be drawn together.

Excluded subject areas whereby separate guidance either exists or is in the process of being constructed:
- Conveyances
- Plumbing
- Temporary systems (e.g. seasonal campsites)
- Materials (materials guidance covered elsewhere)
- Food production facilities: this includes the place where the food is being prepared (washing hands, cleaning etc.) but does not include the water that is used within the food production. Food safety legislation exists to cover this (Codex Alimentarius). Air conditioning, sprinkler systems etc. are not covered by the food legislation although they may lead to ingestion or contact.

Other inclusions

Airports, ports, railway stations – in principle these will be included, but when they are part of an international system of travel there will be cross-references to other standards and regulations.
Water in food preparation and production is subject to a different legislation procedure (covered by the Codex Alimentarius). However, where water is not considered as a raw material in food production, WSPs will be applicable, therefore public food manufacturers, food premises, market places and food retail are included. Mobile food vendors and portacabins, with water systems not used in food production are also within this remit.

2.2.3 Types of Hazard to be included

All exposures
- All water
- Ingestion (including public water displays)
- Inhalation (including public water displays)
- Contamination (equipment)
- Cross-contamination (water used for cooking)
- Drinking
- Skin contact
- Hot water - scalding
- Drowning e.g. water displays in shops etc

Specified microbial hazards:
- Legionella
- Pseudomonas aeruginosa
- Fecal contamination
- Aspergillus
- Non-TB mycobacteria
- Antibiotic resistant organisms

Chemical hazards:
- Copper
- Lead
- Nickel

Materials of construction:
There will be a number of subheadings covering a selection of materials in construction in contact with water including metals, plastics, etc. There will be a degree of overlap between materials of construction and the individual chemicals themselves. As described above, there will be cross-reference to existing materials guidance. Materials can also have an important influence on microbial activity and levels. The constructor must therefore understand the principles of risk e.g. use of certified materials, consideration of local water quality.

Stagnation of water
For example long pipes. There must also be some emphasis on the types of connections. With pressure connections, spaces may exist where stagnant water collects and disinfection is not possible.

Quality of supplied water as a hazard (source)
This will also include private water supplies. A sub-component of this is the siting of septic tanks.

Storage of water as a hazard
Storage of water will be considered as clearly different from stagnation, non-plant systems.
Swimming pools, spas etc
Separate guidance exists on these where the building manager is responsible, however the manager should also have a water safety plan. Therefore there is a degree of cross-over (see Figure 1).

Accidental or deliberate contamination
This is an important inclusion (although other guidance also exists). It would be one of the responsibilities of the building designer to make this form of contamination difficult. There was a question of definition as WHO defines ‘water security’ as reliable access to water.

Contingency water safety plans for abnormal and aggravated situations
Consideration of the altered needs of a water safety plan in emergencies e.g. droughts or loss of supplies will be included.

Plumbed in and containered water
Both plumbed in (piped) and containered water (e.g. coolers) are to be included within the scope of this document. It was agreed that it is the responsibility of the building manager under a water safety plan to ensure such devices are properly maintained. This also includes water bottles that are filled from the tap.
With regard to vending machines, when water is used for making drinks (like coffee) then it is classed as a ‘food’ which is covered by other legislation. We are concerned here with the plumbing and the devices plumbed into the water supply but not the devices themselves. The interest is only in the water up to point of where the device is plumbed in (e.g. there have been outbreaks from vending machines from cross connections and copper etc).

Maintenance of plumbed-in devices
There is an obligation for device manufacturers to give proper guidance and instruction to the purchaser for correct use and maintenance. Part of the risk assessment process should include proper maintenance. Although we cannot advise the device manufacturer, we can stress that the target audience (e.g. building manager) be responsible for the maintenance of the device, ensuring that it is running correctly and operated and maintained according to the manufacturers instructions. They must ensure that the risk from the device is minimised and must consider all devices that have the potential to influence water quality (for example, in Germany, pressure valves used in a dentist encouraged the growth of pseudomonas aeruginosa). There may need to be handover advice when the device is sold.

Accessible water displays
For example aquariums (there have been incidences of restaurant staff putting their hands in fish tank water). Public fountains and displays within buildings are to be included. Additional inclusions are misting sprays (horticulture, supermarkets) and irrigation (in hot countries used for cooling) within buildings, but excluding irrigation of parks etc around buildings.

Grey water/recycled water
Draining and sanitation (grey water recycling) will be considered. There is the possibility of cross contamination to drinking water (cross-connections between water supply pipes and other systems e.g. in offices). There is also rain water harvesting in some countries.

Health care facilities special purposes
PH confirmed the existence of guidelines for very specific health issues. They exist for examples including hydrotherapy, dialysis and birthing pools with the guidance being nationally, and not internationally, generated. Other needs associated with health care facilities include endoscope washing water and sluice rooms.
Water safety plans in developed and developing nations
It was agreed that there was no distinction between countries commonly defined as ‘developed’ or ‘developing’ with regard to water safety in buildings. There is a continuum of shared needs and concerns, of varying degrees and severity, with few situations being specific to developing countries. Water storage and source issues may be of particular concern in some countries, together with intermittent supplies and hazards associated with voiding. A separate distinguishing criteria could be physical environmental conditions (‘hot environments’), where there is a need to consider the proliferation of insect disease vectors.

Additional points for inclusion

- Cleaning chemicals used to maintain system
- Zoos would be included and could have a WSP, however the animals would not be covered.
- Condensating air conditioning systems, recirculating systems, one pass systems will be included.
- Intermittent supplies, varying pressures, voids and backsiphonage must all be considered.
- Salinity of water (corrosiveness e.g. saline groundwater, grey water or sea water for cooling purposes) to ensure the proper system is used.
- Fitting designs for hygiene reasons should be considered (e.g. taps). Water quality must be correct at point of use however re-splashes can contaminate outlets.

The siting of air inlets to a building was discussed with regard to outlet drift from other sites. However, it was agreed that this was a boundary issue and would come under the remit of air quality rather than water quality. This will not be considered within the water safety plan.

2.2.4 Identification of at risk populations

A key point is to identify the users of the water systems in a building using a similar approach to the hazard analysis critical control point (HACCP) system of management.

- People in a building
- Workers are clearly defined
- Healthy consumers – no existing co-morbidities to allow contrast with higher risk
- High risk long term (e.g. care home residents)
- High risk short term (e.g. HIV positive person visiting somewhere with re-growth problems, predisposing health conditions visiting area, recently discharged patients)
- Low risk short term (e.g. hospital visitors)
- Immunosuppressed individuals
- Individuals with internal medical devices e.g. catheters
- Also includes Children (e.g. lead in schools)
  Elderly
  Mentally impaired

The report may need to look disproportionately at lead as a risk for children in schools. There may be a need for greater risk management in schools (e.g. re-plumbing due to the presence of lead), whereas it may not be so important in the domestic setting. There will be different implications for certain high risk individuals with regard to varying settings in a building. For example, individuals with pulmonary disease are at high risk for legionnaires but not health hazards associated with lead exposure. Additionally, demographic changes and at risk populations, e.g. elderly cared for at home, present an increased need for awareness of water as a route of exposure to risk.
Table 1 illustrates how this could be expressed as a hazard-building matrix to identify at risk populations. This will allow the identification of issues which may then be specifically addressed, for example if the building exposes individuals to a higher risk, or serves those of a higher risk.

Table 1 Illustration of the hazard-building matrix for the identification of high risk populations

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<thead>
<tr>
<th>Building</th>
<th>Hazard</th>
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Different high risk populations may be identified in each box

Therefore different hazards in different settings may have different at risk groups that need to be reviewed.

2.2.5 Directed Outputs

The main audience for this report will be building managers. Potential outputs may be directed at professional bodies and consumers creating advisories for these groups.

An objective is to engage professional bodies (representing various groups) to update/improve their official guidelines and recommendations. Such bodies could include doctors, dentists, practitioners, architects, building designers, etc. It is very important to include the designers of buildings as often what they do can cause problems (e.g. current UK legionella example of architect being taken to court).

Possible levels of output were discussed for example, high (technical expertise architects/designers) or low (e.g. leaflets for homeowners). Broader warning advisory notices may be used to warn susceptible individuals of hazards e.g. steam rooms and heart attacks. The response to hazard identification does not have to be tighter regulation but could be the use of advisory measures rather than environmental management. This could especially be the case if advising health benefit or promotional effects (this may require special comment).

The report will present two levels of information:

Section 1 – Principles
- Risk analysis
- Background
- Reasoning
- Logic
- Appraisal of issues (a number with cross-referencing)

Section 2 – Discrete information for specific user groups
- Specific guidance

Although cross-referencing will be required due to a number of cross-over issues (as illustrated in Figure 1), the report will attempt to minimise this need by optimising the relevant information contained within.

Stakeholders and identified audiences for this report are listed on page 17.
2.3 Second session - Tuesday afternoon (22/03/05)

Timetable: Outline of product - Title
Table of contents
Target audiences
General style, approach and level

Chair: Paul Hunter

Title: Water Safety in Buildings. (No by-line, this may be added at a later date).

Preface – describing the scope and intention of the report.

The introduction will contain diagrammatic aids to assist people in getting to know their water systems. Examples will be given but will not be prescriptive. There will be a description of the process – i.e. how to describe the water system, identify control measures, how to monitor, management plan etc (linked to HACCP system).

Overview:

The possible health implications of known hazards will be presented in a real world context with examples and detailed case studies given of special health issues in buildings. Hazard trees will then be presented to describe what may be causing such health problems, followed by technical information describing how these risks may be managed. Finally, management roles will be described addressing connectivity and interactions between roles, with the interconnectedness of roles and responsibilities. It is acknowledged that these roles will vary internationally.

2.3.1 - Hazard Identification

This section will provide an early illustration and explanation of the real world importance of this document and water safety plans, by illustrating the costs of poor water safety.

There is already plenty of information listing microbial & chemical hazards; there is no need to re-write this in a chapter. People need to think about the social and economic impact relevant to their water; this should be demonstrated with a number of outbreak case studies. The vast majority of outbreaks will be for Legionella but the idea is to provide an unbalanced set of multiple case studies (e.g. Giardia outbreak in Glasgow) to make it relevant to all. The examples will also be scaled by the number of incidences occurring therefore it will not be restricted solely to outbreaks. A variety of hazards (e.g. chemical, microbial etc) in different buildings and water usage situations (e.g. hospitals, schools, hotels, swimming pools, poor repairs etc) should demonstrate adverse implications in a number of arenas (e.g. health outcomes, economic burden, tourism and judicial, criminal and legal implications, duty of care etc) for multiple user groups (including the young, old, immunocompromised, the healthy etc). The report will therefore illustrate additional cost savings and benefits to users in addition to those related to health. This section will provide a transparent rationale for the motivation of each audience to implement a water safety plan by illustrating the benefits.
The evidence will be presented both in terms of data as well as clear cut evidence from interventions. In this section, the case studies should be linked with a binding narrative but should also be placed as stand alone examples in boxes interspersed throughout the report. The panel is to receive case studies from group participants (with lessons learned) e.g. DC legionella hospital case study. These unbalanced case studies can be ‘internally’ peer reviewed; they do not have to be published.

This section should highlight that the greatest risks with regard to water safety are found when there is independent action by a number of parties.

**Further suggestions:**
- Showing the number reduction of nights in beds in hospitals due to cheap intervention will engage the audience. Include a review of the evidence of adverse health outcomes.
- The broad ‘benefits’ also need to be outlined; pointing out benefits that other people have gained will be the only way to get action from the audiences.
- DWI is collecting all the complaints data from the water companies, the time spent on complaints is a hard cost. Problems in buildings often cause the cost to be borne by the supplier instead of the customer.
- There should be something for Legionnaire’s disease; not just the impact but show how poor management within a hotel can cause an outbreak, illness, death and economic impact (this all may result in legal action, duty of care and the possibility of being charged with manslaughter). ME’s example of pseudomonas and tap filters would be good to include.
- Hospitals waste a lot of money on inappropriate controls for Legionnaires. Control for the problem must be proportional and this must be highlighted to avoid the waste of money.
- Tap hygiene –the scale of the problem should be identified and illustrated with chemical examples (installations in buildings).
- Bad repairs should be identified.
- A hazard tree will allow the reader to get ownership of the information in the book; it will answer why they need to read it. Real world examples will illustrate the necessity of the information in the book (case studies and statistics).
- Section 1.4 lack of learning from repetitive inquiries into adverse incidents should be highlighted, many of which have identified common themes (JC).
- Section 1.3 HPC document from ME.

**2.3.2 – Effective Water Management Actions**

Water safety plans will be illustrated and detailed for normal working situations, however abnormal situations (e.g. unusually poor quality source water) and aggravated situations will also be covered.
This will include an outline of the hazards and management options (awareness, training, specifications) for individual factors. The different hazards will be organised by actors. The necessary people involved would be identified as well as how to improve their awareness and training. In section 2.4, supporting measures includes training of all persons involved e.g. builders, plumbers etc.

### 2.3.3 – Organising actions

Interference with the system (including routine maintenance and repairs) is a risk in its own right and should be captured in section 3.3.
- HACCP: A flow diagram for typical building with all things that can go wrong but demonstrates normal conditions.
- WSP involves: System Description, System Assessment, Control Measures, Monitoring and Response – the end result should be a diagram so CCPs can be readily identifiable.

#### 2.4 Third session - Wednesday morning (23/03/05)

Discussion of Tuesday’s conclusions & David Cunliffe’s comments

Chair: David Drury

Telephone conference with David Cunliffe (Water Quality Advisor for the South Australia Department of Health). David is starting an Australian WSP for health care facilities (including small commercial type premises, surgeries and dentists).

##### 2.4.1 What about horticulture centres?
- These can be contained within buildings. An example for horticulture centres is an outbreak of legionella from a fountain in a greenhouse.

##### 2.4.2 What about plumbing devices?
- Specification of the device itself not to be included, only water up to (and not beyond the machine) should be included.
- DC: There was a case of **legionella from a hospital ice machine**. A carbon filter was fitted before the machine which removed the free chlorine. This fitting was required by the manufacturer. This information is in the public domain but remains unpublished so would be ideal for the case studies of this report.

##### 2.4.3 Birthing pools

Relate to hospital infections and therefore hospital policy.
- DC: The hospitals manage spas and baths and they are not covered by legislation and therefore many have been removed. There are preventative measures that can be employed (self draining and maintenance).
  - It would be best to collect all the **actors into functions**. Grouping into function will avoid problems with commonality of who is responsible for what in other countries e.g. building owners and managers will be in one group. See list of Stakeholders.
2.4.4 International/National Guidelines. For hospitals and dialysis it is likely that the regulations will be national rather than international (and therefore may be difficult to cross reference for all countries). Medical and microbiological people may want to get involved and therefore could get unmanageable.

- DC: There is a lack of understanding for managing water quality; an international document would be welcome. It is important to not repeat other regulation and to be specifically guidelines for water quality in buildings.

2.4.5 What about Beauty salons?

- DD: There may well be more devices that will come to our attention and this will be the responsibility of the writer of that section to deal with. Section 2.4 will have to include the types of communication and documentation required.

2.4.6 Accidents and emergencies. There will need to be explicit detail on communications and documentation for accidents and emergencies.

2.4.7 Outbreak surveillance. Detail the points of principle not instructions on how to do, there are already general guidelines for outbreak detection and response. If there is an illness in a hotel and there is doubt about the time of the onset, the residence of the person is visited for tests to identify the building that is the source.

| o This group is a small group and therefore not wholly representative of the WHO members. There need to be more volunteers from other countries to take the chapters forward. |
3. LIST OF AGREED SECTIONS

3.1 High Level Structure:
Yves Chartier (WHO) to oversee the whole process, section leaders will work with YC to edit the whole document. The following individuals are required to lead and co-ordinate the 3 sections, to overview the sections ensuring that contributions are forthcoming and are cohesive for the document as a whole:

Section 1 Jeni Colbourne
Section 2 Oliver Schmoll
Section 3 David Cunliffe

3.2 Sub-Section Contributors:
Initials marked in bold represent the main contributors to the sub-section. Length of the section is noted on the left, one side representing single face, A4, 12 point (around 400 words).

Section 1: Introduction and Health Aspects

1.1 Unbalanced case studies. PH – suggested Kim Fox who has investigated many problems in buildings, SS, DD, ME, SH, FV, LL.

1.2 Types of Buildings and associated water systems, uses and associated risks. SS with FV, OS, DD, YC - non-attendees & Emmanuel.

1.3 Types of users and vulnerabilities. ME (with PH), LL, DD. PH to contribute but not on chemical aspects - suggested Jack Coleford (uni Barclay). JB suggested Jenny Pronczuk (WHO) who specialises in Children’s Environmental Health (may be able to contribute re lead/nickel/copper exposure in children).

1.4 National and International policy lessons learned (repetitive enquiries). DD.

Section 2: Effective Water Management Actions

2.1 Review of evidence for effectiveness of control measures – break down by hazardous scenario e.g. sprinklers, showers, aircon coolers. LC (specifically water treatment aspects), SS, JC, FV, OS.

2.2 Process of developing and implementing building WSP. OS. Suggested: Dan Deere & team (Australia).

2.3 Setting appropriate standards (legislative arrangements and provisions) (LC (specifically water treatment aspects), LL)

2.4 ‘Model’ 2 page building WSPs – several of them each covering:
   - System assessment
   - Control measures + CM monitoring + verification
   - Management plan – incl. normal, incident and emergency + supporting measures incl. training and capacity building

   SS (with John), BT (latter part: training, communication, documentation), ME (microbiological monitoring – highlight different approaches in each country) – suggested contact Philippe (France) & K North for situation in India & developing countries, SH, FV. Suggested: Dan Deere & team (Australia).
Surveillance – different approaches incl. certification, audit, testing. This section will not detail how an investigation is done but more focused upon issues in buildings; where there is doubt concerning time of onset will investigate domestic premises (rather than hospitals etc), how to identify which buildings could be the source (LL, BT (overlap with 3.5))

Section 3: Organising Actions

3.1 Complementary roles and responsibilities (one section per stakeholder). YC – will do rough draft of this section with DC for people to read & add to. Within Ch.1 there is a subset of roles & responsibilities which will add to 3.1.

3.2 Specification, design and construction and major upgrades.

3.3 Commissioning and initial higher intensity monitoring including major upgrades. SH.

3.4 Management (incl. repairs, minor upgrades etc.) SH?

3.5 Independent oversight (LL, BT, OS)

3.6 Outbreak surveillance/detection, response and investigation. SS suggested her contact John should help lead this section, PH, ME with Sue to provide German approach. YC – non-attendees & Emmanuel. OS.

3.7 Training providers (BT, OS)

Additional Potential Contributors (linked to 1+ sub-section):

- JC: ENDWARE regulators network – the Eastern European countries can be engaged.
- SS: Czech Republic – Vladimář Drasar.
  - JB: Someone from the UK is required in the position of setting policy.
  - OS suggested colleagues from the Umweltbundesamt (Benedict Schaeffer, Irmgard Feuerpfeil, Thomas Rapp) and local health contacts, as well as Ethiopia (Aberra Geyid), Ghana DWI (Nii Ohei) and India (K.J. Nath) contacts these may not be able to contribute but may be able to review. There is also the Ethiopian Health Institute.
  - Dan Deere & team (including: Guy Howard, Annette Davison, Molita Stevens (?)) from Australia are potential reviewers.
  - FV has a contact in Mexico who may be able to contribute to his sections.
  - PH suggested Julian Dennis (aerosol research) and Christian Alicante (Mexico) may be able to contribute to his sections.
  - DD suggested European Drinking Water States, environmental engineers (Japan) and Alex Mackii (PhD Student) as potential contributors to DWI identified sections.
  - SH suggested international contact Fajiein (?) for her sections.
  - YC suggested Emmanuel & non-attendees on list also need to be considered.
3.4 Policy/Regulation Issues:
  o JC: The BS 6700 represents trade guidelines for buildings. JB: Health and Safety Regulations and consumer regulations need to be considered.
  o JC: there are many different regulations for buildings in different countries (Nick Hallam is possible contact – Map for Water and Health Alliance). ME: In France there are microbiological standards for health care facilities, in the Netherlands there are Legionella regulations. JC: Water is the joint responsibility of many departments in the UK and this is the likely case in many other countries.
  o JB: A sensible and appropriate level of health protection is required with these guidelines. Chapter 3 of the guidelines should address the many regulatory provisions which need to be harmonised without gaps. The level of health protection across all of these provisions has to be established. Mechanisms for consistency between all of the regulations are required. SS: There needs to be an evidence base to change things. JC: Regulatory Impact Assessment and Cost Benefit Analysis all need to apply to very simple cases as well as for developed countries.

3.5 Additional Comments on Guideline Structure:
  o Also need to allow additional pages for Contents, Preface, Abbreviations, Glossary, Table Annexes and an Index.
  o OS: Section 2.4: Should this be a brainstorming exercise, an iterative process to produce a model WSP for buildings? JB: this could be an e-mail exchange so everyone can contribute, determine what to include in the two pages.
  o BT: Should photographs be included in the book? JB: Photographs are avoided when illustrating because they are often culturally-specific but we need to be aware of when they would provide additional benefit. Line diagrams are fine.
  o JB: The style of the document must be like that of the drinking water guidelines. More referencing may be required particularly in chapters 1 and 2. If this style can be followed from the start, then this will avoid extra work later on to get the style consistent. The main line of the logic needs to be clear but comprehensive and interesting.

3.6 Timetable:
  o JB: Before engaging with official bodies it would be wise to have the draft sections done – basically a skeleton of the book.
  o Telephone/Email Exchange. The milestone in October will systematically check progress and review the whole process, an intensive round of telephone calls/email exchange with full progress reports will be carried out over the week commencing 17th October (YC to organise). Section leaders are to go through the sections and identify the problems/issues which need to be discussed during this time, and identify possible gaps in information prior to
the group meeting. To ensure that this has been done, a mini-group meeting may be necessary soon after this week so that the editing process can begin in time for the face-to-face meeting in December. By November there should be a set of draft materials, all sections having the correct orientation.

- **Next Meeting.** ME to host the next meeting at Bonn University between 5-9th December 2005. Meeting dates are to be confirmed but it was suggested that the meeting be held over two days on 8-9th Dec. A site visit and demonstration of the problems experienced and microbiological monitoring at the university hospital will be arranged for the day prior to the meeting (7th Dec) for those who are interested. People from other countries should be invited to contribute but not write text, however, the meeting must be kept to about 25 people so that the same approach can be taken. This meeting will be a ‘Technical Review Meeting’, bringing in people from the various sections identified for cross reference.

### 3.7 Plan of Action:

- **JC** to present the objectives of this plan to the Eastern European countries next month to gain interest, comments and support.
- Repetitive inquiries and reports for section 1.4 should be identified by participants and emailed to JC.
- Case Studies (for section 1.1 and to be scattered throughout report) should be sent to PH for organisation e.g. DC to send PH information on legionella hospital outbreak.
- DC was volunteered for section 3; this is to be confirmed.
- A list of all potential contributors is to be sent by participants to YC. 3.1 and 3.2 currently have no main contributors, members and section leaders to contact YC with potential contributors. DC may have some ideas on possible contributors to this section.
- OS: 2-4 pages outlining the scope and contents of the document should be sent to potential contributors. JB: YC can coordinate information being put on the website and the contacts being directed there for the information. There can also be information put in PDF format to be sent by e-mail of downloaded. Contributions will be formally requested so that there will be small numbers of sensible comments. A general public request is not necessary.
- DD: the section leaders are to decide on the sub-section leaders.
- DD: There needs to be a follow up on the financing. Singapore may be interested.
- JC: There should be an explicit follow up for David Cunliffe as he was unable to attend the meeting, date and content/structure adjustments will need to be followed up.
3.8 Output from discussion groups

3.8.1 Stakeholders

- **Building commissioners**
  - Commissioners
  - Developers
  - Architects
  - Engineers
  - Plumbers
  - Plumbing material manufacturers

- **Building Management**
  - Building Owners
  - Building managers (including leasehold companies)
  - Building maintenance industry (estate managers)

- **Independent Auditors**
  - Regulators
  - Certifying Agencies (e.g. risk assessors)
  - Health and Safety Management
  - Local Authorities (planning officers, environmental health)
  - Independent oversight agencies (local government, public health)
  - Water purveyors?
  - Water vendors?

- **Reactive Public Health**
  - Building Users e.g. vulnerable groups
  - Investigative Public Health
  - Professional Bodies (dentists, medics etc)

- **Training Providers**
  - Water companies
  - Building Commissioner Associations e.g. plumbing, engineers etc.

3.8.2 Devices

- Distribution systems and pipes
- Water outlets and sinks
- Non-touch fittings
- Showers
- Reservoirs for tall buildings
- Pressure valves
- Waste water networks and septic tanks (cross connections)
- Water storage
- Heating systems
- Geysers and hot water systems
• Water coolers
• Ice machines
• Water fountains and exhibits
• ‘Misting’ systems
• Air conditioning networks and cooling towers (stand alone humidifiers (plumbed in)?)
• Fire hydrants, sprinklers and pipes
• Dialysis systems
• Dental units
• Other special medical devices
• Cleaning machines for medical devices (endoscopes…)
• Sluice rooms (medical cross references)
• Closed loop systems
• Water Conditioning, Water Softeners
• Plumbing issues (domestic appliances)
• Drinking water filters (including carbon filters)

3.8.3 Types of Buildings
• Simple system (not necessarily domestic home)
• Apartment blocks and high-rise buildings (booster stations, large storage tanks)
• Hotel with leisure complex and sport arenas (incl. swimming pools, spa baths, showers, saunas etc.)
• Multipurpose public buildings (incl. offices, museums, shopping malls, enclosed markets) (central heating, air conditioning, indoor fountains, fire hoses)
• Schools and Kindergartens (central heating, air conditioning, hot water boiler)
• Hospitals and nursing homes (incl. emergency units, primary care, intensive care)
• Dentists and surgeries (dental chairs)
• Industry and industrial premises (central heating, sprinklers, closed systems, cooling systems)
• Seasonal holiday complex
• Exhibition centres and trade fairs
• Horticultural sites (incl. plant nurseries)
• Food retailers and restaurants
# Annex 1: Detailed list of Participants

<table>
<thead>
<tr>
<th>Name of delegate</th>
<th>Contact details</th>
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<tbody>
<tr>
<td>Jamie BARTRAM</td>
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<td>Name</td>
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<tr>
<td>Luciano COCCAGNA</td>
<td>Consultant</td>
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<td>Professor Martin EXNER</td>
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<td>Dr Susanne Surman</td>
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<td>Ms Annabelle MAY</td>
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Annex 2. Agenda

22nd March

10.30am - Coffee and Registration

11h to 13h - Welcome from:
   - Professor Paul Hunter (University of Anglia)
   - Professor Jeni Colbourne (DWI)
   - Dr Jamie Bartram (WHO)

Introduction of participants.

Introduction of the scope of work
   - Dr Jamie Bartram (WHO)

Review of need and target audience, including any comment on the nature and scale of the problems (as a round table).

13h to 14h - Lunch

14h to 17h - Open session
   - Chair activity to be decided
   - review of the proposed list of contents
   - Head lines / chapters

23rd March

9h to 13h - Open session
   - Follow up on the head lines / chapters
   - List of authors
   - List of reviewers
   - List of experts from developing countries
   - Potential financial contributions
   - Next steps
     o Agenda
     o Meetings

Summary of the meeting

13h to 14h - lunch
Notes will be taken by students from the university and WHO