WHO Guidance on the Protection of Drinking-water Resources

*Why and What?*

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- WHO Collaborating Centre for Drinking-water Hygiene -

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Guidance document

„Protecting Groundwater for Health: Managing the Quality of Drinking-water Sources“

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Key approaches taken within the revision of WHO Guidelines for Drinking-water Quality

- Introduction of quality management principles: Hazard Assessment and Critical Control Points (HACCP)
- Assessment of whole drinking-water supply chain from „catchment to consumer“
Points of departure (2)

- Importance of resource protection as the first barrier in a multi-barrier-approach

- Importance of groundwater as drinking water source: recognition ("hidden-sea-phenomenon") and time scales

- Need for empowering the public health sector for participation in the inter-sectoral process of groundwater resource management
**Intention**

**Health angle!**

Protection of groundwater resources as a health concern

- Provision of guidance and introduction of HACCP principles
- Development of the important interface between environment and health
- Focus on groundwater quality only: pathogens and chemicals ("disease agents")
General concept

Scientific Background Information

Information Needs: Characterisation of Recharge Area

Catchment Specific Situation Assessment

GMP and decision-making criteria

HACCP

Monitoring & Verification
Section I

Scientific background information

- Groundwater system: hydrological and hydrogeological processes
- Health relevance, transport and attenuation of pathogens and chemicals in the subsurface
- Naturally occurring constituents
Section II

Information needs for the characterisation and assessment of the catchment environment

- Provision of basic understanding for current or past human activities and their potential pollutants
- Socio-economic and institutional conditions
- Guidance on type of information needed for assessing potential of groundwater contamination (checklists)
- Guidance on how to compile information (checklists)
- Guidance on situation assessment
Section III

Management approaches

- Aspects of policy and law frameworks, enforcement, institutional capacity building and public participation
- Guidance on general protection concepts (protection zones, wellhead protection)
- Guidance on good management practices (GMP) for avoiding groundwater contamination from specific human activities
- Introduction of HACCP principles and guidance on identification of relevant critical control points (CCPs)
What is HACCP?

Hazard Analysis and Critical Control Points

- Scientific, systematic and transparent management tool to identify and control threats to public health via drinking-water
- Preventative and uniform approach applicable for the whole drinking-water supply chain from catchment to consumer
- Tool for controlling processes in the drinking-water supply chain
Principle I
Identify the threat to public health

Step 1
Hazard analysis and assessment by the HACCP team

**Prerequisite**
Multi-disciplinary HACCP team
**HACCP principles (2)**

Principle II
Identify means for control

- **Step 2**
  Determination of Critical Control Points (CCPs)

- **Step 3**
  Specification of critical limits

- **Step 4**
  Establishment of a monitoring system
Line of thinking

Protection of the recharge area + B2

Agriculture: nutrient management + M2

Stock densities/Manure application + A2

CCP x  CCP y

BARRIER (B)

MANAGEMENT ISSUE (M)

SPECIFIC ACTIVITY (A)
(GOOD PRACTICE)

IDENTIFICATION OF RECHARGE AREA SPECIFIC CRITICAL CONTROL POINTS (CCPs)
CCPs & Good practice

- HACCP does not replace good codes of practice but build on them
- Criteria for identifying CCPs:
  1. Certain process step is critical to control in a specific supply setting
  2. Monitoring and enforcement of corrective actions in the case of non-compliance are possible
## CCPs in recharge areas (1)

<table>
<thead>
<tr>
<th>Management Issue</th>
<th>Critical Control Point (CCP)</th>
<th>Options for Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>avoiding disease agents from <em>any human activity</em></td>
<td>drinking-water protection zone</td>
<td>periodic site inspection</td>
</tr>
<tr>
<td>avoiding disease agents from <em>hazardous chemicals</em></td>
<td>containment during transport and storage</td>
<td>regular inspection of containments</td>
</tr>
<tr>
<td>avoiding disease agents from <em>human excreta</em></td>
<td>distance between latrines and wells</td>
<td>regular site inspection</td>
</tr>
<tr>
<td>avoiding disease agents from <em>human excreta</em></td>
<td>leakage from sewers</td>
<td>regular inspection of sewer condition</td>
</tr>
<tr>
<td>avoiding disease agents from <em>agriculture</em></td>
<td>stock density adequate for local soil/hydrological conditions</td>
<td>control of farm book-keeping, site inspection</td>
</tr>
<tr>
<td>avoiding disease agents from <em>agriculture</em></td>
<td>fertiliser application adequate for local soil/hydrological conditions</td>
<td>control of farm nutrient management plan</td>
</tr>
</tbody>
</table>
HACCP principles (3)

Principle III
Ensure control is properly exercised

Step 5
Execution of corrective actions

Step 6
Verification of the system

Step 7
Record keeping
CCPs in recharge areas (2)

- No single operational or technical internal process but accumulation of different activities
- No single owner of facilities but many different independent players
- Time scale of groundwater pollution