

Safety in drinking water supply - the new DVGW guidelines W 1001 and W 1002

Risk management ■ In recent years, the subject of "safety" has increasingly been the focus of discussions and activities at national, European and international level. New concepts such as the Water Safety Plan concept of the World Health Organisation (WHO) or standardisation activities at CEN and ISO level as well as activities of the Federal Office of Civil Protection and Disaster Assistance (BBK) are examples of this. In this regard it is interesting to note that with reference to the safety of supply, the German term "Sicherheit" refers both to aspects of process safety as well as to security against external interventions in water supply.

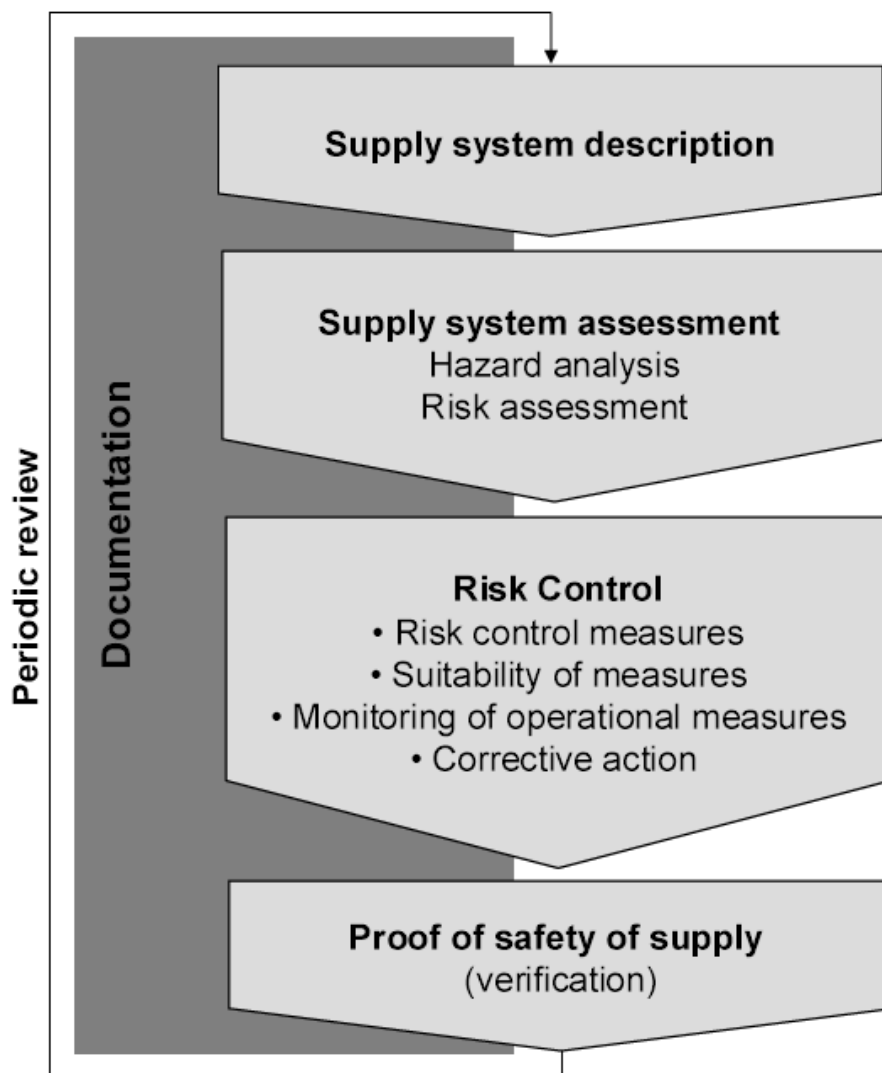


Fig. 1 Overview of risk-based, process-oriented risk management

During the year 2006, the DVGW, in coordination with the Federal Ministry for Health (BMG), the Federal Environmental Agency (UBA) and the Federal Office of Civil Protection and Disaster Assistance (BBK), has decided to face up to the task of developing an overall concept "Safety in the Drinking Water Supply".

The working groups W 1001 and W 1002 set up for this issue by the steering committees W-LK1 "Water management, water quality, water works" and W-LK2 "Water supply systems" have compiled the DVGW guidelines W 1001 "Safe and secure drinking water supply – risk management under normal operating conditions" and W 1002 "Safe and Secure Drinking Water Supply – organisation and management in the Event of a Crisis"; they have been published as white paper in August 2008 [1,2].

The numbering of the new DVGW guidelines W 1001 and W 1002 reflects their proximity to the DVGW Code of Practice W 1000 "Requirements for the Qualification and Organisation of Drinking Water Utilities" as important framework paper regarding the organisation and management in drinking water supply. The method set forth in guideline W 1001 of a risk-based and process-oriented management and the references and requirements in respect of organisation and management in the event of crisis described in guideline W 1002 will consequently also affect the further development of the Technical Safety Management (TSM) and here in particular the TSM guideline.

[Risk management during normal operation](#)

DVGW guideline W 1001 "Safe and secure drinking water supply – risk management under normal operating conditions" describes the principles of a risk-based and process-oriented management for the continuous, in-house examination and optimisation of the safety of supply during normal operation.

These principles are embedded in the objectives and fundamentals of safety of supply applicable to the German water supply. This security is given, if

- the health-related objectives (i.e. the requirements of the Drinking Water Ordinance, DIN 2000 and DVGW W 1000 (A),
- the supply engineering objectives (i.e. according to DIN 2000 and DVGW 1000 (A) to make drinking water available in sufficient quantity and with adequate pressure at every transfer point), and
- the aesthetic objectives (i.e. making drinking water available that is according to DIN 2000 appetising, colourless, clear, cool, entices to indulge and exhibits a perfect smell and taste) are observed.

"Normal operation" is understood to mean all operating states and processes, including faults in the water supply, which can be controlled by the usual means and/or organisation structures selected by the supplier.

Based on the DVGW Code of Practice W 1000 "Requirements For the Qualification and Organisation of Drinking Water Utilities" and the essential elements of the Water Safety Plan concept presented by the WHO in 2004, a method is presented by means of which risks in the operation of drinking water supply can be systematically determined, evaluated and controlled.

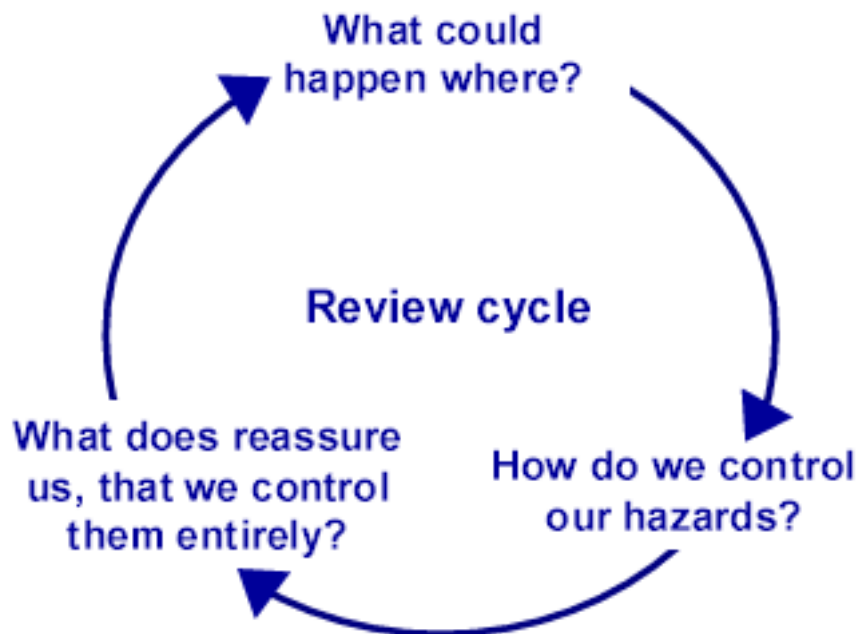


Fig. 2 Basic principle of questions for a risk-based and process-oriented management

Figure 1 shows the essential components of the method:

- Description of the supply system
- Evaluation of the supply system
 - Hazard analysis
 - Risk assessment
- Risk management
 - Definition of measures
 - Suitability of measures (validation)
 - Internal monitoring of measures
 - Corrective actions
- Proof of the safety of supply (verification)

The above-mentioned points are completed by documentation and periodic revision. The latter in particular enables to first start with individual risks or with (sub-)areas of the supply system that are afflicted with risks and to extend the area under consideration by and by until a complete risk assessment has been carried out.

Figure 2 clarifies the basic principle behind the issues of a risk-based and process-oriented management. The periodic revision makes it possible to systematically scrutinise the operational practice, so that potentials for improvement are recognised

and taken up. In addition, it is recommended to apply the method again if there are relevant changes to the supply system, the legal provisions or the technical rules and regulations.

Similarly to using the method to determine and meet risks in respect of process safety, it is also suited for identifying and meeting risks originating from natural disasters or terrorist attacks.

Application of this method serves to supplement the existing Technical Safety Management (TSM) on the basis of DVGW W 1000. The approach to and execution of technical practices, operational sequences and processes in everyday operation described in the DVGW rules and regulations are in this risk management approach considered as being basically verified (base validated). This means, if the water supplier has to take any risk management measures, he can assume the technical rules are suitable, provided they are professionally executed.

From the DVGW's point of view, the method of a risk-based and process-oriented management supports the objective of safeguarding the operational safety and economic efficiency of a supply system in the long term. Specific aspects in this connection are:

- Diligent performance of the operational tasks (overcoming the "tunnel vision")
- Application of the technical rules
- Recognition and elimination of weaknesses in the supply system
- Support of operational planning by a systematic evaluation of the supply system
- Promotion of the internal exchange of experience and safeguarding the practical operational know-how
- Strengthening the organisational reliability
- Improvement of mutual understanding and cooperation with the inspection authorities and further stakeholders as well as communication with the public.

So as to implement this method in everyday operation, a "supporting programme" is currently being developed, which comprises background materials as well as publications and corresponding seminars offered by the DVGW and partner organisations, for instance the BBK or the UBA. An overview of this "supporting programme" has been set up on the DVGW's homepage.

Organisation and management in crisis situations

Even the most sophisticated risk management system still holds a certain measure of residual risks, as

- certain risks are not recognised or cannot be recognised
- no measures for risk management can be carried out or only insufficient measures as far as the cost/benefit ratio is concerned can be carried out
- the risk is perceived as bearable.

For these rarely occurring, hardly foreseeable and therefore unpredictable situations, which cannot be managed by the supplier with his usual means or organisation structures alone, and which often require the involvement of the responsible authorities, DVGW guideline 1002 "Safe and Secure Drinking Water Supply – organisation and management in the Event of a Crisis" has been developed.

The transition between normal operation (including fault management) and a crisis situation depends on the fact how intensely and comprehensively it identifies and evaluates existing risks by means of risk management for each supply company individually, as well as how it has initiated and implemented corresponding risk management measures. A general definition for the start of a crisis situation does therefore not exist (Fig. 3).

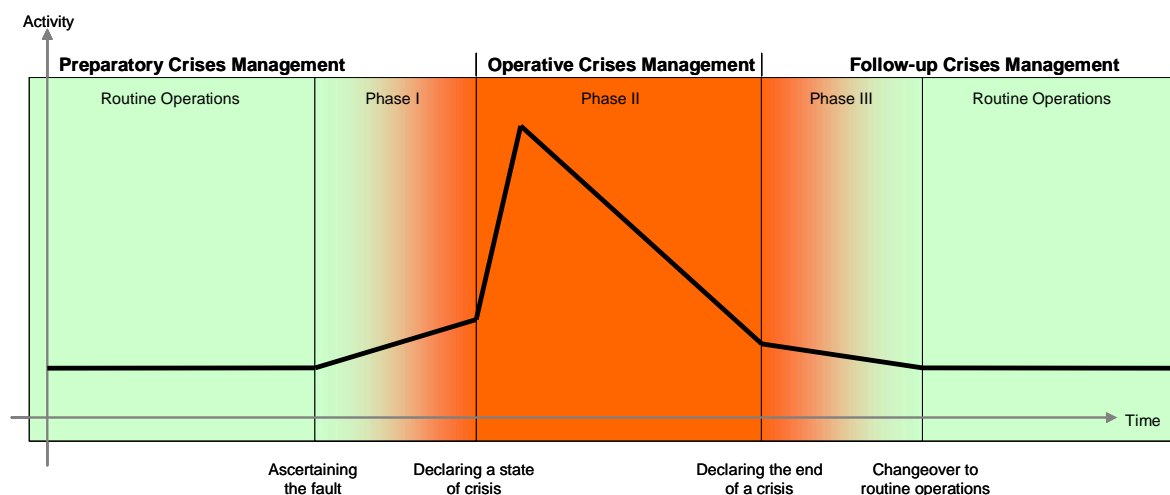


Fig. 3 – Corporate activities over the course of a crisis

DVGW guideline W 1002 formulates the basic principles of an operational crisis management with appropriate recommendations for the water supply company, based on the tried and tested organisation structures of the authorities responsible for civil protection and disaster control.

The focal points in this regard are:

- Possible occasions for a crisis
- Phases and elements of crisis management
- The necessary structural organisation in crisis situations (crisis management group)
- The process organisation inside the crisis management group (alert, establishment, sequence of operations, termination).

In addition, information is provided in the following respects:

- Technical equipment of the crisis management group
- Telecommunication facilities and priorities
- The execution of exercises.

In addition, the guideline reflects versatile information regarding the organisation of the disaster/crisis management of the responsible authorities and the possibilities of cooperating with these in the event of a crisis.

With the publication of guideline W 1002, the DVGW guideline W 1050 "Contingency planning for states of emergency in the public drinking water supply" was withdrawn.

Conclusion

With guidelines W 1001 (Risk Management during Normal Operation) and W 1002 (Organisation and Management in Crisis Situations), the DVGW supplements its recommendations regarding the organisation and management in water supply (DVGW Code of Practice W 1000:2005) and creates an overall concept for the industry with regard to the topic of safety. The guidelines will soon be included in the "Technical Safety Management" of the DVGW so that the most important elements can also be considered for future initial and repeat assessments.

A launch event for the purpose of introducing the contents of guideline W 1001 and its relationship to guideline W1002 will be held at the Gas-Water-Centre in Bonn on 7 May 2009.

Further information can be found under: <http://www.dvgw.de/wasser/organisation-management>

Literature

- (1) *DVGW guideline 1001: Safety in the Drinking Water Supply - Risk Management during Normal Operation (August 2008)*
- (2) *DVGW guideline 1002: Safety in the Drinking Water Supply - Organisation and Management in Crisis Situations (August 2008)*
- (3) *Schmoll, O. and Müller-Wegener, U: The third edition of the WHO Guidelines for Drinking Water Quality: Background and new developments, GWF Wasser Abwasser 145 (13), p. 10 - 16*
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