

THE QUALITY ASSURANCE IN A DRINKING WATER SUPPLY

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Abstract

Careful and continuous assessment of likely sources of risk and the development of a management plan for the drinking water supply are important to ensure the sustainable supply of safe drinking-water. A management plan outlines requirements in both normal operation and during “incidents” where a loss of control of the system may occur.

In this paper we evaluate the basic steps which are needed in a crisis situation assessment, as part of control of drinking-water quality for public health protection.

Key words: quality assurance, drinking water supply, risk management

1. Introduction

In the domain of water supply a crisis appear in the following circumstances: inadequate performance of drinking-water treatment plant, spillage of a hazardous substance into source water, unusual turbidity, taste, odor or appearance of water, measurement of unusually high faecal indicators densities, outbreaks of potentially waterborne disease. [1,2]. In all these situations and anytime when an important problem in water distribution appears, the elaboration of an emergency plan is needed.

In this view, a close collaboration between involved experts is necessary. They have to elaborate calmly the correct reactions imposed in this urgency situation. All those who manage a crisis must impart their experience in the field [3].

During of the crisis we can describe five principal steps (according to Figure.1):

- the alert;
- the decision;
- overseeing the decision;
- the return to normal state;
- the evaluation.

2. Basic steps in a crisis situation assessment

First step: the alert

The alert is the first link of the intervention chain, which is the weakest.

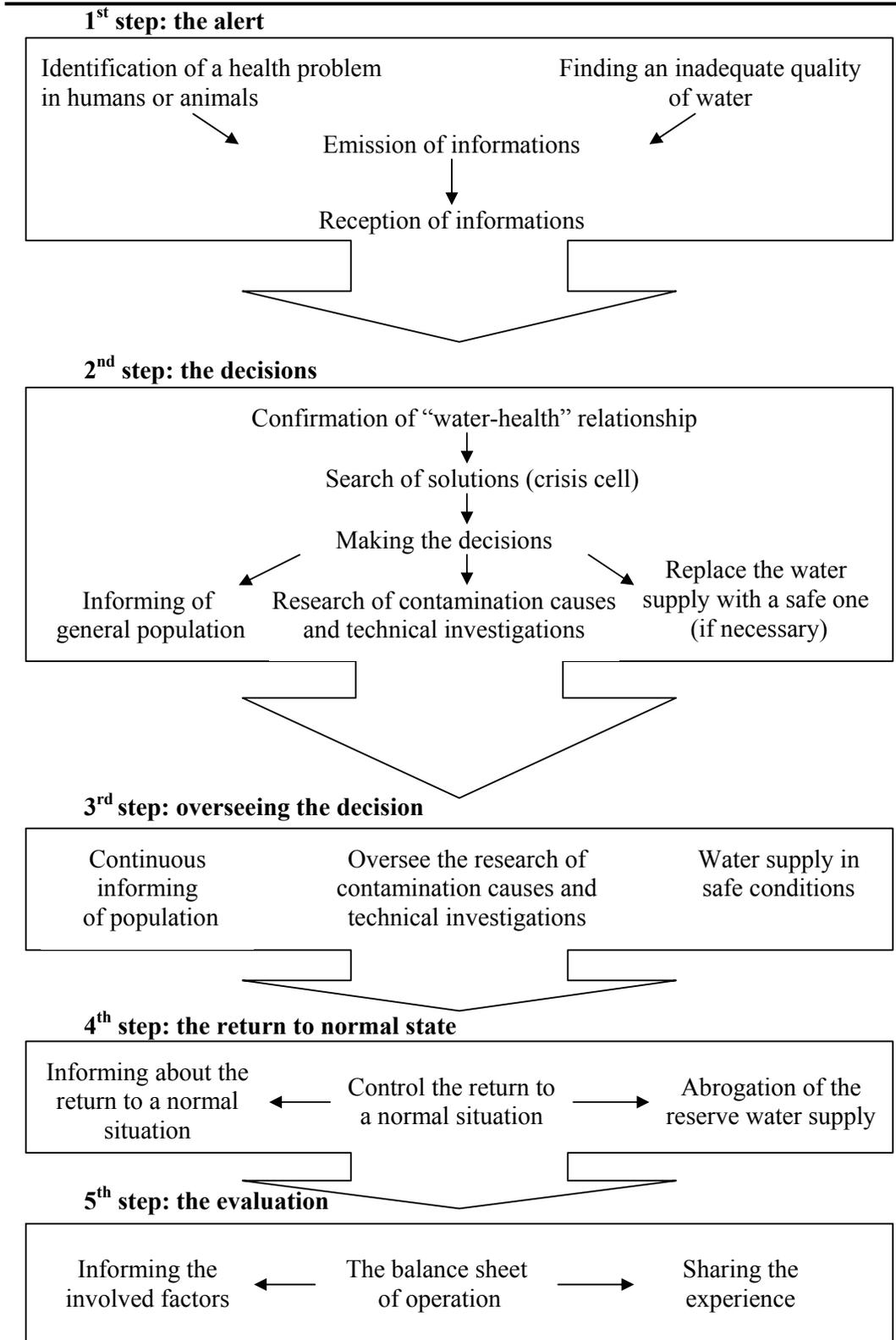


Figure 1: The management of a crisis situation in drinking water supply

A&QT-R 2004 (THETA 14)
2004 IEEE-TTTC – International Conference on
Automation, Quality and Testing, Robotics
May 13 –15, 2004, Cluj - Napoca, Romania

The identification of a health problem in human or even in animals can cause the alert.

The alert can be break out in the following situations: the inadequate quality of water at the sanitary control, inadequate results of the producer's control and consumer's complaints [4].

Before to break out the alert, is important to check the information and, eventually, to complete it.

Second step: the decision

In case that the alert was based on identification of a health status problem, it is necessary to confirm a possible water-health relationship and to exclude a possible foodborne disease.

Depending on severity of situation, will be established a crisis cell. It includes the participants of different local interested departments, including water suppliers and health authorities. Also, plans for emergency water supplies will be developed, in consultation with relevant regulatory authorities and other key agencies. Emergency plans should clearly specify responsibilities for coordinating measures to be taken, a communication plan to inform users of the supply, and plans for providing and distributing emergency supplies of water.

The assessment of the solutions depends on the severity of situation. The situation is considered major upon the following criteria: if the estimated risk is important, the risk cannot be assessed, the causes of the health effects are unknown, the appearance of an important reaction from the residents or from mass media [5, 6].

During this phase, after risk assessment at departmental / national level, the following solutions can be decided:

- to close the supply. This decision carries an obligation to provide an alternative safe supply.
- to survey the distribution of unsuitable water with the condition of a proper informing of population, not to use the water for drinking and cooking. In this case it is necessary the epidemiological surveillance of population.
- to survey the water distribution with restriction for certain users (food industry, dialysis etc.);
- to survey the distribution without restriction but with information.

The decision must include:

- to study the contaminants and to establish the adequate technical measures;
- to replace the water supply, to assure the special device for water treatment or to distribute the water with the tank or bottled;
- during an emergency in which there is evidence of faecal contamination, it may be necessary to increase disinfection at source, or to rechlorinate during distribution. If the quality cannot be maintained, consumers should be advised to boil the water during the emergency;
- to inform the public or only certain subscribers considered more sensible because of the health or of their activity (in food domain, pharmaceuticals domain, dialysis, etc.).

Third step: to oversee the decisions

The decision established during the previous step, are followed by their implementation in a period of time varying among days - weeks - months. All those

who are interested must be informed about the decisions and this period of time, including the general population [7]. Implementation of improvement plans will often have significant budgetary implications and therefore may require detailed cost-benefit analysis and careful prioritization in accord with the outcomes of risk assessment. Implementations of plans should be monitored to confirm that improvements had been made and are effective.

Fourth step: return to normal state

The decisions taken can be interrupted only after the return to the normal situation attested by official laboratory analysis. This situation represents the subject of an information realized by the same authority, presented in the same form and distributed according to the same protocol as the initial information regarding the restriction of water supply [8].

Fifth step: the evaluation

This is the last phase, but not less important, being an integrand part of management. It consists in the achievement of a balance sheet upon the management of the crisis and the establishment of valuable conclusions. The crisis experienced could be a lesson useful in the future work.

To lay down a wrote balance sheet in great detail is necessary for information of all interested levels:

- ministerial: to send a declaration about the accidental pollution;
- departmental: to inform all participants or the interested persons about this type of problems;
- local: to inform the decisional factors about the vulnerability of drinking water supply.

Should be established an appropriate documentation and reporting of the incident /emergency. The organization should learn as much as possible from the incident to improve preparedness and planning for future incidents.

3. Conclusions

In the domain "health – environment", the management of a crisis include five principal steps. They are chained from the alert to making the decision and thereafter the overseeing their implementation to return to a normal status; all interventions will be finally evaluated.

An essential element and beforehand to begin an adequate reaction is the first phase, the alert. In this domain in our country we still have to do some progresses concerning the epidemiological surveillance of the population, the alert system and the control of water quality, especially upon parasitological and virusological aspects.

Concerning the factors involved in the management of an urgency situation, the individual capacities to improvise, are sometimes a valuable help. The choice of pertinent reactions in urgency is intensely conditioned of preliminary preparation in calm conditions. In this perspective, the public authority must elaborate the documents of reference that allow to local factors to prepare itself with a view to manage the "unusual situations". It is necessary a better determination of the roles in each domain, also.

A&QT-R 2004 (THETA 14)
2004 IEEE-TTTC – International Conference on
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One of the key points of a good preparation consist in the systematic assessment of the conditions for technical deployment of operations and of the population's perception about the incidents which everybody could experienced. In this butt, it is important that a balance sheet to be elaborated in order to serve for the experience and knowledge exchange. This fact is important for education of each person who could be confronted, once, with this kind of problems.

References:

1. Popa M., (2001), Concepte și tendințe privind poluarea mediului înconjurător, Quo Vadis, Cluj-Napoca, 200pp.
2. Curseu D., Ionut C., Cristea C., Surdu S., Popa S., Zeic A., (1999), Cadmium levels in surface and groundwater in Copsa Mica, *Jurnal de Medicina Preventiva*, Vol. 7, No.1, 34-44.
3. WHO (1991), Strategy and program for development of European environment and health information systems, Regional Office for Europe, ICP/CEH 074, 5625/5694, 200 pp.
4. WHO (2003) Guidelines for drinking-water quality, Third edition. Geneva, World Health Organization.
5. WHO (1997), Guidelines for drinking-water quality, Second Edition. Volume 3. Surveillance and control of community supplies. World Health Organization, Geneva, 238pp.
6. Surdu S., Gurzau A., Gurzau E.S., Curseu D., Faraian D., Bereczki A., Cristea C. (1998), Risk Assessment / Communication in a Lead Contaminated Area of Romania. *Central European Journal of Public Health*, Vol.6, No.2, 123-126.
7. Copenhagen Health Services (1994) Healthy city plan of the city of Copenhagen 1994-1997, Healthy cities project, 246 pp.
8. Commissions of the European Communities, Brussels, (1991), The results of the CORINE program: "Operational information on the state of the environment in the Community and lessons for further Community action", 120 pp.