

Recent progress in WSP application in Japan

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Introduction

A Water Safety Plan (WSP) [WHO, 2004] is a useful tool for ensuring drinking water safety, and both the government and local water supplies in Japan have been much interested in its application to drinking water quality management [Kunikane, 2007]. This paper describes recent progress in WSP application in Japan.

Guidelines for WSP development and other related materials

The Ministry of Health, Labor and Welfare (MHLW), Government of Japan, issued the guidelines for WSP development [MHLW, 2008], which were drafted by a committee of the Japan Water Works Association (JWWA), in May 2008 together with a notice of recommending the application of WSP to drinking water quality management in local water supplies. The following materials were also prepared as the annexes of the guidelines.

- Computer software with pull-down menus and templates, including a WSP format (Word file) and a file for hazard analysis (Excel file)
- Examples of WSP development case studies for small water supplies; a rapid sand filtration system (one case), a slow sand filtration system (one case), and disinfection only (two cases) [JWWA, 2008]

The draft English versions of the above computer software and the instructions on its use have also been prepared [JICWELS, 2008].

One of the features of the guidelines is recommending the utilization of water quality monitoring data for hazard identification because all the water suppliers in Japan should monitor raw and finished water quality on standard and other parameters. A hazard control sheet, with items as shown in Table 1, will be prepared based on the

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Table 1 Items to be included in a hazard control sheet

Item	Example
Location of event occurrence	Water source
Hazardous event	Spill of industrial wastewater
Related water quality parameters	Cyanides
Risk level	3
Frequency of occurrence	Once a year
Degree of impact	Significant
Existence of control measures	Yes
Monitoring methods	On-line monitoring
Control points	Prechlorination

result of hazard analysis according to the guidelines. The computer software also stresses the importance of hazard identification listing 237 different potential hazardous events in its pull-down menu.

WSP incorporation in drinking water quality management in local water supplies

Although many water supplies are on the way of WSP development, some have already developed it or even incorporated it into their water quality management as below.

Tokyo Metropolitan Water Supply

WSPs have already been developed for the whole system, including seventy-one water treatment plants/stations and water distribution network. They are put into practice together with ISO 9001, for quality management in water treatment plants, and ISO/IEC 17025, for analytical quality control in a water quality examination laboratory, under the “Tokyo High Quality Water Management Program”.

Osaka City Water Supply

The ISO 9001 certification has already been obtained for the water treatment plants. A comprehensive water safety management program will be developed incorporating a WSP with ISO 9001, for quality management in the water distribution network, and ISO 22000, for drinking water safety management, to be obtained in due course.

Kobe City Water Supply

A WSP has already been developed for Sengari Water Treatment Plant. A new WSP covering the whole system of Kobe City Water Supply is being developed at present, where the WSP for Sengari Plant will be revised and incorporated.

Conclusions

The way of WSP application to individual water supplies may vary according to their situations, but there is no doubt that WSP is essential for ensuring drinking

water safety. Hazard identification seems a key component of WSP. It is expected that WSP will be widely applied in water supplies, especially small ones, in Japan.

References

- Japan International Corporation of Welfare Services (JICWELS): Assisting program for developing WSP (CD-ROM), September 2008.
- Japan Water Works Association (JWWA): Case studies on water safety plan (*in Japanese*), 2008
- Kunikane S.: Application of “Water Safety Plan” to drinking water quality management in Japan, Proceedings of the 7th US-Japan Governmental Conference on Drinking Water Quality Management, Okinawa, January 2007.
- Ministry of Health, Labor and Welfare (MHLW): Guidelines for the development of a water safety plan (*in Japanese*), May 2008.
- World Health Organization: Guidelines for Drinking-water Quality, 3rd Edition, Vol.1: Recommendations, 2004.

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US-Japan Governmental Conference
2-5 March 2009, Las Vegas

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WSP application in the world

- IWA website: WSPortal
- “Bonn Charter” (IWA, 2004)
- Incorporation in the regulatory framework in New Zealand
 - As Public Health Risk Management Plan
- Under discussions in EU
- WSP development in UK companies
- Application in many developing countries

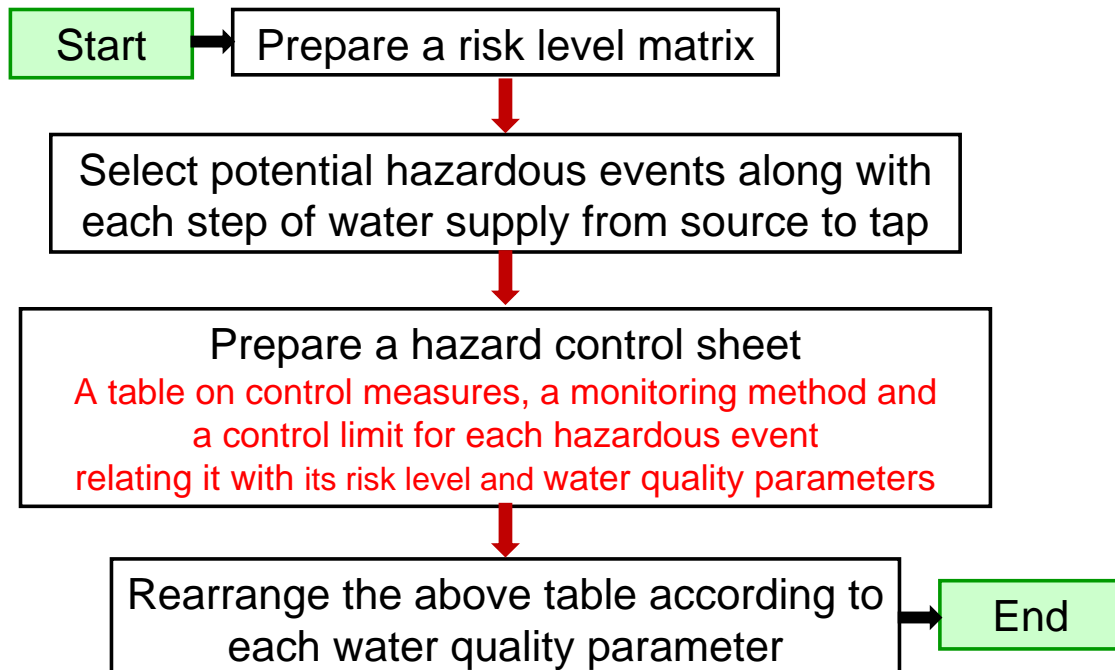
“Guidelines for WSP development”

- Issued by MHLW in May 2008
 - **Not as a regulation but as a recommendation**
- Drafted by a JWVA committee
- Small/Medium water suppliers as main target audience
- Reference to New Zealand’s approach
- Hazard identification utilizing water quality monitoring data

Annexes of “Guidelines for WSP development”

- **Computer software** with pull-down menus and templates (*in Japanese*)
 - A WSP format (Word file)
 - A file for hazard analysis (Excel file)
- **Examples of WSP development case studies** for small water supplies (*in Japanese*)
 - Rapid sand filtration system
 - Slow sand filtration system
 - Disinfection only (two cases)

Procedure of hazard analysis



WSP application in Tokyo Metropolitan Water Supply

In FY2006

- Development of a WSP for one water treatment plant (Misato WTP)

In FY2007

- Practical application of a WSP to Misato WTP
- Development of WSPs for the whole system, including 71 WTPs

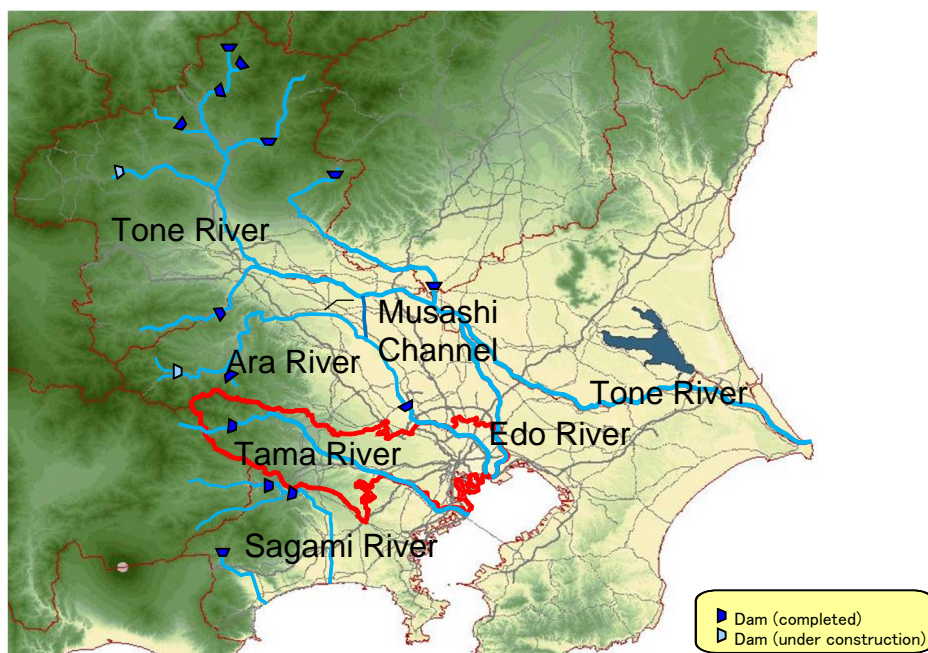
In FY2008

- Practical application of WSPs to the whole system

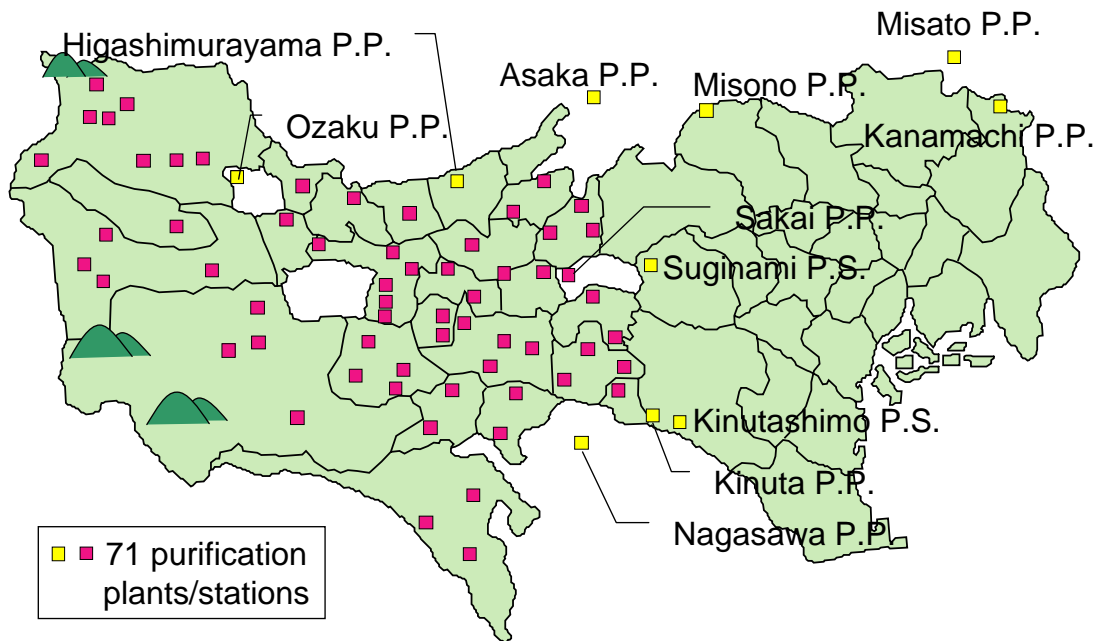
“Tokyo High Quality Water Management Program”

- WSPs for the whole system
 - incl. 71 water treatment plants/stations and distribution network
- ISO 9001
 - for quality management at water treatment plants
- ISO/IEC 17025
 - for analytical quality control at a water quality examination laboratory

Water Sources of Tokyo Metropolitan Water Supply



Purification plants and stations of Tokyo Metropolitan Water Supply



Purification plants and stations of Tokyo Metropolitan Water Supply

Source type	Treatment method			
	Rapid sand filtration	Slow sand filtration	Membrane filtration	Disinfection only
Surface water	8	1	2	-
Groundwater with direct influence of surface water	3	3	5	-
Groundwater	1	-	1	47
Total	12	4	8	47

Reference chart of risk levels (Tokyo MWS)

Frequency of occurrence	Degree of impact			
	Control criteria		Quality standard	
	Below	Above	Below	Above
Once a week or more	2	4	5	
Not more than once a week but once a month or more	1	3	5	
Not more than once a month but once a year or more	1	3	5	
Not more than once a year	1	3	5	

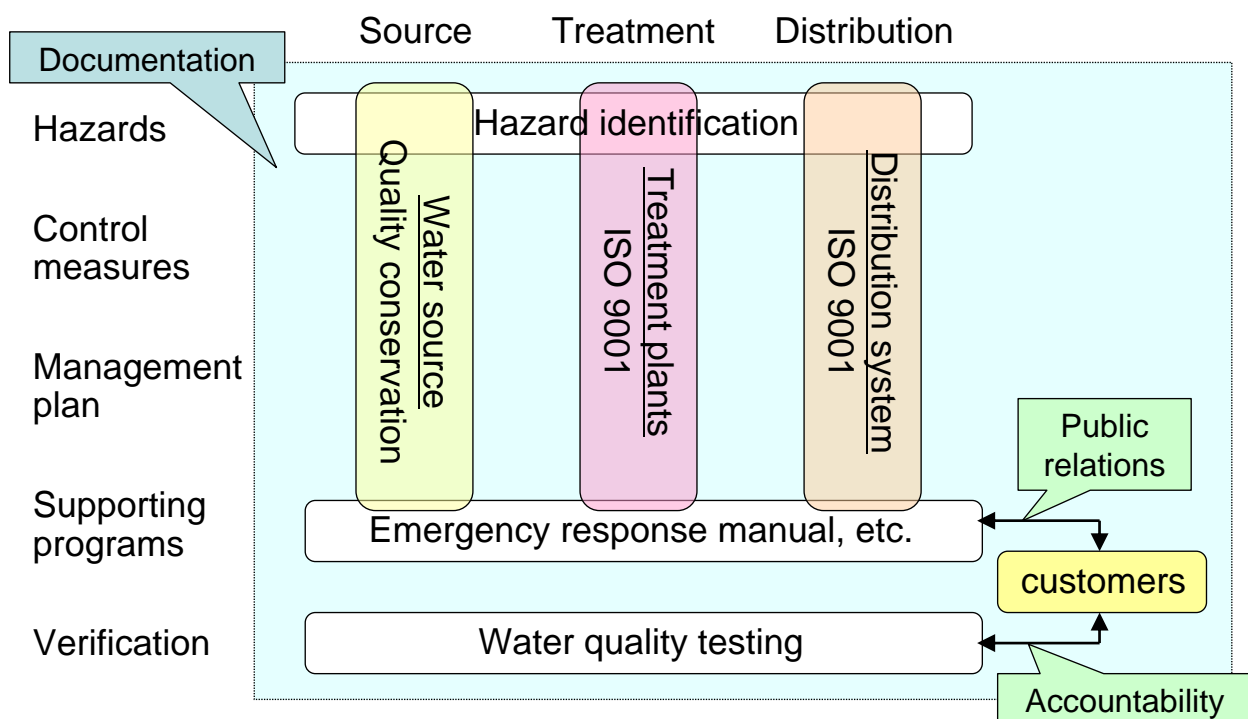
Control measures according to risk levels (Tokyo MWS)

Risk level	Control response measures
5	Water intake, transmission/distribution or supply shall be suspended, in principle.
4	Control shall be stepped up. In addition, permanent measures such as facilities improvements shall be considered.
3	Control shall be stepped up.
2	Normal control shall be continued. In addition, permanent measures such as facilities improvements shall be considered.
1	Normal control shall be continued.

A comprehensive water safety management program in Osaka City Water Supply

- WSP
- ISO 9001
 - for quality management in water treatment plants (already obtained) and water distribution network (to be obtained)
- ISO 22000
 - for water safety management (to be obtained)

WSP application in Osaka City Water Supply



WSP application in Kobe City Water Supply

- A WSP for the whole system
 - Under development
- A WSP for Sengari Water Treatment Plant
 - Already developed, but being revised and incorporated in the above

Conclusions

- WSP is essential for ensuring drinking water safety.
- Hazard identification is a key of WSP.
- It is expected that WSP will be widely applied in water supplies, especially small ones.

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