**OPERATIONAL POLICY**

**PREPARATION AND IMPLEMENTATION OF WATER SAFETY PLANS**

**Introduction**

This purpose of this Operational Policy is to provide an overview of the ***minimum*** requirements for the preparation and implementation of Water Safety Plans (WSPs) across a water supply system.

This Operational Policy is not intended to replace any applicable regulatory requirements with respect to WSPs, but, rather, to provide some guidance on important aspects of the WSP implementation

This Operational Policy is divided into three distinct sections: Catchment, Treatment and Distribution, and provides information on the minimum requirements for each part of the catchment-to-consumer WSP framework.

**Reference documents**

The following documents can be used as references when preparing and implementing WSPs.

***National resources***

***Applicable National Drinking Water Quality Management Framework***

***World Health Organization (WHO) resources***

***Guidelines for drinking-water quality*** (fourth edition incorporating the first addendum) WHO (2017) <https://apps.who.int/iris/handle/10665/254636>.

***Water safety plan manual: Step-by-step risk management for drinking-water suppliers*** WHO & IWA (2009) <https://apps.who.int/iris/handle/10665/75141>

***Water safety planning for small community water supplies: Step-by-step risk management guidance for drinking-water supplies in small communities*** WHO (2012) <https://apps.who.int/iris/handle/10665/75145>

***Protecting surface water for health: Identifying, assessing and managing drinking-water quality risks in surface water catchments*** WHO (2016) <https://apps.who.int/iris/handle/10665/246196>

***Water quality and health - review of turbidity: Information for regulators and water suppliers*** (WHO, 2017) <https://apps.who.int/iris/handle/10665/254631>

***Water safety in distribution systems﻿*** (WHO, 2014) <https://apps.who.int/iris/handle/10665/204422>

***Climate-resilient water safety plans: Managing risks associated with climate variability and change*** WHO (2017) <https://apps.who.int/iris/handle/10665/258722>

WHO resource documents are available from [WHO WSH website](https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health). Further supporting resources, and practical tools can be found in the [WSP Portal](https://wsportal.org/find-wsp-resources/).

***Other resources***

Water Research Australia (2020) ***Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk Second Edition*** <https://www.waterra.com.au/project-details/247>

**Catchment**

The following are the ***minimum requirements*** that need to be undertaken for the **catchment** elements of a WSP. It is important that these requirements are integrated into the WSP.

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| **Minimum Catchment Requirements** | **Undertaken (Y/N)** |
| As part of the preparation of the WSP, a survey is undertaken of the catchment area for the water supply system (Module 2\*), with the aim being to identify potential sources of hazards for the production of safe drinking water (Module 3) |  |
| Undertake a risk assessment to determine the priority catchment-level risks to the water supply (Modules 3 and 4) |  |
| Identify short, medium and long-term catchment improvement activities that are needed to remove or minimize the identified risks, in consultation with relevant stakeholders (Module 5), and develop and implement a management plan endorsed by the senior management (Modules 6 to 8) |  |
| At the offtake point(s) to the water treatment facility, routine monitoring is undertaken in order to understand changes in raw water quality and potential impacts on the downstream water treatment process (Module 6). Preferably this monitoring is undertaken continuously, using online meters, but if that is not possible, then regular grab samples should be collected to capture baseline data for both normal flow regimes and events, such as heavy rainfall and drought |  |
| The collected raw water quality data is reviewed regularly, and triggers or targets have been developed that would alert operational staff when the raw water quality deteriorates to a point where it should either not be drawn into the water treatment facility, or, if it has to be used, that it either compromises the ability of the facility to adequately treat the water, or would necessitate a major change to the treatment process (e.g. increased coagulant dosing; more frequent backwashing of filters) (Module 6) |  |

\*Module reference refers to module in WHO WSP Framework

**Treatment**

The following are the ***minimum requirements*** that need to be undertaken for the **treatment** elements of a WSP. It is important that these requirements are integrated into the WSP

| **Minimum Treatment Requirements** | **Undertaken (Y/N)** |
| --- | --- |
| At each water supply system, a process has been undertaken to compare the hazards that were identified during the catchment survey with the available treatment processes to determine whether the sufficient treatment to guarantee consistent production of safe drinking water (i.e. the effectiveness of any existing barriers (control measures) that are in place to manage the associated risks (Module 4)) |  |
| If the above process finds that there is insufficient available treatment, and improvement plan needs to be prepared for consideration by senior management |  |
| For each water treatment process at a water treatment facility, a standard operating procedure (SOP) has been development, which helps ensure that all operational staff have a common understanding and methodology for operating each treatment process |  |
| Develop water treatment targets for each water treatment process |  |
| Appropriate Critical Control Points (CCPs) have been identified within each water treatment facility |  |
| For each identified CCP, Alert and Critical Limits have been developed and implemented |  |
| For each identified CCP, the Alert and Critical Limits is regularly monitored, ideally with online meters, but if that is not possible, then with regular grab samples |  |
| For each identified CCP, a response plan has been developed for any breach of either an alert or critical limit, and this response plan details the actions to be taken in the event that either an alert or critical limit is breached |  |
| All meters that are used to monitor the performance of CCPs, whether online or in an onsite laboratory, are maintained, regularly calibrated and regularly serviced, in order to ensure that all monitoring results are as accurate as possible |  |
| There is a process in place to notify staff in the event that the chlorination of the final treated water stops. The importance of continuous primary disinfection with chlorine needs to be recognised |  |
| All staff are adequately trained and competency-assessed in the aspects of water treatment that they are responsible for, as well as drinking water quality risk management |  |
| Whilst each water treatment plant will be different, and local circumstances will vary greatly, below are some targets that should met, as much of as is possible, to ensure adequate treatment has occurred:  **Turbidity of water after clarification:** ***Ideally <1 NTU, no greater than 5 NTU***  **Turbidity of water after media filtration:** ***Ideally <0.3 NTU, acceptable <0.5 NTU, but no greater than 1 NTU***  **Chlorination:** ***the minimum Ct value disinfection should be 15mg/L.min, which equates to maintaining a free chlorine concentration of 0.5 mg/L for 30 minutes.***  **Chlorination: *The turbidity of the water at time of chlorination must be <1NTU***  Based on recommendations in Water Research Australia (2020) ***Good Practice Guide to the Operation of Drinking Water Supply Systems for the Management of Microbial Risk Second Edition*** <https://www.waterra.com.au/project-details/247> which are based on other recognised international good practice (e.g. USEPA) |  |
| There is a management system in place to ensure that all chemical additives (e.g. chlorine, coagulants) are of suitable quality for use in drinking water, and consumables for water quality testing are stored appropriately (with basic good stock management practices in place), handled safely, ordered in a timely fashion, with appropriate supply chain contingency in place. |  |

**Distribution**

The following are the ***minimum requirements*** that need to be undertaken for the **distribution** elements of a WSP. It is important that these requirements are integrated into the WSP

| **Minimum Distribution Requirements** | **Undertaken (Y/N)** |
| --- | --- |
| A minimum free chlorine residual 0.2 mg/L is maintained across the entire distribution system to the point of delivery. |  |
| A process to identify and eliminate, or manage, points of cross-connection between treated drinking water and untreated water has been developed and implemented |  |
| A process to identify and eliminate points of backflow between untreated water and treated drinking water has been developed and implemented |  |
| A process to identify and eliminate points of backflow between customers’ premises and treated drinking water has been developed and implemented |  |
| A process to manage safely manage mains breaks and mains repairs has been developed and implemented, so that breaks and repairs are managed in such a way to minimise the risk of contamination, specifically in relation to the ingress of contaminants, unplanned interruptions and low-pressure events |  |
| A process to manage tools, equipment and materials, including chemicals used by construction, operation and maintenance staff has been developed and implemented, in order to manage risks associated cross contamination and maintain good hygienic practices |  |
| A process to manage contamination risks during design, construction and commissioning of new water supply assets, or system upgrades, in accordance with the relevant standards/guidelines, has been developed and implemented |  |
| All distribution staff are adequately trained and competency-assessed in water distribution system management and drinking water quality risk management |  |
| As appropriate, asset maintenance programs, such as storage tank inspection and cleaning and water mains cleaning programs, are developed and implemented, in order to minimise biofilm growth and the accumulation of sediments/particles within distribution systems |  |

**General requirements**

The following table contains a number of general requirements that should be implemented to ensure that the WSP stays current, is reviewed regularly, and that the views and concerns of customers are valued and used as part of a continuous improvement culture.

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| **General WSP Requirements** |
| Catchment surveys are conducted at a routine interval (e.g. every 5 years) in order to identify any changes in the catchment environment, or land use, which may impact on the quality or available quantity of source waters (Module 2) |
| A process to support customers with water quality related issues in the customer’s premises and a process to measure customer satisfaction are developed and implemented |
| A process to manage customers complaints and queries is developed and implemented |
| Educational material on the way that the water utility manages drinking water quality from the catchment to the consumer is prepared and made available to customers |
| The WSP undergoes regular (e.g. yearly) internal review to ensure that it reflects the currently available water treatment infrastructure and current risk management practice. The internal reviews are documented and kept for future reference |
| The WSP undergoes both regular internal and external audit, as required by the executive of the water utility, or regulatory agencies |