

Q&A

12Q4: I would like to make standard operating procedure (SOP) of countermeasure against algae obstacles. Would you introduce case example? (S.K. , Thailand)

A1: I think the purpose of SOP for water treatment plant is to prevent algae leaking into filtered water due to operators misjudge or operation mistake as much as possible. Therefore, it is important to create SOP that avoids leaking algae to filtered water when algae blooms occur. I would like to tell you my experience.

1. How to decide chemical injection rate when algal bloom occurs.

Decide the coagulant (ex.PAC, Aluminum sulfate) which is effective for treating algae, its dosing rate and the dosing rate of pre-chlorination by jar test.

2. Criteria of sludge drain at the sedimentation tank

Although flock which contains many algae is not so good sedimentation efficiency in most cases, I recommend you to prove the efficiency while increasing drainage times of sludge than usual.

3. Criteria of filter washing.

- Verify the leakage of turbidity to the filtered water. And consider the criteria of head loss
 - Verify the washing effect against algae, which is captured. And then decide the quantity of backwash water and backwashing duration.
- . (More often filter washing is required during the breeding of algae: ex. Frequency of filter washing can be increased if there is a cleaning effect with less backwash water than usual flock.)
- If you have SOP about usual water treatment plant, you can add SOP when algal bloom occurs. Moreover, in case that algae outbreak is predicted in coming several years, I recommend that you remodel the dual filtration system which uses anthracite and sand.

(Answerer: Mr. KAGATA Katsutoshi, Kitakyushu Shi Waterworks & Sewerage Association, 2013)

A2:

1) One of key points is who uses the manual or SOP against biological troubles. Contents of the manual should be different for different targets such as operators of treatment plant and staff of water quality management. If you combine these contents in one manual, you will meet advantage as (i) easy to look whole countermeasures of water supply utility against biological troubles, (ii) easy to prevent discrepancy in some parts while they are revised. Meanwhile, you will meet disadvantages as (i) not easy to find proper part because of too large size, (ii) much working for revising, (iii) responsible person for each part is not clear and some part is left without necessary revising. For operators, manual should be clear for their duty and easy to understand. So, I think the manual should

be separated into two kinds (A manual for operators and another manual for water quality management staff). They can refer another manual each other.

2) Outline of countermeasures in water treatment

Countermeasures in water treatment process should be classified by kinds of trouble such as (i) inhibition of coagulation, (ii) filter clogging, (iii) passing through filter and (iv) odor trouble. I am not sure that algal toxin should be included. In my opinion, it will be written for water quality staff as notes. One of countermeasures against filter clogging or passing through filter is lowering flow rate of the process by reducing intake amount for more efficient treatment. For this case, water supply utility meets shortage of supplying water. Then collaboration among many departments such as public relations section should be described in the manual.

(Answerer: Mr. SASAYAMA Hiroshi, Yokohama Waterworks Bureau, 2013)

A3: Japan Water Works Association has published “Handbook for Preventive Water Treatment against Biological Troubles” in March 2006 as guidance. It is written in Japanese. I introduce it as reference. Its table of contents is as follows:

Table of contents

Chapter I: Biological troubles and new way of water quality management

1. Drinking water quality and quality and assurance of data
2. Building new system to supply safe water
3. Biological troubles relevant to water supply vision
4. Drinking water quality management
5. Overcoming biological troubles

Chapter II: Influence of living creatures to water supply system

1. Biological hazard to water supply system
2. Countermeasures against biological hazard to water supply system
3. Non-pathogenic creatures causing hazard to water supply system

Chapter III: Biological troubles

1. History of biological troubles
2. Case study of biological troubles
3. Biological troubles handled in this handbook
4. Identification of each trouble and causing creatures
5. Biological troubles and the treatment methods

Chapter IV: Creatures causing biological troubles

1. Extraction of creatures causing biological troubles
2. Causing creatures

Chapter V: Critical value for countermeasures against biological troubles

1. Concept of critical value for countermeasures against biological troubles
2. Troubles on operation of facility
3. Trouble on quality of drinking water
4. Others

Chapter VI: Monitoring and cause survey of biological troubles

1. Procedure of monitoring and cause survey of biological troubles
2. Trouble on operation of facility
3. Trouble on quality of drinking water
4. Others
5. Quantitative analysis of trouble creature; biological examination method

Chapter VII: Countermeasures against biological troubles

1. Selecting a countermeasure method against a biological trouble
2. Countermeasure at water source or for raw water
3. Countermeasure in treatment process
4. Countermeasure in distribution process

Chapter VIII: Trouble by small animal and countermeasure

1. Small animal causing passing through filter
2. Other trouble by small animal

Chapter IX: Countermeasure against biological troubles in overseas

1. Manual of countermeasure against biological troubles by American Water Works Association (AWWA)
2. Guideline of drinking water in Australia
2. Invertebrate growth in slow sand filter and reservoir of Zurich water supply

(Answerer: Mr.KUDO Yukio, JWWA, 2013)