#### DRINKING WATER SAFETY ADVISORY COMMITTEE

### Updates on Drinking Water Standards in Other Jurisdictions (Period from October 2021 to September 2022)

#### **PURPOSE**

This paper aims to update the Drinking Water Safety Advisory Committee ("Committee") on revisions of drinking water standards made by other jurisdictions during the period from October 2021 to September 2022, and to seek the Committee's views, if any, on any particular aspects that should be looked into or addressed in the study to review the Hong Kong Drinking Water Standards ("HKDWS") being conducted by the Water Supplies Department ("WSD").

#### BACKGROUND

2. At present, the WSD tracks the latest development of drinking water standards in leading jurisdictions through its Radar System<sup>1</sup>, and will report its findings and recommended follow-up actions, if any, to the Committee<sup>2</sup>. According to the established mechanism<sup>3</sup>, the Drinking Water Safety Unit ("DWSU") of the Development Bureau ("DEVB") will initiate reviews of the HKDWS, Surveillance List ("SL") or Watch List ("WL") in respect of the parameters concerned.

3. During the period from October 2021 to September 2022, the following jurisdictions/organisation revised their drinking water standards/guidelines:

(i) Australia;

<sup>&</sup>lt;sup>1</sup> The Radar System will regularly scrutinise reports, journals and websites of renowned organisations and institutes to keep abreast of, inter alia, the latest international development on drinking water quality and standards.

<sup>&</sup>lt;sup>2</sup> The report will be made to the Committee annually or on a need basis.

<sup>&</sup>lt;sup>3</sup> Based on the interim endorsement mechanism outlined in DWSAC Paper No. 6/2018, a review of the parameters in the HKDWS will be triggered if the World Health Organization's Guidelines for Drinking-water Quality or drinking water standards commonly adopted by other leading jurisdictions are updated, or on recommendation of the Committee.

- (ii) World Health Organization ("WHO");
- (iii) New Zealand;
- (iv) the United States ("USA"); and
- (v) the Mainland China.

At the Committee's 9th meeting held in November 2021, the WSD 4. reported, among others, that the WHO was expected to revise its Guidelines for Drinking-water Quality ("GDWQ") in due course following its publication of a number of chemical background documents in 2020 and 2021, and a comprehensive review of the HKDWS, SL and WL would be carried out by then. In March 2022, WHO published its updated GDWQ: fourth edition incorporating the first and second addenda ("WHO 2022") and accordingly, the DWSU initiated a review on the HKDWS, SL and WL. Against this background, the WSD engaged a consultancy study in late August 2022 (hereinafter referred to as "HKDWS Study") (i) to review the updates made in WHO 2022 as well as the updates on drinking water standards/guidelines made by leading jurisdictions since January 2019 inclusive of those mentioned in paragraph 3 above and the water quality monitoring data obtained from the Enhanced Water Quality Monitoring Programme, and (ii) to provide recommendations on how the HKDWS, SL, WL and Aesthetic Guidelines ("AG") should be updated.

### **UPDATES/REVISIONS MADE**

### Drinking Water Guidelines of Australia ("ADWG")

5. The ADWG is updated from time to time to take account of the latest scientific evidence on good quality of drinking water. In January and September 2022, these guidelines were updated as detailed in the ensuing paragraphs.

6. The two updates did not amend any guideline values but had rounded up the health-based guideline value for uranium from 0.017 to 0.02 mg/L and renamed the "guideline value" for radioactivity in drinking water to "reference value" which is 1 mSv per year.

7. The September 2022 updates mainly involved revision of Chapter 5 on "Microbial Quality of Drinking Water" with addition of an appendix to provide

technical information on the underpinning assumptions and calculations, and to bring ADWG in line with international best practice for managing the microbial safety of drinking water. At the same time, a new framework on Quantitative Microbial Risk Assessment ("QMRA") for water supply system was introduced with the inclusion of a microbial health outcome target of  $1 \times 10^{-6}$  Disability Adjusted Life Years ("DALY")<sup>4</sup> per person per year for drinking water. The new microbial health outcome target is however not used as a measure of regulatory compliance but as an operational benchmark forming the basis for the development of water quality improvement programme such as adding treatment barriers to achieve the requirement identified through the assessment. The relevance of the QMRA framework to Hong Kong's context (where the microbial quality of drinking water has been good in general) and the need for its adoption in Hong Kong will be evaluated by the HKDWS Study.

#### WHO 2022

8. The updates incorporated in the WHO 2022 reflected new evidence and provided additional explanations to support better understanding and application of the GDWQ. The new/revised guideline values on 12 chemicals<sup>5</sup> are the same as those laid down in the chemical background documents published in 2020 and 2021, except that (i) the provisional health-based value ("PHBV") for anatoxin-a and analogues is now referred to as provisional reference value ("PRV") for anatoxins, and (ii) a PRV of 100 µg/L is established for silver.

9. Amongst the other updates in the WHO 2022, the WHO's management practices in respect of the follow-up of exceedance in screening values and/or guidance levels of radionuclides, the monitoring regime for radon as well as the risk of taste/odour and cyanotoxins, would be specifically reviewed in the HKDWS Study.

<sup>&</sup>lt;sup>4</sup> While it is not possible to achieve zero health risk when quantifying microbial safety within a risk framework, a tolerable risk needs to be set as a health outcome target that can be considered to represent a target of safety across a population. The metric selected to define the health outcome target is the DALY, and 1 x 10<sup>-6</sup> DALY per person per year is adopted in Australia's drinking water supplies which is the same health outcome target adopted by the WHO in its GDWQ. One DALY can be interpreted as one year of healthy life lost (due to premature mortality or having to live with a condition that detracts from good health due to that specific cause). An upper limit of 1 x 10<sup>-6</sup> DALY per person per year would mean that the microbial risk should not result in the loss of more than 365 days of healthy life in a population of one million people in a year.

<sup>&</sup>lt;sup>5</sup> viz. anatoxins, bentazone, chromium, cylindrospermopsins, manganese, microcystins, nickel, organotins, saxitoxins, silver, tetrachloroethene and trichloroethene. Asbestos and iodine were also reviewed but with no guideline values established.

### Drinking-Water Standards for New Zealand ("DWSNZ")

10. A new DWSNZ just came into effect on 14 November 2022 ("DWSNZ 2022") to replace the DWSNZ revised in 2018 ("DWSNZ 2018"). Aesthetic values and drinking water quality assurance rules (related to compliance criteria and monitoring requirements) are also published separately as individual documents<sup>6</sup>.

11. A comparison of DWSNZ 2022 with DWSNZ 2018 is given in **Annex 1**, and the major changes are highlighted below:

- (i) inclusion of nine new chemical parameters, namely aluminium, hydroxyatrazine, nitrate and nitrite (sum of ratio), Nnitrosodimethylamine, perchlorate, perfluorohexane sulfonate + perfluorooctane sulfonate, perfluorooctanoic acid ("PFOA"), sodium dichloroisocyanurate (as cyanuric acid) and pesticide 1080 (short-term);
- (ii) exclusion of five chemical parameters, namely, anatoxin-a(s), homoanatoxin-a (grouped under anatoxins), molybdenum, nitrite (long-term) and nodularin (grouped with microcystins);
- (iii) renaming of anatoxin-a, microcystins and pesticide 1080 to anatoxins
   (with expanded coverage), microcystins / nodularins, and pesticide
   1080 (long term) / pesticide 1080 (short term) respectively; and
- (iv) revision of the maximum acceptable value ("MAV") for 12 chemical and radiological parameters, namely atrazine, azinphos methyl, barium, boron, cylindrospermopsin, MCPA, metalaxyl, selenium, trichloroethene, uranium, total alpha activity and total beta activity.

12. As shown in **Annex 1**, most parameters added, renamed or with MAV revised have already been included in either HKDWS, SL, WL or AG, except for the sum ratio of nitrate and nitrite, sodium dichloroisocyanurate, pesticide 1080 (long-term) and pesticide 1080 (short-term).

13. The comparison of the aesthetic values with that previously incorporated in DWSNZ 2018 is also given in **Annex 1**, which include revision of aesthetic values for five parameters, namely chlorine, colour, iron, temperature and turbidity.

<sup>&</sup>lt;sup>6</sup> Details can be found at www.taumataarowai.govt.nz/for-water-suppliers/new-compliance-rules-andstandards.

Drinking water health advisories of USA

14. In June 2022, the Environmental Protection Agency of the USA ("USEPA") released drinking water health advisories for four per- and polyfluoroalkyl substances ("PFAS") with the following advisory levels<sup>7</sup>:

- (i) perfluorooctanoic acid ("PFOA"): 0.004 ng/L (interim);
- (ii) perfluorooctane sulfonic acid ("PFOS"): 0.02 ng/L (interim);
- (iii) hexafluoropropylene oxide dimer acid and its ammonium salt ("GenX" chemicals): 10 ng/L; and
- (iv) perfluorobutane sulfonic acid and its potassium salt ("PFBS"): 2 000 ng/L.

15. The above interim advisory levels for PFOA and PFOS are drastically lower than the previous advisory levels of 70 ng/L for individual and combined PFOA and PFOS. It is however important to note that the underlying science to develop such interim advisory levels is still under review by the USEPA Science Advisory Board. The interim advisory levels are thus subject to change and not mandatory. It should also be noted that, according to the USEPA, the health advisory levels for PFOA and PFOS are below the level of detection and quantitation of current testing methods.

16. At present, PFOA, PFOS and PFBS are in our WL with past snapshot monitoring results of  $<0.5 - 7.5 \text{ ng/L}^8$ ,  $<0.3 - 12 \text{ ng/L}^8$  and  $<0.3 - 11 \text{ ng/L}^9$  in treated water respectively. Also, sum of 20 PFAS and PFAS Total are included in the WL, and snapshot monitoring results for the former in treated water were  $<9 - <54 \text{ ng/L}^9$ . As for the latter, technical guidelines regarding methods of analysis are still under development by the European Commission and expected to be available in early 2024 and snapshot testing for treated water in Hong Kong will be arranged once the technical guidelines and overseas testing service are

<sup>&</sup>lt;sup>7</sup> Interim updated health advisories for PFOA and PFOS, as well as final health advisories for GenX chemicals and PFBS were issued. These non-regulatory advisories provide information on the health risks and are not legally enforceable standards. Details on the new health advisories can be found at www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos.

<sup>&</sup>lt;sup>8</sup> From January 2017 to March 2022.

<sup>&</sup>lt;sup>9</sup> From November 2021 to March 2022.

available. While the PFAS-related parameters will be thoroughly reviewed under the HKDWS Study, the WSD will continue to keep in view the development of any new standards for PFAS by the USEPA.

#### Standards for Drinking Water Quality of the Mainland China ("GB 5749")

17. GB 5749-2022 was published in March 2022 and will come into effect on 1 April 2023 to replace GB-5749-2006. A comparison of water quality indices<sup>10</sup> in GB5749-2022 with GB-5749-2006 is given in **Annex 2**, and the major changes are highlighted below:

- (i) inclusion of four new chemical parameters, namely perchlorate (高氯 酸鹽), acetochlor (乙草胺), 2-methyl-isoborneol (2-甲基異莰醇) and geosmin (土臭素);
- (ii) exclusion of 13 microbiological and chemical parameters, namely thermotolerant coliform (耐熱大腸菌群), trichloroacetaldehyde (三氯乙醛), sulphide (硫化物), cyanogen chloride (氯化氰), hexachlorocyclohexane (total) (六六六(總量)), parathion (對硫磷), parathion methyl (甲基對硫磷), lindane (林丹), DDT (滴滴涕), formaldehyde (甲醛), 1,1,1-trichloroethane (1,1,1-三氯乙烷), 1,2-dichlorobenzene (1,2-二氯苯) and ethylbenzene(乙苯);
- (iii) revision of index limits for eight chemical parameters, namely nitrate (硝酸鹽), turbidity (渾濁度), permanganate index (高錳酸鹽指數), free residual chlorine (游離氯), boron (硼), vinyl chloride (氯乙烯), trichloroethene (三氯乙烯) and dimethoate (樂果); and
- (iv) renaming of CODMn (耗氧量), ammonia nitrogen (氨氮) and 1,2-dichloroethene (1,2-二氯乙烯) to permanganate index (高錳酸鹽指數), ammonia (氨) and 1,2-dichloroethene (total) (1,2-二氯乙烯(總量)) respectively.

18. Except for permanganate index and ammonia, parameters added, renamed or with index limits revised have already been included in the HKDWS, SL, WL or AG as shown in **Annex 2**.

<sup>&</sup>lt;sup>10</sup> For the purpose of this paper, non-mandatory reference indices in GB 5749 which are of informative purpose only are not included.

#### WAY FORWARD

19. As mentioned in paragraph 4 above, the HKDWS Study is in progress and the consultant will follow the established framework laid down in DWSAC Paper No. 3/2019 to make recommendations on (i) inclusion of new parameters and/or revision of existing parameters in the HKDWS, SL, WL and AG with suggested standard/guideline values where applicable; and (ii) how such new/revised parameters are to be monitored. Upon receipt of the consultant's deliverables under the HKDWS Study, we will arrange to consult the Committee on any proposed revisions to the HKDWS, SL, WL and AG, as well as the associated monitoring programme.

## ADVICE SOUGHT

20. Members are invited to take note of the revisions made by the leading jurisdictions/organisation on their drinking water standards as mentioned in paragraphs 5 to 18 above and to offer their views on aspects that should be looked into or addressed in the HKDWS Study.

Development Bureau Water Supplies Department November 2022

# Summary on the Revision of Drinking-water Standards for New Zealand ("DWSNZ")

			Curr	ent Status i	n Hong Kong	2	Adoption in other jurisdictions (mg/L)												
Parameter	DWSNZ 2018	DWSNZ 2022	HKDWS/SL/ WL/AG	Mo (2017 Trea	nitoring Res 7 Jan – 2022 ited water (n	ults Mar) 1g/L)	who	EU	CN	UK	USA	CA	AU	SG	JP	<b>Remarks</b> (All subject to detailed review under the			
	MAV (mg/L)	MAV (mg/L)	Standard/ Guideline value (mg/L)	Min	Max	Average	GV	PV	IL	PV	MCL	MAC	GV	MPQ	SV	HKDWS review consultancy study)			
Chemical																			
Aluminium	-	1	AG: ≤0.2	<0.01	0.27	0.03	HBV:0.9	0.2	0.2	0.2	-	-	AG: 0.2	-	0.2	<ul> <li>While WHO has derived a HBV of 0.9mg/L, the practicable levels based on optimization of the coagulation process in water treatment works using aluminium-based coagulants are ≤0.1- 0.2 mg/l.</li> </ul>			
Barium	0.7	1.5	HKDWS: ≤1.3	0.0018	0.028	0.014	1.3	-	0.7	-	2	2	2	1.3	-				
Boron	1.4	2.4	HKDWS: ≤2.4	< 0.02	0.09	0.03	2.4	1.5	1	1	-	5	4	2.4	1				
Molybdenum	0.07	-	-	-	-	-	-		0.07		-	-	0.05	0.07	-				
Nitrite, long term	0.2 as NO <sub>2</sub> -	-	HKDWS: ≤3 as NO2 <sup>-</sup>	< 0.004	0.015	< 0.004	3 as NO <sub>2</sub> -	$0.5 \text{ as NO}_2^-$	-	0.5 as NO <sub>2</sub> -	1 as N	3 as NO <sub>2</sub> -	3 as $NO_2^-$	3 as NO <sub>2</sub> -	0.04 (nitrite nitrogen)	• There are respective HKDWS values for nitrate and nitrite, which are the same as DWSNZ's short-term MAVs.			
Nitrate and nitrite	-	sum of the ratio against their short- term MAVs <1	-	-	-	-	-	Sum ratio: ≤1	-	Sum ratio: ≤1	-	-	-	Sum ratio: $\leq 1$	10	• Consultant to review need for inclusion of sum ratio as separate parameter.			
Perchlorate	-	0.08	HKDWS: ≤0.07	<0.0025 <0.001*	0.0057 0.011*	<0.0025 0.0011*	0.07	-	0.07	-	-	-	-	0.07	-				
Selenium	0.01	0.04	HKDWS: ≤0.04	< 0.003	< 0.003	< 0.003	0.04 PGV	0.02	0.01	0.01	0.05	0.05	0.01	0.04	0.01				
Uranium	0.02	0.03	HKDWS: ≤0.03	< 0.0002	0.0015	< 0.0002	0.03 PGV	0.03	-	-	0.03	0.02	0.02	0.03	0.002(P) TV				
Anatoxins <sup><i>a</i></sup> (including congeners anatoxin-a, homoanatoxin-a, dihydroanatoxin-a and dihydrohomoanatoxin-a) ( <i>previously anatoxin-a</i> )	0.006	0.006 as anatoxin-a toxicity equivalents	WL (anatoxin-a)	-	-	-	0.03 PRV short term for total anatoxins	-	-	-	-	-	-	-	-	<ul> <li>WSD has equipped the testing kits and apparatus for enzyme-linked immunosorbent assay ("ELISA") analysis. Evaluation of its capability for measuring cyanotoxins including anatoxins, cylindrospermopsins, microcystins and saxitoxins for screening purpose has been in progress since June 2022.</li> <li>Congeners to be covered should be reviewed by the consultant.</li> </ul>			
Anatoxin-a(s) <sup>a</sup>	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Atrazine <sup>b</sup>	0.002 Cumulative for atrazine and congeners	0.1 (Sum of atrazine and its metabolites)	SL (atrazine and its chloro-s-triazine metabolites)	<0.025	<0.025	<0.025	0.1 (atrazine and its chloro-s-triazine metabolites)	0.0001 <sup>c</sup> (pesticides)	0.002	0.0001 <sup>c</sup> (other pesticides)	0.003	0.005	0.02	0.1 (atrazine and its chloro-s- triazine metabolites)	0.01 <sup>d</sup> TV	• Chloro-s-trazine metabolites are the major metabolites that are of primary concern in surface and ground water.			
Azinphos methyl <sup>b</sup>	0.004	0.1	WL	(5	<0.0001 single set data	ı)	-	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	0.02	0.03	-	-				
Cylindrospermopsin <sup><i>a</i></sup>	0.001	0.0008 mg/L as cylindrospermopsin toxicity equivalents	WL	-	-	-	0.0007 PGV 0.003 PGV short term	-	-	-	-		-	-	-	• Evaluation of testing capability in progress, see remarks on anatoxins above.			
Hydroxyatrazine <sup>b</sup>	-	0.3	SL	< 0.05	< 0.05	< 0.05	0.2	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (pesticides)	-	-	-	-	-				
MCPA <sup>b</sup>	0.002	0.8	WL	< 0.002	< 0.002	< 0.002	-	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	0.1	0.04	0.07	0.005 <sup>d</sup> TV				
Metalaxyl <sup>b</sup>	0.1	0.3	WL (metalaxyl and metalaxyl-M)	<0.00001	<0.00001	NA	-	0.0001 ° (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	-	-	-	0.2 <sup>d</sup> TV				
Microcystins / Nodularins <sup>a</sup> (previously microcystins)	0.001 as microcystin-LR toxicity y equivalents		HKDWS: 0.001 (microcystin- LR)	<0.0005	<0.0005	< 0.0005	0.001 PGV 0.012 PGV short term	0.001 (microcystin-LR)	0.001 (microcystin-LR)	-	-	0.0015 (microcystins)	0.0013 as microcystin- LR toxicity equivalents	0.001 (microcystin -LR)	-	• Nodularins have a very similar structure to microcystins and can be tested by similar method, however, nodularins are mainly found in cyanobacteria in			
Nodularin <sup>a</sup>	0.001	(subsumed in "microcystins / nodularins")	WL	-	-	-	-	-	-	-	-	-	-	-	-	brackish water.			
N-Nitrosodimethylamine (NDMA)	-	0.0001	HKDWS: ≤0.0001	<0.000025	<0.000025	<0.00002:	5 0.000 1	-	-	-	-	0.00004	0.0001	0.0001	-				

Abbreviations:

SV: Standard Value

AG: Aesthetic Guidelines IL: Index Limit PFOA: Perfluorooctanoic acid

JP: Japan PFOS: Perfluorooctane sulfonic acid TV: Target Value

AU: Australia

CA: Canada

MAC: Maximum Acceptable Concentration PFOSF: Perfluorooctane sulfonyl fluoride UK: United Kingdom

CN: Mainland China MAV: Maximum Acceptable Value PGV: Provisional Guideline Value USA: United States of America

EU: European Union MCL: Maximum Contaminant Limit PRV: Provisional Reference Value WHO: World Health Organization

GV: Guideline Value MPQ: Maximum Prescribed Quantity PV: Parametric Value WL: Watch List

P: Provisional SG: Singapore

### Annex 1

HBV: Health-based value pCi: Picocuries

HKDWS: Hong Kong Drinking Water Standards PFHxS: Perfluorohexane sulfonic acid SL: Surveillance List mrem: Millirem

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	DWSNZ 2018	DWGNZ 2022		rent Status in Hong Kong Monitoring Results						Adoption in other j	urisdictions	(mg/L)					
Parameter		DWSINZ 2022	WL/AG	(201) Trea	(2017 Jan – 2022 Treated water (r		WHO	EU	CN	UK	USA	CA	AU	SG	JP	<b>Remarks</b> (All subject to detailed review under the	
	MAV (mg/L)	MAV (mg/L)	Standard/ Guideline valu (mg/L)	e Min	Max	Average	GV	PV	IL	PV	MCL	MAC	GV	MPQ	SV	HKDWS review consultancy study)	
Perfluorohexane sulfonate +	-	0.00007	PFHxS	<0.000000	3 0.0000084	NA	-	0.0005 (PFAS total)	-	-	-	0.0006 (perfluorooctane	0.00007	-	0.00005(P) (sum of	• Sum of snapshot data for (i) PFHxS; and (ii) PFOS will be compared with	
perfluorooctane sulfonate			WL PFOS, it salts and PFOSF	<sup>S</sup> <0.0000003 (PFOS)	3 0.000012 (PFOS)	NA		0.0001 (sum of PFAS)				sulfonate)			PFOS and PFOA) TV	0.00007 mg/L.	
PFOA	-	0.00056	WL	<0.000000	5 0.0000075	NA	-	0.0005 (PFAS total) 0.0001 (sum of PFAS)	-	-	-	0.0002	0.00056	-	0.00005(P) (sum of PFOS and PFOA) TV		
Sodium dichloroisocyanurate (as cyanuric acid)	-	40	-	-	-	-	40	-	-	-	-	-	-	40	-	<ul> <li>Sodium dichloroisocyanurate is not used as disinfectant in water treatment in HK and thus was not included in any of the lists.</li> </ul>	
Trichloroethene	0.02	0.03	SL	<0.018 <0.004*	<0.018 <0.004*	<0.018 <0.004*	0.008	0.01 (tetrachloroethene) & trichloroethene)	0.02	0.01 (tetrachloroethene & trichloroethene)	0.005	0.005	-	0.02	0.01		
Pesticide 1080 <sup><i>b</i></sup> , short	-	0.035	-	-	-	-	-	0.0001 <sup>c</sup>	-	0.0001 <sup>c</sup>	-	-	-	-	-	• Pesticide 1080 is the brand name to the synthetic form of sodium fluoroacetate	
Pesticide 1080 <sup><i>b</i></sup> , long term	0.0035	0.0035	-	-	-	-	-	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	-	-	-	-	<ul> <li>1080 is banned in Mainland. While not in the lists under the Rotterdam</li> </ul>	
(previously Pesticide 1080)																Convention, it is not found in HK's registered pesticides list. • There is no evidence that it is in use in HK, snapshot testing may not be necessary at this stage.	
Radiological																	
Total alpha activity (Bq/L)	0.1 excluding radon	0.5 excluding radon	HKDWS: ≤0.3 (gross alpha activity)	5 <0.1	0.1	<0.1	0.5 (gross alpha activity)	-	0.5	0.1 (gross alpha activity)	15 pCi/L (alpha particles)	0.5 (gross alpha activity; screening level)	0.5 (gross alpha activity	≤0.5 (gross alpha activity)	-	• Initial investigation will be triggered in HK if gross alpha screening level (without exclusion of radon) is exceeded.	
Total beta activity (Bq/L)	0.5 excluding potassium-40	1 excluding potassium-40	HKDWS: ≤1 (gross beta activity)	<0.2	0.2	<0.2	1 (gross beta activity	-	1	l (gross beta activity)	4 mrem/yr (beta particles & photon emitters)	1 (gross beta activity; screening level)	0.5 (gross beta activity)	≤1 (gross beta activity)	-	<ul> <li>Initial investigation will be triggered in HK if gross beta screening level (without exclusion of potassium-40) is exceeded.</li> <li>For confirming exceedance, the contribution of potassium-40 will be subtracted from the gross beta value.</li> </ul>	
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Chlorine	0.6 - 1.0	0.3 - 1.0	HKDWS: $\leq 5$	0.5	1.6	1.1	5	-	≤2	-	4	-	0.6 aesthetic	5	TV		
Colour (TCU)	10	≤15	AG: ≤15	<5	<5	<5	-	Acceptable to consumers and no abnormal change	15	20	15	≤15 aesthetic	15 aesthetic	≤5	5		
Iron	0.2	≤ 0.3	AG: ≤ 0.3	<0.01	0.19	<0.01	-	0.2	0.3	0.2	0.3 Secondary standard	≤0.3 aesthetic	0.3 aesthetic	-	0.3		
Temperature	Acceptable to most consumers preferably cool	≤15°C	-	-	-	-	-	-	-	-	-	≤15°C aesthetic	-	-	-		
Turbidity (NTU)	2.5	≤5	AG: ≤3	<0.1	4.7	0.3	Aesthetic: Ideally <1. Water becomes visibly cloudy at ≥4 NTU.	Acceptable to consumers and no abnormal change	1 (3 NTU when decentralized and small centralized water supply are restricted by water source & treatment technology)	4	-	-	5 aesthetic	≤5	2		

Notes

a b cyanotoxin

pesticide

С

0.0001 mg/L for each individual pesticide and 0.0005 mg/L for the sum of all individual pesticides Sum ratio of individual pesticide concentration to the respective TV of all pesticides in a list containing 115 items shall not exceed 1 d

Test data with revised reporting limit \*

- Abbreviations:
- AG: Aesthetic Guidelines AU: Australia IL: Index Limit JP: Japan PFOA: Perfluorooctanoic acid SV: Standard Value

PFOS: Perfluorooctane sulfonic acid TV: Target Value

CA: Canada MAC: Maximum Acceptable Concentration PFOSF: Perfluorooctane sulfonyl fluoride UK: United Kingdom

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GV: Guideline Value MPQ: Maximum Prescribed Quantity PV: Parametric Value WL: Watch List

P: Provisional SG: Singapore HKDWS: Hong Kong Drinking Water Standards PFHxS: Perfluorohexane sulfonic acid SL: Surveillance List mrem: Millirem

### Summary on the Revision of GB 5749 – Standards for Drinking Water Quality (國家標準《生活飲用水衞生標準》)<sup>1</sup>

			Current													
指標 (Index)	GB 5749-2006	GB 5749-2022	HKDWS/SL/ WL/AG	N (20 Tr	Monitoring Results (2017 Jan – 2022 Mar) Treated water (mg/L)		WHO	EU	NZ	UK	USA	CA	AU	SG	JP	Remarks (All subject to detailed review under the HKDWS review
	IL (mg/L)	IL (mg/L)	Standard/ Guideline value (mg/L)	Min.	Max	Average	GV	PV	MAV	PV	MCL	MAC	GV	MPQ	SV	consultancy study)
Microbiological		-			_	_	-		_	-						
耐熱大腸菌群 (Thermotolerant coliform) (MPN/100mL / CFU/100mL)	不得檢出 Not detected	-	SL (coliform)	0	0	0	0/100mL	0/100mL (coliform bacteria)	-	0/100mL (coliform bacteria)	Total coliform ≤5% samples positive/month	0/100mL (Total coliform)	-	0/100mL	-	
Chemical																
高氯酸鹽 (Perchlorate)	-	0.07	HKDWS: ≤0.07	<0.0025 <0.001*	0.0057 0.011*	<0.0025 0.0011*	0.07	-	0.08	-	-	-	-	0.07	-	
乙草胺 (Acetochlor) <sup>b</sup>	-	0.02	WL	< 0.00003	<0.00003	NA	-	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	-	-	-	-	
2-甲基異莰醇 (2-Methyl- isoborneol)	-	0.00001	AG: ≤0.00005	<0.000005	5 0.000043	0.000007	-	-	-	-	-	-	-	-	0.00001	<ul> <li>95th percentile level of HK's treated water: 0.000022 mg/L (2019 Jan - 2022 Mar)</li> </ul>
土臭素 (Geosmin)	-	0.00001	WL	< 0.000003	3 0.00001	< 0.000003	-	-	-	-	-	-	-	-	0.00001	
三氯乙醛 (Trichloroacetaldehyde also known as chloral)	0.01	-	SL (chloral hydrate)	< 0.0025	0.0078	<0.0025	0.1 HBV for chloral hydrate	-	-	-	-	-	0.1	-	0.02 (P)	
硫化物 (Sulphide)	0.02	-	-	-	-	-	-	-	-	-	-	≤0.05 aesthetic	-	-	-	
氯化氰 (Cyanogen chloride)	0.07 (以 CN⁻ 計 as CN⁻)	-	WL	<0.02	<0.02	<0.02	-	-	0.4	-	-	-	0.08	0.07	0.01 as cyanide and cyanogen chloride	
六六六(總量) (Hexachlorocyclohexane) <sup>b</sup> (total)	0.005	-	WL as alpha- and beta- hexachlorocyclohexane	<0.00001 and <0.00001	<0.0001 and <0.0001	NA	-	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	-	-	-	-	• These pesticides are banned in Mainland and in HK. Although for
對硫磷 (Parathion) <sup>b</sup>	0.003	-	WL (Parathion and Parathion methyl)	<0.00075 (raw water	<0.00075 (raw water)	<0.00075 (raw water)	0.01 HBV	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	-	0.02	-	-	hexachlorocylohexane, prohibition only applies to alpha- and beta-
甲基對硫磷 (Parathion methyl) <sup>b</sup>	0.02	-	WL (Parathion and Parathion methyl)	<0.0005 (raw water	<0.0005 (raw water)	<0.0005 (raw water)	0.009 HBV	0.0001 <sup>c</sup> (pesticides)	-	0.0001 <sup>c</sup> (other pesticides)	-	-	0.0007	-	-	hexachlorocyclohexane; while for parathion methyl, prohibition
林丹 (Lindane) <sup>b</sup>	0.002	-	HKDWS: ≤0.002	< 0.0005	< 0.0005	< 0.0005	0.002	0.0001 <sup>c</sup> (pesticides)	0.002	0.0001 <sup>c</sup> (other pesticides)	0.0002	-	0.01	0.002	-	parathion with
滴滴涕 (DDT) <sup>b</sup>	0.001	-	SL (DDT and metabolites)	<0.0005	<0.0005	<0.0005	0.001 (DDT and metabolites)	0.0001 <sup>c</sup> (pesticides)	0.001 (DDT and isomers)	0.0001 <sup>c</sup> (other pesticides)	-	-	0.009	0.001 (DDT and metabolites)	-	concentrates at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient.
甲醛 (Formaldehyde)	0.9	-	SL	< 0.225	< 0.225	< 0.225	-	-	-	-	-	-	0.5	-	0.08	
1,1,1-三氯乙烷 (1,1,1-Trichloroethane)	2	-	-	-	-	-	2 HBV	-	-	-	0.2	-	-	-	0.3 TV	
1,2-二氯苯 (1,2-Dichlorobenzene)	1	-	SL	<0.25	<0.25	<0.25	1	-	1.5	-	0.6	0.2	1.5	1	-	• Riding from the last HKDWS review <sup>2</sup> , the need for inclusion in AG should be studied by the consultant.
乙本 (Ethylbenzene)	0.3	-	HKDWS: ≤0.3	<0.075	<0.075	<0.075	0.3	-	0.3	-	0.7	0.14	0.3	0.3	-	
硝酸鹽(以N計asN) (Nitrate)	10 地下水源限制時為 20 (when restricted by ground water)	10	HKDWS: ≤50 as NO <sub>3</sub> <sup>-</sup> [i.e. ≤11 as N]	<2.5 as NO <sub>3</sub> -	15 as NO <sub>3</sub> -	4.5 as NO <sub>3</sub> -	50 as NO <sub>3</sub> -	50 as NO3 <sup>-</sup>	50 as NO <sub>3</sub> Short term	50 as NO <sub>3</sub> -	10 as N	45 as NO <sub>3</sub> <sup>-</sup> [10 as N]	50 as NO <sub>3</sub> -	50 as NO <sub>3</sub> -	10 as nitrate and nitrite	

<sup>&</sup>lt;sup>1</sup> Only water quality indices which are mandatory and for compliance purposes are included.

Abbreviations:

AG: Aesthetic Guidelines IL: Index Limit P: Provisional UK: United Kingdom

AU: Australia JP: Japan PGV: Provisional Guideline Value USA: United States of America

CA: Canada MAC: Maximum Acceptable Concentration PV: Parametric Value WHO: World Health Organization

EU: European Union MAV: Maximum Acceptable Value SG: Singapore WL: Watch List

GV: Guideline Value MCL: Maximum Contaminant Limit SL: Surveillance List

HKDWS: Hong Kong Drinking Water Standards MPQ: Maximum Prescribed Quantity SV: Standard Value

HBV: Health-based value NZ: New Zealand TV: Target Value

<sup>&</sup>lt;sup>2</sup> In the last HKDWS review, the consultant's recommended a AG value of 0.001 mg/L. However, there was insufficient information to assess a guideline value from the aesthetic perspective (i.e. the levels that would give rise to consumers' complaints) due to its presence in low levels in Hong Kong's drinking water. Therefore, it was concluded that WSD would keep in view if its concentration will reach a level that will give rise to consumers' complaints to determine if it is necessary to include them in the AG.

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指標 (Index)	GB 5749-2006	GB 5749-2022	HKDWS/SL/ WL/AG	M (20) Tr	Ionitoring Re 17 Jan – 2022 eated water (	esults 2 Mar) (mg/L)	WHO	EU	NZ	UK	USA	CA	AU	SG	JP	(All subject to detailed review under the
	IL (mg/L)	IL (mg/L)	Standard/ Guideline value (mg/L)	Min.	Max	Average	GV	PV	MAV	PV	MCL	MAC	GV	MPQ	SV	consultancy study)
渾濁度(散射渾濁度單位 scattering turbidity unit) (Turbidity) (NTU)	1 水源與淨水技術 條件限制時為3 (when restricted by water source and purification technology)	1 小型集中式供水 和分散式供水因 水源與淨水技術 受限制時渾濁度 指標限值 按 3NTU 執行 (3 NTU when decentralized and small centralized water supply are restricted by water source and treatment technology)	AG: ≤3	<0.1	4.7	0.3	Aesthetic: Ideally <1. Water becomes visibly cloudy at ≥4 NTU.	Acceptable to consumers and no abnormal change	≤5 aesthetic	4	-	-	5 aesthetic	≤5	2	• 95th percentile level of HK's treated water: 0.5 NTU (2019 Jan - 2022 Mar)
高錳酸鹽指數(以O2計) (Permanganate index) (as O2) (previously 耗氧量(COD <sub>Mn</sub> 法))	3 水源限制、 原水耗氧量>6 時為 5 (when restricted by water source and the original oxygen consumption>6mg/L)	3	-	<1 (2019 Jan - 2022 Mar)	2 (2019 Jan – 2022 Mar)	<1 (2019 Jan – 2022 Mar)	-	-	-	-	-	-	-	-	-	
游離氯 (Free residual chlorine)	4 (出廠水中 finished water)	≤2 (出廠水和末梢水 finished water and tap water)	HKDWS: ≤5 (Chlorine)	0.5	1.6	1.1	5	-	-	-	4	-	5	5	1	
硼 (Boron)	0.5	1.0	HKDWS:≤2.4	< 0.02	0.09	0.03	2.4	1.5	2.4	1.0	-	5	4	2.4	1	
氯乙烯 (Vinyl chloride)	0.005	0.001	SL	< 0.0002	< 0.0002	< 0.0002	0.0003	0.0005	0.0003	0.0005	0.002	0.002	0.0003	0.0003	-	
三氯乙烯 (Trichloroethene)	0.07	0.02	SL	<0.018 <0.004*	<0.018 <0.004*	<0.018 <0.004*	0.008	0.01 (tetrachloroethene & trichloroethene)	0.03	0.01 (tetrachloroethene & trichloroethene)	0.005	0.005	-	0.02	0.01	
樂果 (Dimethoate) <sup>b</sup>	0.08	0.006	SL	< 0.0015	< 0.0015	< 0.0015	0.006	0.0001 <sup>c</sup>	-	0.0001 <sup>c</sup>	-	0.02	0.007	0.006	0.05 d	
氨 (Ammonia) (previously 氨氦 (Ammonia nitrogen))	0.5	1	-	<0.02 as NH <sub>3</sub> -N	<0.02 as NH <sub>3</sub> -N	<0.02 as NH <sub>3</sub> -N	Threshold odour concentration of ammonia at alkaline pH is approximately 1.5	0.5 as ammonium	≤1.5 aesthetic	0.5 as ammonium	-	-	0.5	-	-	
1,2-二氯乙烯 (總量) (1,2-Dichloroethene) (Total) ( <i>previously1,2-二氯乙烯</i> ( <i>1,2-Dichloroethene</i> ))	0.05		SL	<0.012	<0.012	<0.012	0.05	-	0.06	-	0.07 cis-1,2- dichloroethene 0.1 trans-1,2- dichloroethene	-	0.06	0.05	0.04	

Notes

cyanotoxin а

pesticide b

0.0001 mg/L for each individual pesticide and 0.0005 mg/L for the sum of all individual pesticides С

Sum ratio of individual pesticide concentration to the respective TV of all pesticides in a list containing 115 items shall not exceed 1 d

\* *Test data with revised reporting limit* 

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