# Drinking Water Safety Advisory Committee Seventh Meeting

Date:23 November 2020 (Monday)Time:2:30 p.m. to 4:35 p.m.Venue:Conference Room 7, G/F, Central Government Offices,<br/>2 Tim Mei Avenue, Tamar, Hong Kong

## **Minutes of Meeting**

#### Members Present

Ir LEUNG Kwong Ho, Edmund Chairman Vice Chairman Ir Dr CHAN Hon Fai Dr CHUI Ting Fong, May Mr HO Kui Yip, Vincent Ir Prof LO Man Chi, Irene Dr MA Yiu Wa, Anthony Ir TANG Ming Sum, Michelle Dr TO Kai Wang, Kelvin Prof TSE Lap Ah, Shelly Mr LO Kwok Wah, Kelvin **Director of Water Supplies** Mr CHAU Siu Hei, Francis Deputy Secretary for Development (Works) 3 Dr HO Ka Wai, Rita Head, Non-Communicable Disease Branch, Department of Health ("DH") Mr KAN Yim Fai, Fedrick Secretary Team Leader (Water Safety), Development Bureau ("DEVB")

## Members Absent with Apology

Dr CUNLIFFE David Anthony Prof HO Kin Chung Dr WONG Siu Ming, Raymond Dr WONG TAAM Chi Woon, Vivian Ir WONG Yiu Sun, Peter

#### In Attendance

Ms KWAN Kai Yin, Janice	Assistant Secretary (Water Safety) 1, DEVB
Ms YEUNG Man Yan, Didi	Executive Manager (Water Safety), DEVB
Mr CHAU Sai Wai	Deputy Director of Water Supplies
Mr WONG Yan Lok, Roger	Assistant Director/Development, Water Supplies Department ("WSD")
Mr CHEUNG Yip Kui, Rico	Chief Engineer/Tech Support, WSD
Mr CHOY Tak Yip	Chief Chemist, WSD
Mr YU Chi Wing, Albert	Senior Chemist/Water Quality (Standards and Monitoring), WSD
<u>For Agenda Item 3 only</u> Ms PANG Oi Ling, Irene	Assistant Director/New Works, WSD
Ms LAM Lai Hang, Mable	Chief Engineer/Consultants Management, WSD
Mr LAM Kwok Chuen	Senior Engineer/Consultants Management 2, WSD
Mr KWOK Andy	Managing Director, Black & Veatch Hong Kong Limited ("B&V")
Mr LAU Tony	Project Manager, B&V
Prof Dr WONG Tze Wai	Adjunct Professor, Chinese University of Hong Kong ("CUHK")

## Action by

1. The Chairman welcomed Dr TO Kai Wang, Kelvin who was a new member of the Drinking Water Safety Advisory Committee ("DWSAC") and reminded him to note the house rules of the DWSAC and, where required, declare conflict of interests according to DWSAC Paper No. 1/2018. The Chairman also expressed thanks to Professor LAU Kar Pui, Susanna, who had resigned from the DWSAC, for her valuable contribution in the past.

2. The Chairman explained that some Members were unable to attend the meeting due to travel restriction under the COVID-19 pandemic. In this regard, the meeting materials had been sent to them on 13 November 2020 and their feedback or comments would be presented by the Secretary under the respective agenda items.

## Agenda Item 1: Confirmation of Minutes of the Last Meeting

3. The Secretary circulated the draft minutes of the last meeting (i.e. the sixth meeting) to Members on 30 July 2020 and no comment had been received. There being no further comment from Members at the meeting, the minutes were confirmed.

## Agenda Item 2: Matters Arising from Last Meeting

4. In response to Members' suggestions made in the last meeting (paragraph 16 of the minutes of the last meeting), Mr TY CHOY, Chief Chemist of WSD, presented the results of a review on ibuprofen and carbamazepine conducted by an expert consultant of WSD, and concluded it not necessary to include the two pharmaceuticals in the Watch List. Members had no further comment.

# Agenda Item 3: Presentation on the Findings of the Consultancy on Detachment of Internal Bitumen Lining in Fresh Water Mains (DWSAC Paper No. 2/2020)

5. Mr Andy KWOK of B&V, WSD's consultant, presented the background and findings of an ongoing study on detachment of internal bitumen lining ("lining") in fresh water mains ("the Study"), which was supplemented by a video presentation on the associated health risk assessment by B&V's specialist sub-consultant, the Water Research Centre ("WRc") of the United Kingdom ("UK"). Mr Andy KWOK also presented the preliminary strategy for tackling the issue of lining detachment, which would be finalised in Q1 2021.

6. The Chairman opined that although the Study concluded negligible risk on drinking water safety due to detached lining, the public would hardly accept the

presence of bitumen particles in the drinking water and WSD should consider a long-term plan to tackle the issue.

7. A Member enquired whether the Study had covered bitumen particles smaller than 1 mm, which were less visible and would not have been captured by the filter bag in the Fire Hydrant Flushing Survey ("FHF Survey"), as well as the potential risk arising from micro-bitumen particles to hospital equipment. Another Member enquired the rationale of adopting filter bag with mesh hole size of 1 mm, instead of smaller mesh hole size, in the FHF Survey as it would affect the condition assessment and the prioritisation of water mains.

8. Mr Tony LAU of B&V explained that there were no specific criteria on the size of detached lining used in the laboratory testing for assessing the health risk and the bitumen samples used for the test were crushed beforehand. Prof Dr TW WONG of CUHK, another B&V's specialist sub-consultant, supplemented that the World Health Organization ("WHO") did not have standards set for the size and quantity of bitumen particles in assessing drinking water quality. Therefore, benzo(a)pyrene, being more commonly found and highly carcinogenic as compared to other polycyclic aromatic hydrocarbons ("PAHs") in the family, had been adopted as the surrogate parameter with a guideline value of  $0.7 \mu g/L$  pursuant to WHO's Guidelines for Drinking-water Quality ("WHO Guidelines") for the health risk assessment. Prof Dr TW WONG also pointed out that bitumen particles should pose no risk to hospital equipment.

9. Mr Kelvin LO, Director of Water Supplies, further responded that tests on drinking water samples with bitumen particles soaked under boiled and unboiled conditions had been carried out under the Study for assessing the chemical impact on health caused by detached lining. The test results showed that the concentrations of benzo(a)pyrene in all the water samples were much lower than the corresponding guideline value of  $0.7 \,\mu\text{g/L}$  in WHO Guidelines, hence concluding that the presence of bitumen particles in drinking water should pose negligible health impact.

10. A Member acknowledged that bitumen particles of sizes below 1 mm had been included in the water samples for the chemical assessment according to the sample preparation methodology, and thus the laboratory test results could reasonably reflect the concentration of benzo(a)pyrene released from such small bitumen particles. Mr Andy KWOK affirmed that the benzo(a)pyrene contents for all the drinking water samples were undetectable at the detection limit of  $0.05 \mu g/L$ , i.e. 14 times below the respective guideline value of 0.7  $\mu g/L$  in WHO

Guidelines and the Hong Kong Drinking Water Standards ("HKDWS").

11. With regard to the condition assessment of water mains, Mr Tony LAU supplemented that as the water volume and flushing pressure in the FHF Survey were much higher than that at consumer ends, capturing of bitumen particles with size 1 mm or larger at the fire hydrant could adequately reflect the lining detachment problem, while bitumen particles, if any, appearing at consumer ends should be much less and tinier.

[Post-meeting note: WSD supplemented the following information to address Members' concern on the bitumen particle size: - The FHF Survey was conducted for the purpose of condition assessment of the steel mains, and using filter bag with mesh size of 1 mm was adequate. This was because the detached lining inside the pipeline would consist of various sizes. Those found in the distribution mains were generally larger than those collected at consumer end, as the latter would have been broken into smaller pieces by pumps and filtered by water meters. Hence, for pipelines with lining detachment problem, bitumen particles of larger sizes could likely be collected by flushing at hydrants. As for the laboratory test on health risk of consuming water with bitumen detached from pipe linings, the bitumen used in the test was first crushed followed by screening out of those bitumen particles with significantly observable size. Only bitumen particles with sizes 3 mm and below were added into the water samples. Chemical analysis was then carried out to the water samples. Therefore, water samples for the health risk assessment had in fact contained bitumen particles with size below 1 mm. Details of the testing methodology can be found in DWSAC Paper No. 2/2020.]

A Member asked why the flushing survey was conducted at fire hydrants 12. instead of consumer ends and how the locations of the FHF Survey was selected. Another Member asked if the choice of locations had taken into account factors such as the upstream/downstream pressure differences and the branching of the water main network. In response, Mr Tony LAU advised that fire hydrants, being closer to the source of potential lining detachment than consumer's networks, were considered more suitable for capturing detached bitumen, if any, for examining the seriousness of the lining detachment problem. Mr Andy KWOK added that FHF Surveys would be conducted at fire hydrants located at the farthest downstream of the steel water mains under examination and would cover steel water mains branching off them as well. As regards the upstream/downstream pressure difference, it was insignificant to the conduction of FHF Surveys. In response to a Member's enquiry on how water mains of the same category were prioritised, Mr Tony LAU stated that the prioritisation would be set in a holistic manner upon completion of all FHF Surveys by end 2020. A Member suggested WSD monitoring the amount of bitumen captured by strainers and considering inspection of the internals of water mains for the actual lining condition so as to facilitate the prioritisation work. Another Member suggested that other factors such as flow velocity and frequency of complaints should be taken into account in the condition assessment. Mr Andy KWOK pointed out that the steel fresh water mains would be continuously monitored and their priorities would be appropriately adjusted from time to time based on the latest monitoring results. Mr Kelvin LO supplemented that WSD would replace all steel fresh water mains with bitumen lining in the long run and the prioritisation of the replacement works would be revisited regularly.

[Post-meeting note:	WSD's consultant	had reviewed the	ranking c	of steel fresh
water mains, and the	prioritisation mat	rix had been revise	d as follow	<i>'s</i> :

		Level of Consequence (Population Affected, Y)			
		Significant (Y ≥ 20,000 and/or fresh water supply to essential installation(s) such as hospital without alternative source of supply)	Moderate (0 < Y < 20,000)	Insignificant^ (Y = 0)	
Presence	Yes	High priority	Medium priority	No action to water mains,	
of		(including problematic mains)		but with enhanced regular	
Bitumen				cleansing to receiving	
in FHF				service reservoirs	
Survey	No	Medium priority	Low priority	No action	

Remarks:

^ Steel fresh water mains with "Insignificant" Level of Consequence are trunk mains for transferring fresh water between water treatment works, primary service reservoirs ("PSRs") and secondary service reservoirs ("SSRs"). Bitumen from detached lining of these water mains will normally settle in the PSRs or SSRs without affecting the consumers.

Based on previous FHF surveys, WSD's consultant did not find any correlation between flow velocity, pressure and age of water mains with the amount of detached bitumen collected. As such, no predictive model could be developed under the Study. Nevertheless, whenever bitumen was detected during the FHF surveys irrespective of its amount, the water mains concerned would be prioritised according to the number and nature of customers affected as well as the operation experience, including the complaint history for inclusion in the replacement/rehabilitation works list.]

13. Two Members and Prof Dr TW WONG exchanged views on whether the

concentration of benzo(a)pyrene in suspended form should be taken into account (e.g. determined via total digestion) in the laboratory testing for assessing the health risk associated with the presence of bitumen (from detached lining) in drinking water. Prof Dr TW WONG advised that as there was still no health guideline for suspended bitumen worldwide, the associated laboratory testing was considered unnecessary.

[Post-meeting note: WSD had further consulted WRc, who advised that no evidence, past study or health guideline/standard could be found regarding the nano/micro particle toxicology of bitumen. In any case, WRc advised that as crushed bitumen particles with sizes of 3 mm and below were added and soaked in water samples for the laboratory test done under unboiled and boiled conditions, the water sample would have contained bitumen particles of various sizes including nano/micro particles of bitumen in suspended form. The test should therefore be adequate to assess the concentration of benzo(a)pyrene leaching from both visible and nano/micro particles of bitumen and hence the test method via total digestion was not necessary.]

# Agenda Item 4: Updates on Implementation of Action Plan for Enhancing Drinking Water Safety in Hong Kong ("Action Plan")

14. Mr TY CHOY updated Members on the implementation of the Action Plan. In respect of the Enhanced Water Quality Monitoring Programme ("Enhanced Programme"), he reported that the collection of water samples at consumers' taps in randomly selected premises would be resumed by the end of November 2020. The collection of additional samples at consumers' taps in conjunction with the Enhanced Programme for testing of residual chlorine and *E. coli* was also planned to roll out in Q2 2021. For the water safety regulatory regime, he highlighted that the public consultation for the proposed amendments to the Waterworks Ordinance (Cap. 102) had commenced on 6 November 2020 and would last for 3 months.

15. For the evaluation of the feasibility of adopting 24-hour stagnation ("24HS") water sampling tests in the commissioning of new plumbing installations, the Chairman enquired about the follow up action in case of exceedance in the metal parameters. Mr TY CHOY replied that the contractors would be requested to reflush the system and retest the 24HS samples, and the corresponding follow up protocol was being refined. Regarding the current systematic flushing protocol for newly installed plumbing system, a Member suggested exploring an extension

of the water soaking time rather than repeating the flushing cycle with a view to conserving water. Mr Roger WONG, Assistant Director/Development of WSD, explained that the systematic flushing protocol was introduced based on a study by WSD's consultant, which concluded the protocol being effective to remove the fine metal particles on the surface of new plumbing installations and reduce the subsequent leaching of heavy metals. Nevertheless, WSD would continue reviewing potential enhancement of the protocol and the sampling test method where appropriate.

16. A Member enquired the reasons of the failed samples in the 24HS test. Mr Roger WONG explained that the failures might be due to the improper handling of flushing, disinfection and/or stagnation by individual licensed plumbers. Mr TY CHOY added that WSD would consider enhancing the procedures, e.g. exploring means to ensure the whole system had been properly flushed and disinfected before the stagnation. A Member suggested providing practice guidelines and instructions for the systematic flushing and stagnation water sampling test to enhance licensed plumbers' knowledge so that the test results would be more reliable. Mr Roger WONG responded that WSD had already promulgated guidelines for the systematic flushing and disinfection in addition to conducting courses to relevant contractors covering the appropriate disinfection procedures.

17. In response to a Member's enquiry on the implementation timetable for 24HS water sampling test, Mr Roger WONG advised that WSD would continue collecting more samples until mid-2021. WSD would then analyse the data collected, and present the findings to the Technical Committee on Plumbing and discuss the way forward and implementation plan.

18. A Member opined that the update on the Action Plan showed encouraging progress on plumbing material control. Implementation of Water Safety Plans for Buildings ("WSPB") was particularly impressive with plans implemented for 19% of buildings up to end October 2020. Other components (i.e. the Water Safety Plan Subsidy Scheme ("WSPSS"), implementation of WSPB in relevant government buildings and related promotional programmes) should continue so as to further increase the number of buildings with WSPB implemented. Another Member suggested that the number of beneficiary buildings/households under WSPSS be included in future promotion to encourage wider adoption of WSPB by the community. Mr Roger WONG noted and responded that an active promotion campaign for WSPSS was to be launched to promote the benefits of implementing WSPB to the target group buildings.

# Agenda Item 5: Update on Drinking Water Standards in Overseas Jurisdictions

19. Mr TY CHOY briefly updated Members on the proposed revision of European Commission's ("EC") Drinking Water Directive ("DWD") and the revision of the Guidelines for Canadian Drinking Water Quality. For the proposed revision of EC's DWD, nineteen parameters were involved<sup>1</sup>. Mr TY CHOY highlighted that bisphenol A and nonylphenol were neither in HKDWS, the Surveillance List, the Watch List nor the Aesthetic Guidelines.

20. Mr TY CHOY continued to update Members that the Guidelines for Canadian Drinking Water Quality Summary Table had been revised in September 2020, which involved four parameters (i.e. strontium, chloramines, barium and cadmium). Amongst them, barium and cadmium were in HKDWS, while strontium and chloramines were in the Watch List.

21. The Chairman requested WSD to provide summary sheets for each parameter **WSD** concerned, which should cover the relevance of their updates in the Hong Kong context and a preliminary assessment on the need for further comprehensive review, so as to facilitate Members' further consideration and deliberation in the next DWSAC meeting.

22. In response to a Member's enquiry, Mr TY CHOY advised that the new parametric value of lead in drinking water proposed by the EC was to be lowered from  $10 \ \mu g/L$  to  $5 \ \mu g/L$ .

23. With regard to the proposed revision of EC's DWD, a Member shared his view that the DWD had taken a reasonable approach for *Legionella* with the focus on a risk management approach in priority premises such as hospitals, healthcare facilities, retirement homes, etc. including an assessment of risks associated with domestic distribution systems. When considering *Legionella* in Hong Kong, the range of priority premises could be reviewed in the local context while taking account of the risk profile of *Legionella*. For microplastics, he pointed out that there had so far no evidence of them being a public health concern through

The proposed revision included inclusion of nine parameters, viz. chlorate, chlorite, haloacetic acids, sum of perfluoroalkyl substances ("PFAS"), total PFAS, microystin-LR, uranium, bisphenol A and *Legionella*; deletion of two parameters, viz. tritium and total indicative dose; revision of five parameters, viz. antimony, boron, chromium, lead and selenium; and inclusion of three parameters, viz. nonylphenol, beta-estradiol and microplastics in a new watch list of DWD.

drinking water supplies as per WHO guidance on Microplastics in Drinking-water and thus routine monitoring was not recommended. Nevertheless, keeping microplastics on a watch list might be useful given the lack of data.

24. As for PFAS, a Member pointed out that it was likely to have numerous discussions in the future, and suggested maintaining an awareness about it while being prepared for further changes in tolerable limits and guideline values. The way forward would likely be about maintaining PFAS on the Watch List or including them in the Surveillance List. Another Member opined that PFAS and bisphenol A, which were found in sewage effluents, should be kept under watching. Mr TY CHOY advised that for PFAS, WSD had been conducting annual snapshot monitoring for the two individual perfluorinated substances, namely perfluorooctanesulfonic acid ("PFOS") and perfluorooctanoic acid ("PFOA"). The monitoring results were all below the limits set by the United States Environmental Protection Agency ("USEPA") and UK's Drinking Water Inspectorate ("DWI") and showed no particular concern in Hong Kong.

25. A Member also shared information that there would be a second addendum to the fourth edition of the WHO Guidelines, followed by a next edition in due course.

## **Agenda Item 6: Summary on International Water Quality Incidents**

26. Mr TY CHOY briefly reported on WSD's review on major international water quality incidents for the period from March 2020 to June 2020. Among them, four incidents were more relevant to Hong Kong and Mr TY CHOY explained that their risks of occurrence in the local context were low. Members noted and had no comment.

## Agenda Item 7: Any Other Business

27. There being no other business, the meeting adjourned at 4:35 p.m.