立法會
Legislative Council

LC Paper No. CB(1)734/12-13(04)

Ref: CB1/PL/DEV

Panel on Development

Meeting on 26 March 2013

Background brief on the supply and quality of Dongjiang water

Purpose

This paper provides background information on the supply and quality of Dongjiang ("DJ") water and summarizes the views and concerns expressed by Members on the subject at meetings of the Legislative Council and its committees since the 2010-2011 legislative session.

Supply of Dongjiang water

2. About 20% to 30% of Hong Kong's fresh water supply is from rainfall and the remaining 70% to 80% is DJ water imported from the Guangdong Province ("GD"). The long-term supply of DJ water is secured under the "Agreement for the supply of Dongjiang water to Hong Kong" ("the Supply Agreement") entered between the Hong Kong Government and the GD Provincial Government, which is subject to periodic review of water prices and supply quantities. Prior to 2006, water supply agreements on DJ water were based on a unit water price and annual supply quantities agreed with the GD side. From 2006 onwards, the Supply Agreements adopted a package deal lump sum approach, under which an annual lump sum payment was made to the GD side for supply of an annual agreed quantity of DJ water to meet the needs of Hong Kong. The current Supply Agreement covers the period from 2012 to 2014.

Arrangements for the supply of Dongjiang water to Hong Kong between 2012 and 2014

3. The Administration briefed the Panel on Development ("DEV Panel") in October 2011 on the proposed arrangements for the supply of DJ water to Hong Kong between 2012 and 2014 and its financial implications. On 18 November 2011, the Administration sought a supplementary provision of $35.4 million from the Finance Committee ("FC") to meet additional water purchase cost. According to the Administration, to ensure 99% reliability[1] in water supply to Hong Kong, it was estimated that an annual quantity of 820 million cubic metres ("mcm") would be required in the period from 2012 to 2014. Taking into account the changes in Renminbi and Hong Kong dollar exchange rate, as well as inflation in GD and Hong Kong, the two sides agreed that the water purchase cost for the years of 2012, 2013 and 2014 be increased at the rates of 5.82%, 5.78% and 5.77% respectively. Hence, as compared to the annual sum of water purchase cost of $3,344 million for 2011, the annual sum of water purchase cost for 2012, 2013 and 2014 was adjusted to $3,538 million, $3,743 million and $3,959 million respectively. The funding proposal was approved by FC.

The package deal lump sum approach versus the unit water price approach

4. At the aforesaid meetings of DEV Panel and FC held in 2011, some members expressed concerns that the current "package deal lump sum approach" for purchase of DJ water was not conducive to water conservation. There was an opinion that the Administration should pay for DJ water according to the actual annual consumption based on a unit water price to be agreed with the GD authorities.

5. According to the Administration, the package deal lump sum approach for purchase of DJ water adopted since 2006 would ensure reliable and flexible water supply to Hong Kong. The Administration explained that if the water purchase price was based on the actual quantity of water delivered without any pre-determined agreed quantities, there would be difficulties in ensuring adequate water supply for Hong Kong's use. The situation could become critical during drought years as there would be no guarantee that GD

[1] "99%" reliability means that water supply is maintained round-the-clock even under extreme drought condition with a return period of 1 in 100 years. "Return period" is the average number of years during which a certain severity of drought will occur once, statistically. A longer return period means a rarer chance of occurrence of a more severe drought.

side could meet a sudden surge in demand from Hong Kong given the competitive needs of other GD cities, such as Heyuan, Huizhou, Dongguan, Shenzhen and Guangzhou.

6. The Administration added that it would be unfeasible to agree with the GD side on a unit water price and pay for the actual annual supply quantity. Due to the difficulty for the Administration to advise the GD side of Hong Kong's actual required annual water supply quantity during the negotiation for the unit water price, the GD side would take into account such uncertainty and fix a high unit water price in order to ensure a stable income. A unit price approach would also put the reliability of water supply at risk unless Hong Kong was prepared to reserve a specific annual quantity and pay a retention fee for the reserved quantity to compensate for under-utilizing the DJ water supply system.

7. The Administration also advised that the unit water price and fixed annual supply quantity approach was inflexible. Under this approach, surplus DJ water would be discharged in wet years. According to the Administration, the package deal lump sum approach allows greater flexibility in the daily supply rate of DJ water to tie in with the seasonal fluctuations in the quantity of surface water collected from local water gathering grounds. Under the package deal lump sum approach, Hong Kong informs the GD side the actual demand of the territory on a monthly basis, thereby achieving a better control of the storage level in Hong Kong, minimizing water overflow and saving pumping costs.

Quantity of supply

8. According to the Administration, under the previous and current Supply Agreements and the "Water Resources Distribution Plan in the Dongjiang River Basin of Guangdong Province" promulgated by the GD authorities setting out the maximum amount of water which cities in GD and Hong Kong could draw from DJ, the GD side should provide an ultimate annual supply quantity of 1 100 mcm in the long run. This ultimate annual supply quantity, as agreed by both Hong Kong and GD sides, was used for planning purpose and had no bearing on the water price for the period from 2012 to 2014. The target date for reaching this quantity would likely be 2030, assuming an average annual growth rate of 1.3% on water demand. For the three years from 2012 to 2014, it was estimated that the required annual supply quantity

would be about 820 mcm and the lump sum DJ water price for 2012 to 2014 was calculated on the basis of this estimation.

9. At the aforesaid meetings of DEV Panel and FC, in view of the increase in the price of DJ water, some members had requested the Administration to reduce the quantity of water to be purchased from DJ by further developing the water catchment system in Hong Kong or building more reservoirs in Hong Kong or the Mainland. The Administration advised that due to scarcity of land and the difficulty in identifying suitable sites, building more reservoirs in Hong Kong or the Mainland was not a viable option.

10. As a measure to lower the dependency on DJ water, the Administration has explored new water resources, including seawater desalination and use of reclaimed water for non-potable uses. The Administration consulted DEV Panel on 17 April 2012 on its proposal to carry out a planning and investigation study for the construction of a desalination plant at Tseung Kwan O Area 137 ("the Study"). The Public Works Subcommittee endorsed and FC approved the funding proposal in May and June 2012 respectively. The output capacity of the proposed desalination plant is 50 mcm per annum (expandable to 90 mcm per annum in future) which accounts for about 5% (10% if expanded) of the total water supply in Hong Kong.

11. At the DEV Panel and PWSC meetings in 2012 discussing the proposed construction of the desalination plant, some members held the view that it was not worthwhile to conduct the Study or construct the desalination plant at that stage, taking into account the estimated cost and the insignificant output capacity. Some other members supported the proposal in view of the continuous advancement in desalination technology which might lower the cost of desalinated water in the long term. The Administration stressed that it was important to explore other sources of potable water supply in Hong Kong in view of severe droughts in some Mainland provinces and the low local rainfall in recent years. As the Study would take time and the proposed plant would not be put into operation before 2020, the Administration considered it opportune to embark on the Study to explore the feasibility and cost-effectiveness of the construction of the plant.

Price of Dongjiang water

12. At the FC meeting on 18 November 2011, some members expressed concern that Hong Kong was paying a higher unit water price than other GD

cities for the use of DJ water, thus subsidizing those cities in the use of water. The Administration advised that it was difficult to draw direct comparison between the unit prices paid by Hong Kong and other GD cities. Although the unit price paid by other GD cities for the use of DJ water was notionally lower than that paid by Hong Kong, other cities were facing higher rates of cost increase.

Quality of Dongjiang water

13. As regards the quality of DJ water, the Administration has advised that according to the current Supply Agreement, the GD side would maintain the existing DJ water quality supplied to Hong Kong in compliance with the latest national standard, which is currently set for Type II[2] waters in the Environmental Quality Standards for Surface Water (GB 3838-2002). According to the Administration's water quality monitoring data, the quality of DJ water meets the relevant standard. The Administration has further advised that following the full commissioning of the dedicated aqueduct for DJ water in 2003, the quality of DJ water supplied to Hong Kong has shown remarkable improvement in various aspects. The Advisory Committee on Quality of Water Supplies ("ACQWS") also regularly appraises the water quality data. In addition, ACQWS visits DJ and its tributaries regularly to inspect the works and measures undertaken to protect DJ water. Separately, since 2001, the GD authorities have provided the water quality data concerning the east bank section upstream of Taiyuan pumping station (intake point of DJ water supply to Hong Kong) to the Water Supplies Department ("WSD") for publication at the Department's website on an annual basis.

14. At the special meeting of FC held on 23 March 2011, some members raised concern about possible contamination of DJ water in the event of a nuclear accident at the Daya Bay Nuclear Plant. The Administration responded that, according to the Daya Bay Contingency Plan, besides strengthening the monitoring of DJ water, WSD would immediately suspend the supply of DJ water if the water was found contaminated with radionuclides exceeding the acceptable standard. The water supply in Hong Kong would

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[2] There are five types of surface water standards designated for specific functions and purposes of protection. Type I standard is only applicable to source water and national nature reserve, whilst Type II is applicable to first class protection area for the abstraction for human consumption. As DJ water does not fall into the category of source water and national nature reserve, DJ water supplied to Hong Kong applies Type II standard, which is the highest applicable water quality standard.

then be switched to local reservoirs, the total storage capacity of which would be able to meet the water demand for about six months.

15. A Member raised a written question about fresh water supply at the Council meeting of 27 February 2013. In response to the part of the question about the quality of DJ water in recent years, the Administration said that the GD authorities had formulated and implemented laws and regulations for the prevention and control of pollution to water resources. WSD had been closely monitoring the quality of DJ water by its on-line water quality monitoring system at Muk Wu pumping station and analyzing water samples taken from the pumping station and different water treatment works. The findings of WSD's regular water quality monitoring work had shown that DJ water supplied to Hong Kong was of consistently good quality and their indicative values were in compliance with the national standard. The question and the Administration's reply are given at **Appendix I.**

16. A written question about the Administration's monitoring of the quality of potable water, coordination with the GD authorities on the work in this respect and measures to ensure stable supply of safe potable water was raised at the Council meeting of 20 March 2013. The question and the Administration's reply are given at **Appendix II.**

Latest Development

17. The Administration will brief DEV Panel on 26 March 2013 on the quality of DJ water supplied to Hong Kong and the water quality monitoring work of WSD.

Relevant papers

18. A list of relevant papers is at **Appendix III**.

Council Business Division 1
Legislative Council Secretariat
22 March 2013

Appendix I

Written question raised by Hon Paul TSE
at the Legislative Council meeting of 27 February 2013
and the Administration's reply

Fresh water supply

Question:

It has been reported that, at the first session of the 11th Guangdong Provincial Committee of the Chinese People's Political Consultative Conference (CPPCC), a member said that "if not for the Communist Party, Hong Kong [people] would not even have potable water to drink". This remark has drawn quite a number of reactions. Regarding the supply of Dongjiang water to Hong Kong and water supply in Hong Kong, will the Government inform this Council:

(a) in light of the remark of the aforesaid CPPCC member, whether the Government has studied any policies on and measures for raising the degree of autonomy in the supply of potable water in Hong Kong; if it has, of the outcome; if not, whether it can conduct such a study immediately;

(b) of the percentage of Dongjiang water in the total quantity of water supply in Hong Kong in the next five years; as it has been reported that the quality of Dongjiang water has deteriorated in recent years and there has been an annual increase of about 5.8% in its price, whether it has studied if the long-term reliance on Dongjiang water as the main source of potable water is cost-effective; as well as the latest progress in the search for other sources of potable water;

(c) whether it has studied the cost-effectiveness of the desalination facilities in Singapore (including the production cost of potable water); if it has, of the details;

(d) of the expected annual production capacity of the desalination plant planned to be built in Tseung Kwan O, the cost per cubic metre (m3) of potable water produced by that plant, and how such cost compares with the price of Dongjiang water;

(e) whether it has assessed, with the continuous improvement in desalination technology, if the gap between the cost of potable water produced by desalination and the price of Dongjiang water is narrowing, and if the former may become even lower than the latter; if it has assessed, of the respective price/cost per m3 of both types of water; if not, whether it will conduct such an assessment immediately;

(f) whether the quantity of Dongjiang water supplied to Hong Kong was higher than the water consumption of Hong Kong in the past three years; of the situation projected for the next three years, and whether there is room for reducing the quantity of Dongjiang water to be purchased and for reducing the expenses on purchase of water; how the authorities will strive for reducing the quantity of water supply and the price of water; and

(g) of the quantity of potable water lost/wasted due to leakage of water from worn-out water mains in each of the past five years; of the equivalent amount of public expenditure incurred by such loss/wastage of potable water as calculated at the current cost of water supply?

Reply:

President,

Hong Kong does not have any natural lake, river or rich underground water resources. It also lacks reliable and evenly distributed rainfall. Therefore, it is a great challenge to develop a reliable and adequate source of water supply that can keep pace with the continual development of this city. Since the mid-19th century, Hong Kong has started building reservoirs to store rainwater for use of its people. At the end of the 1950s, Hong Kong started using seawater for flushing purpose to reduce potable water consumption. Since the 1960s, Hong Kong began to import raw water from Guangdong Province to meet the growing demand. At present, rainwater collected locally can only provide 20% to 30% of the water demand in Hong Kong. The remaining demand of about 70% to 80% has to be imported from Dongjiang of Guangdong Province. To prepare for future uncertainties and to enable the sustainable development of Hong Kong, the Water Supplies Department (WSD) launched the Total Water Management Strategy (the Strategy) in 2008. The Strategy mainly comprises two parts, namely:

(1) water demand management and (2) water supply management. Its objective is to achieve an optimal balance between demand and supply to ensure sustainable and effective use of water resources.

My reply to the seven parts of the question is as follows:

(a) The Government has been working on the policies and initiatives for Hong Kong's potable water supply and has rolled out diversified water supply management measures under the Strategy, including developing seawater desalination and studying water reclamation, greywater recycling and rainwater harvesting.

(b) We expect that the percentage of Dongjiang water in the total quantity of water supply in Hong Kong, i.e. about 70% - 80%, will remain unchanged in the next five years.

In regard to water quality, the current Dongjiang Water Supply Agreement signed with the Guangdong Authorities provides that the quality of Dongjiang water supplied to Hong Kong should comply with the national standard for Type II waters (applicable for the abstraction for human consumption in first class protection area) in the "Environmental Quality Standards for Surface Water GB3838-2002". The Guangdong Authorities have always attached great importance to protecting the quality of Dongjiang water. Apart from formulating and implementing laws and regulations for the prevention and control of pollution to water resources, the Guangdong Authorities have also proactively undertaken a series of preventive and control measures, and works to ensure that the quality of Dongjiang water supplied to Hong Kong complies with relevant standards.

The WSD has been closely monitoring the quality of Dongjiang water. Through its on-line water quality monitoring system at Muk Wu Pumping Station, the WSD monitors the quality of Dongjiang water supplied to Hong Kong round the clock. The WSD also regularly takes samples of Dongjiang water from Muk Wu Pumping Station and different water treatment works for analysing various pollution-related parameters. The findings of the WSD's regular water quality monitoring work in the past years show that the Dongjiang water supplied to Hong Kong is of consistently good quality and their indicative values are in compliance with the national standard.

All raw water, including Dongjiang water, undergoes suitable treatment and rigorous purification processes at WSD's water treatment works to remove impurities in water. This ensures that drinking water supplied to the public is clean, hygienic and free from pathogenic bacteria. The treated drinking water is in full compliance with the requirements stipulated in the World Health Organization's Guidelines for Drinking-water Quality and is safe for consumption.

On developing alternative sources of drinking water, the Government is, as mentioned above, in the course of implementing water supply management measures. They include developing seawater desalination and studying water reclamation, greywater recycling and rainwater harvesting. Apart from locally collected rainwater, Dongjiang water remains the most economic water resources available to Hong Kong at present.

(c) We have made reference to overseas experience in desalination facilities in various countries, including the United States, Australia and Singapore. Given their different calculation methods for energy charges, the production costs of desalinated water cannot be compared directly. Notwithstanding this, their data on energy consumption and other operational parameters provide useful reference and have been used for projecting the cost of producing fresh water in the on-going planning and investigation study for the proposed desalination plant at Tseung Kwan O.

(d) When commissioned, the proposed desalination plant at Tseung Kwan O Area 137 will have an estimated annual production capacity of about 50 million cubic metres (and expandable to about 90 million cubic metres in future). The estimated cost of its fresh water supply is about $12 per cubic metre at current price level. The current cost for Dongjiang water supply is about $8 per cubic metre.

(e) Reverse osmosis technology is a relatively sophisticated desalination method. The operating cost of this technology mainly comprises electricity charges and the costs for membrane replacement and chemicals. Compared with other resources, the reverse osmosis desalination process consumes more energy and entails a higher production cost. With the local electricity tariff on the upward trend,

the cost of desalination will not drop to a level comparable to Dongjiang water in the short run.

In 2012, the WSD engaged consultants to carry out a two-year planning and investigation study on the proposed desalination plant at Tseung Kwan O in order to examine in detail the feasibility and cost effectiveness of the plant and associated fresh water transfer facilities. The consultants will conduct detailed studies and assessment for different construction proposals, desalination technology, energy consumption, construction cost and cost effectiveness.

(f) Table 1 below sets out the actual water consumption of Hong Kong and the actual quantity of Dongjiang water supplied to Hong Kong from 2010 to 2012. It shows that the annual supply of Dongjiang water over the past three years is less than the actual consumption, accounting for 73% to 89% of the total consumption. We expect that the situations will maintain at a similar level in the coming three years.

Table 1: Actual water consumption of Hong Kong and the quantity of Dongjiang water supplied from 2010 to 2012

Year	Actual water consumption of Hong Kong (million cubic metres)	Actual supply of Dongjiang water to Hong Kong (million cubic metres)	Percentage of Dongjiang water to actual water consumption in Hong Kong (%)
2010	936	681	73
2011	923	818	89
2012	935	709	76

As mentioned above, we have strived to contain the growth of fresh water demand by implementing various water demand management initiatives under the Strategy in 2008. Despite the steady growth in Hong Kong's population, we have achieved progress in water conservation through public education, promotion on the use of water saving devices and measure to replace and rehabilitate aged water mains to reduce leakage over the past few years. Under the current Agreement, the annual supply ceiling of Dongjiang water is set at 820 million cubic metres, which is sufficient to meet our actual needs and

ensure 99% reliability of water supply for the next three years. We can be assured of continuous water supply round the clock even under the extreme drought conditions with a return period of 1 in 100 years.

On the price of Dongjiang water, the Dongjiang Water Supply Agreement signed with the Guangdong Authorities provides that the price adjustment should be based on operation costs, having regard to the relevant price indices of both parties as well as the exchange rate between Renminbi and Hong Kong dollar. As such, the price adjustment of Dongjiang water basically reflects changes in these factors. We consider the adjustments reasonable.

(g) The water main leakage rate from 2008 to 2012 is set out at Table 2 below.

Table 2: Water main leakage rate from 2008 to 2012

Year	Water main leakage rate (%)
2008	21.8
2009	21
2010	20
2011	19
2012	18

Given the highly varying terrain of Hong Kong, service reservoirs located on high altitude have to supply water to premises at different levels. As a result, water mains at lower altitudes operate under relatively high water pressure, making them more susceptible to leakage. Therefore, water main leakage should be considered an operational constraint instead of loss. We will continue our water main replacement and rehabilitation works, and strengthen pressure management and leakage detection to minimise water main leakage throughout the territory. Indeed, the leakage rate has dropped from 25% in 2001 to 18% in 2012 after the adoption of these measures.

Appendix II

Written question raised by Hon WONG Kwok-hing at the Legislative Council meeting of 20 March 2013 and the Administration's reply

Quality of drinking water

Question:

It has been reported that on the Mainland in recent years, various types of hazardous chemical substances have been found in some rivers, lakes, coastal waters and even in the bodies of wild animals and human beings, and the drinking water in many places has been contaminated. It has also been reported that the Ministry of Environmental Protection has recently acknowledged for the first time the existence of hundreds of cancer villages on the Mainland. There are 25 such villages in Guangdong Province, and two of them are even in Huizhou, which is situated along the riverbank of Dongjiang - the main source of water supply for Hong Kong. In this connection, will the Government inform this Council:

(a) as Hong Kong has adopted the Guidelines for Drinking-water Quality (the Guidelines) published by the World Health Organization as the water-quality standard for treated drinking water, whether the Guidelines have been updated in recent years in response to the environmental pollution problems which have emerged worldwide one after another; and whether the authorities have devised any new and corresponding strategies for monitoring water quality;

(b) of the items which failed to meet the relevant water quality standards in the outcome of tests of the quality of Dongjiang raw water supplied to Hong Kong in each of the past three years; and whether drinking such substandard water is harmful to health; if it is, of the details;

(c) given the worsening environmental pollution problems on the Mainland in recent years, whether the authorities have discussed with the relevant Guangdong Provincial authorities the implementation of measures to further improve the quality of Dongjiang raw water, including reducing the pollution to the source of Dongjiang water, with a view to reducing

the use of chemicals for purifying drinking water; if they have, of the details; if not, the reasons for that; and

(d) given the frequent droughts and revelation of pollution problems on the Mainland in recent years, whether the authorities have formulated any contingency measures to deal with the situations in which Dongjiang water cannot be supplied to Hong Kong or is unsafe to drink due to unexpected incidents, so as to ensure a steady supply of safe drinking water to Hong Kong; if they have, of the details; if not, the reasons for that, and whether the authorities will consider seriously formulating such contingency measures?

Reply:

President,

Since the 1960s, Hong Kong has begun to import raw water from Guangdong Province to meet the growing demand. At present, rainwater collected locally can only meet 20% to 30% of the water consumption in Hong Kong. The remaining 70% to 80% has to be imported from the Dongjiang of Guangdong Province. The Water Supplies Department (WSD) and the Guangdong authorities have kept a close surveillance over the Dongjiang water quality. Under the current water supply agreement, the Guangdong authorities would maintain that the quality of Dongjiang water supplied to Hong Kong complies with the latest national standard, i.e. the standard for Type II waters (applicable for the abstraction for human consumption in first class protection area) in the Environmental Quality Standards for Surface Water (GB3838-2002). It would also strive to step up its efforts in protecting the water resources. At present, the quality of Dongjiang water supplied to Hong Kong is steady and in compliance with the relevant standards. Raw water, both imported from Dongjiang and collected locally, undergoes suitable treatment and stringent disinfection process at WSD's water treatment works before being distributed for public consumption. The quality of treated water is in full compliance with the requirements stipulated in the Guidelines for Drinking-water Quality (the Guidelines) published by the World Health Organization (WHO) and is safe for consumption.

My reply to the four parts of the question is as follows:

(a) The WSD has kept abreast with the latest developments and revisions of the Guidelines published by the WHO and updated the standards for drinking water in Hong Kong accordingly. Currently, WSD is monitoring the quality of drinking water in Hong Kong in accordance with the latest WHO's Guidelines published in 2011.

The WSD has formulated and implemented a Water Safety Plan in accordance with the WHO's Guidelines. The Plan is based on preventive risk management principles and a multiple-barrier approach to monitor and control water quality from water sources, through treatment processes at water treatment works, to water supply and distribution systems for assuring that the water quality is in compliance with the relevant standards.

WSD collects water samples from water gathering grounds, pumping station for receiving Dongjiang water supply, impounding reservoirs, water treatment works, service reservoirs, water distribution system, and consumers' taps to ensure that the water quality is in full compliance with the WHO's Guidelines and is safe for public consumption.

(b) WSD closely monitors the quality of Dongjiang water through the on-line water quality monitoring system set up at Muk Wu Pumping Station around the clock and takes Dongjiang water samples for tests regularly. The routine water quality monitoring results of WSD in the past three years show that the quality of Dongjiang water supplied to Hong Kong is of consistently good quality. The average values of individual monitoring data, including biological oxygen demand, faecal coliforms, various minerals and compounds, are in compliance with the national standards for Type II waters in the "Environmental Quality Standards for Surface Water (GB3838-2002)" (applicable for the abstraction for human consumption in first class protection area). Please refer to the **Annex** for the monitoring results of the quality of Dongjiang water supplied to Hong Kong over the past three years.

The WSD publishes and updates regularly the information on the quality of Dongjiang water received at Muk Wu Pumping Station and drinking water supply after treatment on its website. The public may access the information at the following link:

www.wsd.gov.hk/en/water_resources/water_quality/water_quality_monitoring_data/index.html

(c) Both Guangdong and Hong Kong attached great importance to the quality of Dongjiang water. Both sides have kept in close contact and communication through regular meetings to discuss, follow up and implement various measures to reduce the pollution of Dongjiang water at sources. To safeguard the quality of Dongjiang water supplied to Hong Kong, the Guangdong authorities have implemented a series of prevention and control measures and projects in recent years. These include moving the intake points of Dongjiang water supplied to Hong Kong to a location of better quality water; building a bio-nitrification plant at the Shenzhen Reservoir; and conveying Dongjiang water direct from Tai Yuen Pumping Station to Shenzhen reservoir through a dedicated aqueduct. Various sewage interception and diversion projects have also been undertaken. Video monitoring points are also set up in the periphery of the Shenzhen Reservoir to monitor its water body, the surrounding ecological environment and the operations of key facilities. These measures help the authorities monitor the surrounding environment of the reservoir and facilitate control over untoward incidents that affect water quality. Furthermore, to improve the monitoring facilities for quantity and quality of Dongjiang, the Guangdong authorities are undertaking the construction of the "Dongjiang Water Quantity and Quality Monitoring and Control system", which includes real-time monitoring of the water quality of Dongjiang. Through implementing the above measures and projects, the quality of the Dongjiang water has been maintained steady and of good quality in recent years. As such, there is no significant increase in the use of chemicals for the potable water treatment.

(d) In case of any anomaly in the quality of Dongjiang water, the WSD will immediately step up monitoring and liaise with the Guangdong authorities concerned to carry out appropriate measures, including stepping up the monitoring of various water quality parameters at Muk Wu Pumping Station. The WSD will also maintain close liaison with the Guangdong authorities and consider reducing or suspending the supply of Dongjiang water in the light of its actual quality conditions. Where necessary, all the Dongjiang water already received may be discharged at Muk Wu Pumping Station. Local water resources may then be redeployed to supply the treatment works. In general, the

storage in the impounding reservoirs of Hong Kong is adequate to meet our needs for four to six months. We will also discuss with the Guangdong authorities concerned to plan for further responsive actions.

There is also an established notification mechanism manned by designated liaison officers of both Hong Kong and Guangdong authorities. In case of major contamination incidents affecting the quality of Dongjiang water supplied to Hong Kong, the Guangdong authorities would immediately notify the WSD over the telephone followed by supplementary detailed information.

Appendix III

Supply and quality of Dongjiang water

List of relevant papers

Council/Committee	Date of meeting	Paper
Council meeting	16 February 2011	Hansard -- written question (No. 7) on "water saving measures" (P. 5678 - P. 681) http://legco.gov.hk/yr10-11/english/counmtg/hansard/cm0216-translate-e.pdf
Finance Committee ("FC") (Special meeting)	23 March 2011	Report on the examination of the Estimates of Expenditure 2011-2012 (Paragraphs 11.15 - 11.16 of Chapter XI) http://legco.gov.hk/yr10-11/english/fc/fc/minutes/sfc_rpt.pdf
Panel on Development	25 October 2011	Administration's paper on "Management of water resources" (LC Paper No. CB(1)137/11-12(03)) http://www.legco.gov.hk/yr11-12/english/panels/dev/papers/dev1025cb1-137-3-e.pdf Minutes of meeting (LC Paper No. CB(1)600/11-12) http://www.legco.gov.hk/yr11-12/english/panels/dev/minutes/dev20111025.pdf
FC	18 November 2011	Administration's paper on "Head 194 -- Water Supplies Department Subhead 223 Purchase of water (FCR(2011-12)51) http://www.legco.gov.hk/yr11-12/english/fc/fc/papers/f11-51e.pdf

Council/Committee	Date of meeting	Paper
		Minutes of meeting (LC Paper No. FC95/11-12) http://www.legco.gov.hk/yr11-12/english/fc/fc/minutes/fc20111118a.pdf
Council meeting	27 February 2013	Written question (No. 20) on "fresh water supply" http://www.info.gov.hk/gia/general/201302/27/P201302270327.htm
Council meeting	20 March 2013	Written question (No. 13) on "Quality of drinking water" http://www.info.gov.hk/gia/general/201303/20/P201303200433.htm

附件
Annex

二零零九年四月至二零一二年三月於香港木湖抽水站接收之東江水水質

Dongjiang Water Quality for the Period of April 2009 - March 2012
as received in Hong Kong at Muk Wu Pumping Station

項目 Parameters	單位 Unit	監測結果 (平均值) Monitoring Data (Average value)			GB3838-2002 第II類 GB3838-2002 Type II 標準值 Standard Value
		(04/2009 - 03/2010)	(04/2010 - 03/2011)	(04/2011 - 03/2012)	
pH 值	pH	7.3	7.4	7.4	6 - 9
溶解氧 Dissolved Oxygen	毫克／公升 mg/L	7.5	7.8	8.0	≥ 6
高錳酸鹽指數 Permanganate Index	毫克／公升 mg/L	2	2	2	≤ 4
化學需氧量 Chemical Oxygen Demand (COD)	毫克／公升 mg/L	< 5	6	7	≤ 15
五日生化需氧量 5-Day Biochemical Oxygen Demand (BOD_5)	毫克／公升 mg/L	< 2.0	< 2.0	< 2.0	≤ 3
氨氮 (NH_3-N) Ammoniacal Nitrogen	毫克／公升 mg/L	0.04	0.05	0.05	≤ 0.5
總磷 (以P計) Total Phosphorus (as P)	毫克／公升 mg/L	0.050	0.045	0.046	≤ 0.1
銅 Copper	毫克／公升 mg/L	0.004	0.003	< 0.003	≤ 1.0
鋅 Zinc	毫克／公升 mg/L	< 0.01	< 0.01	< 0.01	≤ 1.0
氟化物 (以F^-計) Fluoride (as F^-)	毫克／公升 mg/L	0.25	0.24	0.27	≤ 1.0
硒 Selenium	毫克／公升 mg/L	< 0.003	< 0.003	< 0.003	≤ 0.01
砷 Arsenic	毫克／公升 mg/L	0.002	0.002	0.002	≤ 0.05
汞 Mercury	毫克／公升 mg/L	< 0.00005	< 0.00005	< 0.00005	≤ 0.00005
鎘 Cadmium	毫克／公升 mg/L	< 0.001	< 0.001	< 0.001	≤ 0.005
鉻(六價) Chromium (VI)	毫克／公升 mg/L	< 0.002	< 0.002	< 0.001	≤ 0.05
鉛 Lead	毫克／公升 mg/L	< 0.003	< 0.003	< 0.001	≤ 0.01
氰化物 Cyanide	毫克／公升 mg/L	< 0.01	< 0.01	< 0.01	≤ 0.05
揮發酚 Volatile Phenols	毫克／公升 mg/L	< 0.001	< 0.001	< 0.001	≤ 0.002
石油類 Petroleum Hydrocarbons	毫克／公升 mg/L	< 0.0125	< 0.0125	< 0.0125	≤ 0.05
陰離子表面活性劑 Anionic Surfactants	毫克／公升 mg/L	< 0.1	< 0.1	< 0.1	≤ 0.2
硫化物 Sulphides	毫克／公升 mg/L	< 0.05	< 0.05	< 0.05	≤ 0.1
糞大腸菌群 Faecal Coliforms	個／公升 no./L	280	310	270	≤ 2000
硫酸鹽 (以 SO_4^{2-} 計) Sulphate (as SO_4^{2-})	毫克／公升 mg/L	12	10	12	≤ 250
氯化物 (以 $C1^-$ 計) Chloride (as Cl^-)	毫克／公升 mg/L	10	8	9	≤ 250
硝酸鹽 (以N計) Nitrate (as N)	毫克／公升 mg/L	1.9	1.8	2.0	≤ 10
鐵 Iron	毫克／公升 mg/L	0.09	0.12	0.10	≤ 0.3
錳 Manganese	毫克／公升 mg/L	0.03	0.03	0.03	≤ 0.1
苯并(a)芘 Benzo[a]pyrene	毫克／公升 mg/L	< 2.0×10^{-6}	< 2.0×10^{-6}	< 2.0×10^{-6}	≤ 2.8×10^{-6}