

For information

SUPPLEMENTARY INFORMATION NOTE FOR LEGCO PANEL ON ENVIRONMENTAL AFFAIRS QUALITY OF DONGJIANG WATER

BACKGROUND

As requested at the meeting of the LegCo Panel on Environmental Affairs held on 2 July 1999, this information note reports on the progress of the key initiatives by the Guangdong Authorities to improve the quality of Dongjiang water, the discussion with the Guangdong side on the possible presence of PCB and PAH in Dongjiang water and the test results on probably carcinogenic substances in Dongjiang water by the Hong Kong side.

KEY INITIATIVES TO IMPROVE QUALITY OF DONGJIANG WATER

2. The key initiatives were reviewed at the 11th Meeting of the Hong Kong - Guangdong Environmental Protection Liaison Group held in March 1999. Progress of the works for the protection of the quality of the Dongjiang water were also discussed at the 10th Business Meeting on Water Supply from Guangdong held in July 1999. Subsequently, further contacts have been made with the Guangdong Authorities on water quality matters. Opportunities have been taken to relay to the Guangdong side the locations in Dongjiang where the pollution is serious. A plan showing the locations of some of the towns with completed or planned Annex A improvement projects is given at Annex A. The progress of the water quality protection works is reported as follows :

On-going Measures

3. The Guangdong Provincial People's Government has taken a series of measures to sustain the strategy for water quality protection and continuous development. These measures include:-

- (a) The provincial government has set up a Dongshen Water Quality Protection Leading Group to promulgate and implement “*The Protection of the Dongjiang Water Quality in Guangdong Province Ordinance*”, the “*Provisions for the Protection of the Source and Quality of Drinking Water of the Dongshen Water Supply Project*” and “*The Trial Procedure of Water Quality Objective Management of the Cross-City River Boundary in the Guangdong Province*” in which the concerned authority of the upstream section has to ensure the water quality at the boundary is satisfactory. The Guangdong Provincial People’s Congress has also endorsed “*The Guangdong Province Zhu Jiang Delta Water Quality Protection Ordinance*” for implementation with effect from January 1999. The Dongjiang and the Dongshen Water Supply System are within the purview of this ordinance.
- (b) The provincial government has designated the catchment area of Xinfengjiang as the first class water resource protection zone. As a result, all existing recreational business within the protection zones has to cease operation and any new activities in the area require prior vetting and approval by the provincial government.
- (c) The provincial government and local governments at all levels are required to implement water quality protection plans, including tree planting, soil stabilization, pollution control, etc., and conduct special study each year to identify management priority and improvement measures according to legislation requirement and in the light of changes in the water quality.

4. The Guangdong Authorities confirmed that the quality of the Dongjiang water maintained at Categories I to II. They also indicated that they would continue to enforce and implement policies of water quality protection and improvement of the areas en-route the Dongshen Water Supply System. The following are some improvement measures taken since 1998 :

- (a) Control of fluoride contamination

Six factories were found to be discharging effluent with high fluoride content. They were instructed by the authorities to tackle the problem and were required to stop any production processes which

discharged high fluoride content before the treatment facilities were built and put into operation. The fluoride level of the Dongjiang water was found to drop significantly since end 1998. There was, however, a rising trend of the fluoride level in May 1999. Upon the request of the Hong Kong side, the Guangdong Authorities took prompt action to rectify the situation, and two factories were reported to have been closed. The control is executed through strengthened monitoring of the Dongguan and Shenzhen governments.

(b) Control of oil contamination

After thorough investigation of some 5000 factories in the catchment area, 97 factories located along the Dongshen water supply route were found to have no anti-oil-seepage devices. The Guangdong Authorities have strengthened the control on these factories. They have also stepped up the monitoring of 19 major polluting enterprises.

(c) Control of medical effluent

Nine hospitals along the Dongshen water supply route have been requested to install solid waste incineration facilities and wastewater treatment facilities. The relevant town governments have already arranged the special funding for the items to be included in the construction programmes.

(d) Control of effluent from the livestock

“Provisions for the Protection of the Source and Quality of the Drinking Water of the Dongshen Water Supply Project” stipulates that all farms located in conservation zone classes 1 and 2 along the supply route have to be demolished. Eight large pig farms have been ordered to bring the level of discharges within limit. The treatment plants were all completed and acceptance tests started in June 1999.

(e) Control of land use

The Guanlan Golf Course Phase II construction was ordered to stop. An item for the design and construction of a sewage treatment plant

of capacity 60,000 tons/day at Guanlan was established.

5. The Shenzhen Environmental Protection Bureau and the Shawan Water Source Office have extended the management purview of the Shawan Water Source Office to cover 3 more towns, namely, Guanlan, Pinghu and Lunghua. The Dongshen water supply route is patrolled 24 hours a day. Besides, other measures like implementing the Sewage Disposal Permit System, stipulating effective pollution control within a time limit and applying control on total pollution load are also taken in areas along the Dongshen water supply route.

Key Projects

Shenzhen Reservoir Bio-nitrification Plant

6. The bio-nitrification plant was put into operation in December 1998 and has been very effective in bringing down significantly the ammonia content in the raw water supplied to Hong Kong.

Desilting of Shenzhen Reservoir

7. The construction of a lagoon at Shenzhen Reservoir to hold 650,000 cubic meters of sludge was completed in May 1999 to receive the desilted materials. The ultimate holding capacity of the lagoon will be 1.6 million cubic meters. The desilting work commenced in September 1999. Around 300,000 cubic meters of sludge will be removed by the end of the year. Desilting is expected to take three years to complete.

Sewage Treatment Plants

8. At present, six sewage treatment plants or sewage pumping facilities have been constructed along the Dongshen water supply route. The sewage treatment capacity is 65,800 tonnes per day. There are also 70 mini-sewage treatment installations installed with a total treatment capacity of 4,680 tonnes per day.

9. The Pinghu Sewage Treatment Plant, with a sewage treatment capacity of 30,000 tonnes per day, is scheduled to be completed and put into operation by the end of 1999. At Fenggang, 2 sewage treatment plants, with a total sewage treatment capacity of 6,000 tonnes per day, are under construction and

will also be commissioned by the end of 1999.

Sewage Interception and Transfer Works

10. The construction of sewage interception work at Qiaotou, Dongguan is partly completed and about 60% of the sewage is now intercepted and transferred out of the Dongshen catchment.

11. A pumping station in Shawan, with a pumping capacity of 20,000 tonnes per day has been constructed. It will transfer the sewage of Shenzhen out of the catchment of the Dongshen water supply route.

12. In Dawang Village off Shenzhen Reservoir, sewage interception works are under construction. Also, the industrial zone of the village will be relocated at a cost of RMB\$130 million.

13. Furthermore, the feasibility study report on the comprehensive sewage transfer for the area to the south of Yantian Reservoir has been endorsed.

Closed Aqueduct from Dongjiang to Shenzhen

14. The Guangdong side informed that the State Planning Commission had endorsed the technicality and initial design of the project. The preparation work and detailed design have been in an advanced stage. The Guangdong side has reaffirmed that the aqueduct will be completed by 2002 as scheduled.

PAH AND PCB

15. As regards the concerns on the possible presence of PAH and PCB in Dongjiang water, we have discussed this subject with the Guangdong side. PAH and PCB are insoluble in water and they may be adsorbed in the sediments on the river bed. However, our water intake point at Dongjiang is well above the river bed level. Therefore, the chance of taking such sediments into our raw Dongjiang water is slim. Even if some sediments enter into the raw water, they can be readily removed in the water treatment process via coagulation, sedimentation and filtration. Intakes of PAH and PCB via water are negligible.

TEST RESULTS ON PROBABLY CARCINOGENIC SUBSTANCES

Annex B 16. Annex B provides the typical concentration of chemical constituents in Dongjiang water at Muk Wu Pumping Station in 1998/99 with reference to the classification made by the International Agency for Research on Cancer (IARC), Annex C which is shown in Annex C. The concentrations of these chemical constituents in the raw Dongjiang water are well below the World Health Organisation (WHO) guideline values set for drinking water. As a matter of fact, our drinking water fully complies with the WHO standard and is safe for consumption.

Quality of Dongjiang Water

Annexes

Annex A - Location Plan of Towns with Completed or Planned Improvement Projects

Annex B - Typical Concentration of Chemical Constituents in Dongjiang Water

Annex C - Explanatory Note on Classification of Probably Carcinogenic Substances

Typical Concentration of Organic and Inorganic Chemical Constituents
in Dongjiang Water at Muk Wu Pumping Station (1998/1999)

Parameter	IARC's * Evaluation	Concentration	WHO GV (1993) (for drinking water)	Parameter	IARC's * Evaluation	Concentration	WHO GV (1993) (for drinking water)	Parameter	IARC's * Evaluation	Concentration	WHO GV (1993) (for drinking water)
Organic				Organic				Organic			
Carbon tetrachloride	Group 2B	<0.50	2	Chlordane	Group 2B	<0.050	0.2	Isoproturon	-	<2.2	9
Dichloromethane	Group 2B	<5.0	20	DDT	Group 2B	<0.50	2	Di(2-ethylhexyl)adipate	-	<20	80
1,2-dichloroethane	Group 2B	<7.5	30	Heptachlor/Heptachlor epoxide	Group 2B	<0.008	0.03	Di(2-ethylhexyl)phthalate	Group 2B	<3.0	8
1,1,1-trichloroethane	Group 3	<500	2000	Hexachlorobenzene	Group 2B	<0.25	1	Formaldehyde	Group 2A	<225	900
Vinyl chloride	Group 1	<1.2	5	Lindane	Group 2B	<0.50	2	Acrylamide	Group 2B	<0.2	0.5
1,1-dichloroethene	Group 3	<7.5	30	Methoxychlor	Group 3	<5.0	20	Tributyltin oxide	-	<0.5	2
1,2-dichloroethene	-	<12	50	Permethrin	Group 3	<5.0	20	Dichloroacetic acid	-	<12	50
Trichloroethene	Group 3	<18	70	Trifluralin	Group 3	<5.0	20	Trichloroacetic acid	-	<25	100
Tetrachloroethene	Group 2B	<10	40	Propanil	-	<5.0	20	Chloral Hydrate	-	<2.5	10
Monochlorobenzene	-	<75	300	Benzo(a)pyrene	Group 2A	<0.18	0.7	Dichloroacetonitrile	Group 3	<23	90
1,2-dichlorobenzene	Group 3	<250	1000	2,4-D	Group 2B	<7.5	30	Dibromoacetonitrile	Group 3	<25	100
1,4-dichlorobenzene	Group 2B	<75	300	MCPA	Group 2B	<2.0	2	Trichloroacetonitrile	Group 3	<0.3	1
Trichlorobenzenes (total)	-	<5.0	20	Dichlorprop	Group 2B	<25	100	Inorganic			
Bromoform	Group 3	<25	100	2,4-DB	Group 2B	<22	90	Cyanogen Chloride	-	<70	70
Dibromochloromethane	Group 3	<25	100	2,4,5-T	Group 2B	<2.2	9	Bromate	Group 2B	<25	25
Bromodichloromethane	Group 2B	<15	60	Fenoprop	Group 2B	<2.2	9	Chlorite	Group 3	<200	200
Chloroform	Group 2B	<50	200	Mecoprop	Group 2B	<2.5	10	Antimony (mg/l)	@	<0.001	0.005
Benzene	Group 1	<2.5	10	Pentachlorophenol	-	<2.2	9	Arsenic (mg/l)	Group 1	0.0015	0.01
Toluene	Group 3	<175	700	2,4,6-trichlorophenol	Group 2B	<50	200	Cadmium (mg/l)	Group 2A	<0.0001	0.003
Xylenes	-	<125	500	Alachlor	-	<5.0	20	Lead (mg/l)	Group 2B	<0.001	0.01
Ethylbenzene	-	<75	300	Atrazine	Group 2B	<0.50	2	Mercury (mg/l)	-	<0.00005	0.001
Styrene	Group 2B	<5.0	20	Metolachlor	-	<2.5	10	Selenium (mg/l)	Group 3	<0.001	0.01
1,2-dibromo-3-chloropropane	Group 2B	<0.25	1	Molinate	-	<1.5	6	Barium (mg/l)	-	0.033	0.7
1,2-dichloropropene	Group 3	<5.0	20	Simazine	Group 3	<0.50	2	Boron (mg/l)	-	<0.07	0.3
1,3-dichloropropene	Group 2B	<5.0	20	Pendimethalin	-	<5.0	20	Chromium (mg/l)	#	<0.04	0.05
Hexachlorobutadiene	Group 3	<0.15	0.6	Aldicarb	Group 3	<2.5	10	Copper (mg/l)	-	<0.09	2
Epichlorohydrin	Group 2A	<0.2	0.4	Carbofuran	-	<1.2	5	Molybdenum (mg/l)	-	<0.02	0.07
Aldrin/Dieldrin	Group 3	<0.008	0.03	Chlorotoluron	-	<7.5	30	Nickel (mg/l)	+	<0.02	0.02
Bentazon	-	<7.5	30	Pyridate	-	<25	100				

(Average values expressed in µg/l except otherwise specified.)

Legend

* IARC = International Agency for Research on Cancer

@ IARC has classified antimony trioxide in Group 2B whereas antimony trisulphide in Group 3.

IARC has classified chromium (VI) in Group 1 whereas metallic chromium and chromium (III) in Group 3.

+ lack of evidence of a carcinogenic risk from oral exposure.

WHO GV (1993) = Guideline values for drinking water recommended by World Health Organization in "Guidelines for drinking-water quality, WHO (1993)"

Explanatory Note on Classification of Probable Carcinogenic Substances

In establishing the Guideline values for drinking-water quality by the World Health Organization (WHO) in 1993, the International Agency for Research on Cancer (IARC) classification for carcinogenic substances was taken into consideration. The IARC categorizes chemical substance with respect to their potential carcinogenic risk into the following groups:

- Group 1** : the substances is **carcinogenic** to humans (sufficient evidence of carcinogenicity in experimental animals and strong evidence in exposed humans)

- Group 2A** : the substance is **probably carcinogenic** to humans (sufficient evidence of carcinogenicity in experimental animals and limited evidence in humans)

- Group 2B** : the substance is **possibly carcinogenic** to humans (less than sufficient evidence of carcinogenicity in experimental animals and limited evidence in exposed humans)

- Group 3** : the substance is **not** classifiable to its carcinogenicity to humans (inadequate evidence of carcinogenicity in experimental animals and inadequate evidence in humans)

- Group 4** : the substance is **probably not** carcinogenic to humans (evidence suggesting lack of carcinogenicity in experimental animals and in humans)

According to the Guidelines for drinking-water quality recommended by World Health Organization (1993), for substances that are considered to be geno toxic carcinogens, the guideline value is the concentration in drinking-water associated with an excess lifetime cancer risk of 10⁻⁵ (one additional cancer case per 100 000 of the population ingesting drinking-water containing the substance at the guideline value for 70 years, assuming a daily consumption of 2 litres of drinking-water). Trihalomethanes, e.g. chloroform, bromodichloromethane, dibromo-chloromethane and bromoform, which are by-products of disinfection by chlorination, are present in the treated water and considered to be in Group 2B possibly carcinogenic.