

Report No. 57 of the Director of Audit — Chapter 12

WATER LOSSES FROM UNAUTHORISED CONSUMPTION AND INACCURATE METERING

Summary

1. The Water Supplies Department (WSD) is responsible for supplying fresh water and salt water (seawater for flushing) in Hong Kong. In 2010, the estimated loss of fresh water arising from unauthorised water consumption and inaccurate metering totalled 34.94 million cubic metres (Mm³), representing 4% of the total fresh water supply in the year. Such water losses result in under-collection of water charges, water wastage and water contamination. The Audit Commission (Audit) has recently conducted a review to examine the WSD's actions taken to minimise water losses from unauthorised water consumption and inaccurate metering.

Enforcement action against unlawful water taking

2. The Prosecution Unit of the WSD is responsible for taking enforcement action under the Waterworks Ordinance (Cap. 102) against unlawful water taking. Suspected cases of unlawful water taking are referred to the Unit for investigation. In 2010, the Unit took prosecution action in 92 cases, of which 91 resulted in convictions.

3. *Convictions of unlawful water taking.* According to the WSD's estimates, in 2010, unauthorised water consumption led to a total water loss of 17.30 Mm³. Audit examination revealed that the number of conviction cases of unlawful water taking increased by 52% from 60 in 2008 to 91 in 2010. *Audit has recommended that the Director of Water Supplies should conduct a review of WSD strategy in addressing the unlawful water taking problem, with a view to identifying and implementing improvement measures.*

4. *Unlawful water taking at Food and Environmental Hygiene Department (FEHD) markets.* Audit examination revealed that, from 2008 to 2010, 25 conviction cases of unlawful water taking took place at seven FEHD markets, and the number of such cases increased from 4 in 2008 to 18 in 2010. Audit also noted that the WSD did not inform the FEHD of such offences for the latter to take follow-up action. *Audit has*

recommended that the Director of Water Supplies should: (a) inform the Director of Food and Environmental Hygiene about substantiated unlawful water taking cases at FEHD markets; and (b) provide training to FEHD officers on detecting unlawful water taking activities at FEHD markets. Audit has also recommended that the Director of Food and Environmental Hygiene should take necessary enforcement action under the market-stall tenancy agreements on tenants who have been convicted of unlawful water taking offences at FEHD markets.

5. ***Unlawful water taking for flushing at residential developments.*** Audit examination revealed that, from 2008 to 2010, there were 48 conviction cases of unlawful water taking for flushing, some of which were attributed to break-downs of residential developments' flushing systems. *Audit has recommended that the Director of Water Supplies should: (a) conduct publicity campaigns on prevention of taking fresh water unlawfully for flushing; and (b) take measures to encourage residential developments to properly maintain their flushing systems.*

6. ***Unlawful water taking at construction sites.*** Audit examination revealed that, from 2008 to 2010, 9 (26%) of the 35 conviction cases of unlawful water taking at construction sites related to government works. Audit also noted that the WSD did not notify the responsible government departments of the 9 conviction cases. According to the Project Administration Handbook for Civil Engineering Works, an application for temporary water supply should be made before the award of a government works contract. However, Audit noted in one case that the government contractor only applied for temporary water supply 132 days after commencement of the works. *Audit has recommended that the Director of Water Supplies should: (a) consider providing the responsible government departments with information of conviction cases of unlawful water taking at their works sites; and (b) remind works departments of the need to comply with the requirement of making an advance application for temporary water supply.*

Inspection of unauthorised water consumption

7. ***Staff training.*** According the WSD's guidelines, any WSD officer who discovers contraventions to the Waterworks Ordinance should attempt to collect evidence as far as possible so that the Prosecution Unit may take follow-up action without undue difficulties. However, Audit examination revealed that some WSD officers did not comply with this requirement, resulting in insufficient evidence for taking prosecution action. *Audit has recommended that the Director of Water Supplies should consider implementing a regular training programme for WSD officers on handling suspected unlawful water taking cases, particularly on evidence collection and experience sharing of conviction cases.*

8. ***Assistance from government departments.*** From 2005 to 2009, the WSD issued memoranda to 12 target government departments to encourage the reporting of unauthorised use of water at construction sites. Audit examination revealed that the number of referral cases by government departments was reduced from 23 in 2008 to 4 in 2010. *Audit has recommended that the Director of Water Supplies should: (a) periodically seek assistance from target government departments for reporting suspected unlawful water taking cases to the WSD for follow-up action; and (b) provide training to the officers of target government departments to help detect unlawful water taking.*

9. ***Risk-based strategy for surprise inspections.*** In 2011, the WSD informed Audit that it selected buildings and premises for conducting surprise inspections based on a risk-based strategy. However, Audit noted that details of such a strategy had not been documented. *Audit has recommended that the Director of Water Supplies should: (a) formulate and document a risk-based strategy for conducting surprise inspections; and (b) devise and implement a structured programme for conducting surprise inspections.*

10. ***Investigations of suspected cases.*** Audit examination revealed that investigation officers of the Prosecution Unit sometimes took a long time to submit investigation reports and district officers of the Customer Services Branch a long time to complete remedial action of terminating unauthorised connections. *Audit has recommended that the Director of Water Supplies should instruct: (a) investigation officers of the Prosecution Unit to submit investigation reports as early as practicable; and (b) district officers of the Customer Services Branch to take prompt remedial action to cease unlawful water taking after receiving notifications from the Prosecution Unit.*

Management of water meter accuracy

11. According to the WSD's estimates, in 2010, inaccurate metering led to a total water loss of 17.64 Mm³. It installs water meters to register the quantity of fresh water consumed by customers. Water pipes for domestic water supply are normally of 15 millimetre (mm) diameter, and those for non-domestic water supply are of 15 mm to 300 mm diameters. Under the Waterworks Regulations (Cap. 102A), a water meter shall be deemed to register correctly if its inaccuracy does not exceed 3% above or below the correct amount. In 2010-11, 95% of 15-mm meters achieved this accuracy rate.

12. ***Replacement of 15-mm water meters.*** The WSD's review in 1995 found that water meters tended to under-register the actual water consumption with the passage of time, and the optimal service life of 15-mm meters was 12 years. Audit examination revealed that, as of July 2011, 6% of the 2.77 million 15-mm meters in service had been installed for over 12 years. In 2011, the WSD informed Audit that the management offices, occupiers and registered customers of some buildings did not allow the WSD to

replace the related meters. Audit has recommended that the Director of Water Supplies should: (a) expedite action to replace 15-mm water meters aged over 12 years; (b) accord high priority to replacing aged 15-mm meters long overdue for replacement; and (c) consider issuing warning letters to, and taking appropriate enforcement action on, management offices, occupiers and registered customers who do not render the necessary assistance for meter replacements.

13. ***Replacement of large water meters.*** Audit examination revealed that, as of July 2011, 31% of the total 33,826 meters of 25 mm to 100 mm diameters and 30% of the total 157 meters of 150 mm to 300 mm diameters had exceeded their optimal service lives of seven years and four years respectively. *Audit has recommended that the Director of Water Supplies should: (a) expedite action to replace aged large water meters which have exceeded their optimal service lives; and (b) accord high priority to replacing aged large meters long overdue for replacement.*

14. ***Replacement of water meters for government establishments.*** Audit examination revealed that, as of July 2011, 9% of the 12,264 water meters installed in government establishments had exceeded their optimal service lives. *Audit has recommended that the Director of Water Supplies should expedite action to replace aged water meters in government establishments.*

15. ***Meter replacement strategy reviews.*** Audit noted that the WSD only conducted reviews in 1995 and 2009 of the meter replacement strategy for 15-mm meters and a review in 1997 of a similar strategy for large meters. *Audit has recommended that the Director of Water Supplies should conduct periodic reviews of the meter replacement strategies for 15-mm and large meters.*

Performance reporting

16. ***Performance targets for enforcement action.*** Audit noted that, relating to enforcement actions, the WSD only included in its Controlling Officer's Report performance indicators on the number of prosecutions and the total amount of fines imposed. *Audit has recommended that the Director of Water Supplies should: (a) set performance targets and indicators on the number of publicity campaigns, seminars and training sessions for the promotion of combating unauthorised water consumption; and (b) publish in WSD publications and on WSD website the extent of achieving the performance targets.*

17. *Performance targets for meter accuracy.* Audit noted that the WSD did not publish in WSD Annual Reports and performance pledge booklets its annual targets on meter accuracy. Audit also noted that the WSD did not select large meters for carrying out meter accuracy tests despite the fact that the water charge revenue of such meters accounted for 34% of the total water charge revenue in 2010-11. *Audit has recommended that the Director of Water Supplies should: (a) publish annual targets on water meter accuracy in WSD publications and on WSD website; (b) include large water meters in selecting samples for accuracy testing; and (c) publish the extent of achieving the performance targets on water meters in WSD publications and on WSD website.*

Response from the Administration

18. The Administration agrees with the audit recommendations.

November 2011