For discussion **FCR(2012-13)31**
on 1 June 2012

ITEM FOR FINANCE COMMITTEE

HEAD 37 – DEPARTMENT OF HEALTH
Subhead 603 Plant, vehicles and equipment
New item "Replacement of a thermoluminescent dosimetry system"
New item "Replacement of a standard radiological dosimetry calibration facility"

Members are invited to approve the following new commitments for the Department of Health –

(a) a new commitment of $22 million for replacing a Thermoluminescent Dosimetry System; and

(b) a new commitment of $15.5 million for replacing a Standard Radiological Dosimetry Calibration Facility.

PROBLEM

The existing Thermoluminescent Dosimetry System (TLD System) and the Standard Radiological Dosimetry Calibration Facility (RDCF) in the Department of Health (DH) have been in use for over ten years and reached the end of their serviceable lives. We need to replace these two equipment items as soon as possible to ensure uninterrupted service to the users.

PROPOSAL

2. The Director of Health, on the advice of the Electrical and Mechanical Services Trading Fund (EMSTF) and with the support of the Secretary for Food and Health, proposes to replace the existing TLD System and RDCF by new ones with enhanced capabilities.

/**JUSTIFICATION** …..

JUSTIFICATION

TLD System

3. The life expectancy of the existing TLD System is about ten years. The existing TLD System which was commissioned by three phases in 1992, 1994 and 2001 respectively, has reached the end of its expected working life. Spare parts are no longer available. Owing to ageing of component parts, the downtime has increased in recent years. Furthermore, the dose analysis and record management system, which was first commissioned in 1992, does not support operation in Chinese. This has prevented DH from accepting users' information in Chinese and meeting the users' demand for dose reports in Chinese. There is an imminent need to replace the existing TLD System to ensure uninterrupted service to the users.

4. The new TLD System will employ up-to-date technologies, including working on the latest computer operation environment and built-in radiation calibration capability which can improve the accuracy of the monitoring results. Users will also be provided the options of receiving their radiation dosage reports in Chinese or English according to their preference.

RDCF

5. The life expectancy of the existing RDCF is about ten years. Commissioned in 2001, the existing RDCF has reached the end of its expected working life. The manufacturer of a major component of the RDCF has closed its business, putting the availability of spare parts and maintenance support at risk. There is an imminent need to replace the existing RDCF to ensure uninterrupted service to the users.

6. The proposed replacement will also bring about the following benefits –

(a) Increased productivity on calibration

The new RDCF will be equipped with an additional calibration track for separate calibration against X-ray and gamma radiation fields. This will shorten the preparation time for dosimeter calibration and increase the calibration throughput.

/(b) …..

(b) Expanded reference energy calibration points

The International Organisation for Standardisation (ISO) specifies a series of radiation energy as reference points for checking the accuracy of radiation dosimeters. The existing RDCF, apart from having a high stability X-ray machine that provides a range of narrow spectrum X-ray reference energies, is equipped with only one radioactive source providing one gamma energy reference point. The new RDCF will be equipped with two additional gamma energy reference points with an expanded range of gamma energies for calibration of gamma dosimetry instruments, hence providing calibration that is more reliable over a wider energy range.

(c) Improved radiation safety

In the existing RDCF, the entrance door to the facility is interlocked with the X-ray machine of the facility so that X-ray will be stopped when the entrance door is inadvertently opened. However, there is no such interlock installed for the radioactive source irradiator in the existing facility. In the new RDCF, the radioactive sources irradiator will be equipped with this safety device to prevent accidental gamma radiation exposure once the entrance door is opened. This is an important improvement on occupational health and safety protection of the calibration staff and other workers.

FINANCIAL IMPLICATIONS

Non-recurrent Expenditure

TLD System

7. The estimated non-recurrent cost of replacing the existing TLD System is $22 million, broken down as follows –

		$ million
(a)	Thermoluminescent dosimeters (TLDs)	5.9
(b)	TLD readers	11.5
(c)	Dose analysis and record management system	2.6
(d)	Contingency (10% of (a) - (c) above)	2.0
	Total:	**22.0**

/8. …..

8. On paragraph 7(a) above, the expenditure of $5.9 million is for procuring TLDs to be carried by radiation workers for monitoring the radiation exposure.

9. On paragraph 7(b) above, the expenditure of $11.5 million is for procuring six TLD readers to replace the existing ones.

10. On paragraph 7(c) above, the expenditure of $2.6 million is for procuring a new dose analysis and record management system with up-to-date technologies.

RDCF

11. The estimated non-recurrent cost of replacing the existing RDCF is $15.5 million, broken down as follows –

		$ million
(a)	New RDCF, comprising –	
	(i) One set of radioactive sources irradiator with control system	1.3
	(ii) One set of X-ray machine for irradiation with control system	3.7
	(iii) Two sets of calibration track	5.5
(b)	Installation of necessary radiation protection facilities in the premises hosting the new RDCF	3.6
(c)	Contingency (10% of (a) and (b) above)	1.4
	Total:	**15.5**

12. On paragraph 11(a) above, the expenditure of $10.5 million is for procuring a new RDCF, comprising one set each of radioactive sources irradiator and X-ray machine for irradiation (both with control system) and two sets of calibration track.

13. On paragraph 11(b) above, the expenditure of $3.6 million is for installation of radiation protection facilities in the premises hosting the new RDCF, including radiation shielding facility, surveillance system and exposure interlock system.

/14. …..

14. The non-recurrent expenditure for both TLD System and RDCF is estimated to be incurred fully in 2012-13.

Recurrent Expenditure

15. The replacement of TLD System and RDCF will entail additional annual recurrent expenditure of $0.913 million and $0.889 million respectively, being the increase in EMSTF charges for maintenance of the new equipment. DH will absorb the additional recurrent cost from within its existing resources.

IMPLEMENTATION PLAN

16. We plan to replace the TLD System and RDCF according to the following timetable –

	Activity	**Target completion date**	
		TLD System	**RDCF**
(a)	Preparation of tender specifications	July 2012	July 2012
(b)	Invitation of tender	October 2012	November 2012
(c)	Installation of radiation protection facilities for the premises hosting the new RDCF	N/A	November 2012
(d)	Tender evaluation and award of contract	December 2012	December 2012
(e)	System delivery, testing and commissioning	March 2013	March 2013

PUBLIC CONSULTATION

17. We consulted the Legislative Council Panel on Health Services on the proposals on 14 May 2012. Members had no objection to the proposals.

/BACKGROUND …..

BACKGROUND

TLD System

18. The TLD System is a device for monitoring the radiation dosages incurred by personnel engaged in work involving exposure to ionising radiation (including X-ray and gamma radiation). The System comprises three major components as follows —

(a) the TLDs, which are carried by the individuals for recording the radiation dosages received by them during work;

(b) the TLD readers, which will process the TLDs by reading out the radiation dosage recorded in the TLDs and transfer the data to a dose analysis and record management system; and

(c) the dose analysis and record management system, which will maintain the radiation dosage information of each monitored individual and will generate the dosage reports as necessary.

19. At present, DH utilises a TLD System to provide occupational radiation monitoring service and environmental radiation monitoring service in Hong Kong. In addition, DH will also provide radiation monitoring service to emergency response workers who are assigned to take part in various nuclear and radiological contingency plans of the Government.

RDCF

20. The RDCF is for calibration of radiation dosimetry instruments which are used for the measurement of ionising radiation (including X-ray and gamma radiation) dosage. In order to conform to the standards prescribed by the ISO on radiation dosimetry, the accuracy of the RDCF has been regularly calibrated directly against national primary dosimetry reference standards. The RDCF is therefore the reference standard for radiation dosimetry in Hong Kong. Through calibration against the RDCF, the accuracy of local radiation dosimetry instruments can be verified. This is fundamental to the protection of workers who are engaged in work involving exposure to ionising radiation.

Food and Health Bureau
May 2012