

# 6 - 34 Individual Dose Monitoring and National Individual Dose Comparison Results of External Exposure of IMP in 2012

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For the routine individual dose monitoring in IMP,  $\gamma$  irradiation of induced radioactivity is monitored with TLD method. The individual dose equivalent  $H_p(10)$  is measured to estimation of individual external exposure. The RGD-3B dose reader, GR200A TLD detectors and TLD469 dosimeter box were used. During every monitoring period, a lot of restrict quality control means were carried out. The RGD-3B dose reader and GR200A TLD detectors were calibrated in standard reference radiation field every year to ensure the accuracy of monitoring data.

Table 1 shows the external exposure individual dose monitoring results of IMP in 2012. It can be seen from the Table 1 that 286 persons accepted individual dose monitoring, and the average annual effective dose was 0.12 mSv, 208 persons was less than 0.1 mSv. The maximum individual dose was about 2.6 mSv, which was caused by the residual radiation of accelerator component during overhaul of the machine. And it was far below the national dose limit(20 mSv).

Institute of Modern Physics(IMP) participated in the comparison of nation individual dose organized by National Institute for Radiological Protection, China CDC, the results were correct and granted with certificate. In the comparison, the RGD-3B dose reader, GR200A TLD detectors and TLDJ4000 dosimeter box were used. Seven groups dosimeter marked number 1 to number 7 were selected to the comparison, group 1 to group 5 were bland samples, group 6 was stand by sample and group 7 was used for background dose monitoring. The first 5 groups were exposed by organizer with unknown ray type in a standard flat water phantom in the  $0^\circ$  direction and with different unknown individual dose equivalent value  $H_p(10)$ . If the relative error is between the exposed value and the measured value within 30%<sup>[1]</sup>, it considered to be correct. The dose measured system calibration processes and quality control means in the comparison were the same as the routine individual dose monitoring. Table 2 shows the detail results of the comparison. It can be seen that the relative error of each group was within 30%.

Table 1 Individual dose monitoring results in 2012								
Year	Number of monitored individuals	Annual collective effective dose (mSv)	Average annual effective dose(mSv)	Number of individuals with different annual effective dose $H_p(10)$ (mSv)				
				<0.1	0.1~1	1~5	5~10	$\geq 10$
2012	286	34.3	0.12	208	74	4(2.6 mSv )	0	0

Table 2 Comparison results of national individual dose of IMP in 2012					
Group number	Reference radiation type	Energy (keV)	Exposed value $H_p(10)$ (mSv)	Measured value $H_p(10)$ (mSv)	Relative error (%)
1	$\gamma$	1250	0.40	0.396	1
2	X	65	0.70	0.677	3.3
3	$\gamma$	1250	0.30	0.299	0.33
4	$\gamma$	1250	1.40	1.52	8.6
5	X	83	0.70	0.669	4.4

## Reference

[1] Chen Jianxin, et al. , Thermoluminescence Dosimetry System Used in Personal and Environment Monitoring for X and Gamma Radiation, (2006)12.