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INTRODUCTION-OBJECTIVES

In accordance with regulation, we have to control raw material for secure production process and we must take care of staff's radioprotection.


The French national nuclear safety authority (ASN) recommends to make regular check, so we set up a control of the parcels of radioactive sources and we defined a new procedure.

MATERIAL AND METHODS

- Tests performed during 4 days on all radiopharmaceuticals received

- Equipments :

* gloves for protection 

* radiation dosimeter for measure of exposure to ionizing radiation 

* ratemeter for measure of dose rate 

* spectrometer for identification of isotope 

RESULTS

- 27 parcels of radiopharmaceuticals were checked

Isotope	¹⁸ F	^{81m} Kr	¹¹¹ In	^{99m} Tc	¹²³ I	¹³¹ I	⁶⁷ Ga
Number	13	3	3	2	3	1	1

- Dose rate at 1 meter can be used to calculate the transport index (IT) and with that of supplier

$$IT = \text{dose rate (1m)} (\mu\text{Sv/h}) / 10$$

- In case of non-compliance, parcel is isolated and managed as radioactive waste

- 100% compliance : all performed controls are in agreement with current local regulations

	parcels number	average dose rate (contact) $\mu\text{Sv/h}$	[min;max] $\mu\text{Sv/h}$	average dose rate (1m) $\mu\text{Sv/h}$	[min;max] $\mu\text{Sv/h}$
Day 1	6	238,8	[4,56-600]	2,7	[0,1-6]
Day 2	6	194	[10,4-440]	3,5	[3,6-10,2]
Day 3	8	135,8	[13-435]	2,8	[0,3-4,5]
Day 4	7	275,4	[4,3-577]	3,3	[0,4-8,1]

- Parcels packaging ¹⁸FDG are most frequent (at least 2 parcels a day) $\simeq 40\%$ parcels received

- Parcels packaging ¹⁸FDG are most irradiant : 398.31 $\mu\text{Sv/h}$ ([52-600]) average dose at contact and 6.2 $\mu\text{Sv/h}$ ([3.6-8.1]) at 1 m.

DISCUSSION

This test is time-consuming not allowed a discharge control : most of radiopharmaceuticals were used until all the results of the analysis were obtained. This control induced additional staff exposure not yet included in the dosimetric estimation. This verification only can be performed when all the radiopharmacy's staff is present, it's happened 30% of the time. So we've decided to perform it once a month. The rest of the time, we've carried out a light check (perform a visual inspection of the package integrity, check the adequacy between order and delivery and control the labeling of the parcels). The ASN has approved this procedure.

CONCLUSION

This control must be adapted to balance regulatory requirements and the ALARA (As Low As Reasonably Achievable) principle in order to minimize the personnel exposure to radiation. Finally, a new analysis of the process will be performed within 6 months.