

Present Status of Radioisotope Distribution in Japan and the Role of JRIA for its Safety Management of It



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1. Outline of JRIA

Japan Radioisotope Association (JRIA) is thea public benefit organization regulated by MEXT. It was established in 1951 as an organization of radioisotope users and researchers-workers. JRIA plays a special role in the distribution of radioisotopes in Japan such as labeled compounds, pure radionuclides and sealed radioisotopes in Japan. JRIA receives orders offor radioisotopes from users all over Japanthe country. Based on these orders, radioisotopes produced or imported by commercial companies are supplied through JRIA. The radioisotope wastes are generated from the use of the unsealed radioisotopes, and the disused radiation sources from the use ofthe sealed radioisotopes. JRIA is also in charge of the collection and treat-

ment of the radioisotope wastes and the disused radiation sources as part of the radioisotope supplier's responsibility. JRIA maintains a complete system from supply to disposal of radioisotopes for the sake of promotion of utilization of radioisotopes and enhancement of safety thereof in Japan.

2. Present status of radioisotope distribution

Radioisotopes have been used in various fields such as medicine, research, industry, education, etc. The use of radioisotopes except for nuclear material is subject to regulation by The Laow Concerning Prevention of of Radiation Hazard due to Radioisotopes, etc. The number of radioisotope users officially licensedthat have got licenses amount to approximately 4,600 (as of

March 31, 2004). The number of users had increased year after year since 1959 when the Laow was established. However, But it has been on a decrease decreased for the last ten years. There are two reasons for this. One is the Japanese economic depression, because about 50% of the users are in industrial firms. Another is that the method for studying without the use of radioisotopes has greatly improved.

2.1 Distribution of Unsealed radioisotopes distribution

Major unsealed radioisotopes distributed are H-3, C-14, P-32 and S-35 for labeled compounds, and. Main kinds of unsealed radioisotopes other than labeled compounds are H-3, P-32, Ni-63, Kr-85, I-125 and I-131 for unsealed radioisotopes other than labeled compounds. Unsealed radioisotopes are used mainly in the life science field. The distribution of unsealed radioisotopes shows a declining trend in for the last few years.

2.2 Distribution of Ssealed radioisotopes distribution

The amount of sealed radioisotopes distributed has been on a trend of minor increase in recent years. As for major sealed radioisotopes, Co-60 sources for sterilization and Gamma

Knife are increasing. Also I-125 permanent implantsources for treatment of prostate cancer are also increasing significantly. The amount of Ge-68 sources for the calibration of PET scanner remains unchanged and is becoming stabilized. As for Ir-192 sources, the amount for nondestructive testscontinue to decrease gradually, while that for RALS (Remote-After-Loading-System) remainunchanged recentlyin recent years. Among the sealed radioisotopes, the amount distributed for medical devices has been increasing steadily every year.

2.3 Collection and storage of Radioisotope wastes

collection and storage

JRIA collects by truck rRadioisotope wastes generated from users after the use of unsealed radioisotopes are by JRIA and storesd them in JRIA's storage facilities of JRIA. The amount of radioisotope wastes collected is almost equivalent to 8 thousand of 200-liter containers every year.

3. Safety management and the incidentson of radiation sources

The majority of incidentson of radiation sourcess occur withhave occurred causing by unsealed radiation sources.

Therefore, JRIA supplies all sealed radiation sources are supplied to users throughout Japan by JRIA and also collects their disused radiation sources are collected by JRIA. This system is very effective for preventing accidents with radiation sources the incidents on it.

3.1 Supply of sealed radiation sources supply

JRIA confirms carefully the user's license to agree with the contents of the user's order prior to its acceptance. JRIA also inspects and tests also the sealed radiation sources to ensure the integrity of it before shipping to the user's facilities. All sealed radiation sources are tested in terms of surface contamination, measurement of output radiation and visual appearance.

3.2 Collection of disused radiation sources collection

Disused radiation sources including the disused radiation sources those installed in instruments are collected by JRIA. The disused radiation sources are separately classified, checked and tested at JRIA's facility before being assigned to the proper waste treatment. The routes of disused radiation sources treatment are as follows.

a) Reuse and recycle

Some kinds of disused radiation sources are transferred to the reuse route after confirming the quality required for its application.

b) Return to foreign manufactures or distributors

JRIA negotiates with the foreign manufactures and distributors for returning the disused radiation sources as much as possible.

c) Storage

The disused radiation sources being incapable of being transferred to neither the reuse nor return routes have to be stored in the storage facilities of JRIA equipped enough to shield against radiation.

3.3 The incidents of radiation sources that occurred in Japan

Approximately 160 incidents related to radiation sources have occurred in the period of 46 years of the periods from 1958 to 2004. The peak of number of incidents reached its peak incidents are found in the middle of mid-1970's which are coincided with the peak of the rapid increase of number of authorized users. Types of incidents can be categorized into Loss of source, Excess exposure, contamination and orphan source. 