

Improving inspection checklist for the medical field in Mongolia

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1. Introduction

Mongolia has no nuclear power plant, but there are several medical radiation facilities and many industrial radiation facilities including mineral mines. Since it is very important to protect the workers in the radiation facilities, Mongolia has developed a radiation protection program for radioactive sources that are used in medicine, industry, agriculture, research, and education; they are also used in some military applications. Numerous industrial companies use radioactive sources of Categories 3 and 4 in their activity.

International Atomic Energy Agency (IAEA)'s Safety guide provides a risk-based ranking of radioactive sources and practices in five categories. Within this categorization system, sources in Category 1 are considered to be most 'dangerous' because they can pose a very high risk to human health if not managed safely and secured. At the lower end of the categorization system, sources in Category 5 are the least dangerous. Even these sources could give rise to doses in excess of the dose limits if not properly controlled and therefore need to be kept under appropriate regulatory control.

The inspection checklists are necessary and have been used in all types of inspections. The checklists are a key document in the role of detecting violations during radiological inspections. The checklists are required to be modified on a regular basis.

South Korea is well-developed inspection processes and procedures for the nuclear and radiation fields. The advantages of Korean checklists have been reflected in these checklists. This inspection checklist will be helpful in creating a safer environment for the workers, patients, and public members, as it will help in considering some points to reduce radiation exposure.

2. Methods and Results

Mongolia and South Korea have almost the same working mechanism, the radiation facility request or apply for a license or inspection to the regulatory body, and after the evaluation and inspection the regulatory body issue the permit or license.

In Mongolia the authorization and inspection of medical facilities are divided into:

1. Nuclear Medicine, such as Gamma Camera, Dose calibrator, PET/CT, Tc-99m generator, etc.
2. Diagnostic Radiology, such as X-ray, Mammography, interventional radiology, CT, etc.
3. Radiotherapy

Radiation sources used in radio-medical facilities are divided into radioisotopes and radiation generators. In addition, radioisotopes are divided into sealed sources and unsealed sources.

Periodic inspection timing and inspection in Mongolia and South Korea are divided differently.

Description	Inspection frequency (year)
For medical treatment and check-ups of the inside and outside of a human body	Every year
Annual usage of not less than 3.7 GBq	Every 3 years
Annual usage of less than 3.7 GBq	Every 5 years
Sealed radioisotopes Annual usage of not less than 111 TBq Annual usage of not less than 111 TBq	Every 3 years Every 5 years
Unsealed radioisotopes Annual usage of not less than 3.7 GBq Annual usage of less than 3.7 GBq	Every 3 years Every 5 years
Radiation generating devices	Every 1-3 years

Table 1 Timing of Periodic Inspection of Users of Radioisotopes in South Korea

Practice	Timing of inspection
Dental radiography	Every 2 years
Nuclear medicine	Twice a year
Radiotherapy	Every year
Diagnostic Radiology	Every year
Industrial radiography	Every year
Radiators (Industrial and research)	Every year
Nuclear Gauges	Every 2 years
Well logging	Every year and a half
Transport of Radioactive Sources	Twice a year
Cyclotron and Synchrotron	Twice a year

Table 2 Timing of Periodic Inspection of Users
of Radioisotopes in Mongolia

As Tables 1 and 2 show, there are differences in the inspection point of view between South Korea and Mongolia. As shown in Table 1, the timing of the inspection is according to the practice itself, ignoring the source type or the annual usage. While as shown in Table 2, there are more specifications of the source, the annual usage, and the radiation-generating device.

The purpose of this paper will improve an inspection checklist for radioactive sources in Mongolia. There is a comparison methodology with Korean checklists. The Korean inspection checklists for radioactive sources are based on the International Atomic Energy Agency model checklists. The checklists are an important tool for monitoring to protect the public and environment from the negative impact of radiation. Checklists are designed to assess radiological risk. Checklists are comprised of questions for risk assessment.

This paper analyzes the Korean Institute of Nuclear Safety(KINS)'s inspection practice for the medical field, compares it to the Mongolian regulatory body, and develops an inspection checklist for the medical field of radioactive sources. In this paper, a comparison between the Mongolian regulatory body and the KINS was made, and some points were discussed.

3. Conclusions

In this paper, General Agency for Specialized Inspection form was used to develop and finalize the inspection checklist to be used by inspectors to perform an inspection in the medical hospitals in Mongolia. This checklist can be used in Mongolia. It can assist to improve their working condition and environment.

Some points were discussed in this report, and added to the attached checklist, as the final checklist, that can be presented to GASI for the purpose of improving the medical field's inspection in Mongolia.

This inspection checklist will be helpful in creating a safer environment for the workers, patients, and public members, as it will help in considering some points to reduce radiation exposure.

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