Contribution ID: **234** Type: **ORAL**

Application of Monte Carlo modeling based –PHITS code to DSRSs management in Cameroon

The Management of Radioactive waste generated from nuclear and radiation applications has become a worldwide issue as nuclear waste is a dam of several radionuclides with different half-lives, activities, and characteristics. The only well-used solution up-to-date is the long-term storage and disposal after its status of "waste" is confirmed. The disposal solution may incur the burden of the current generation onto the future ones. To be properly managed according to the regulations in place, Radioactive waste should be characterized and the appropriate geometries should be used for its long-term storage in Cameroon since the final management option is not yet prescribed by regulations. In this regard, mathematical and numerical tools such as Monte Carlo methods have been developed to perform the safety evaluation of the waste package and to test its performance. This research project describes the extension of the use of Monte Carlo simulation to properly manage radioactive waste, mainly in developing countries with low incomes. It thus deals with 137Cs disused sealed radioactive sources (DSRS) managed in Cameroon with the assistance of the International Atomic Energy Agency (IAEA). Some applications to neutron and gamma-disused sealed radioactive sources are highlighted as case studies. Since Monte Carlo methods are used to simulate the transport of particles, especially photons, electrons, and neutrons through matter and to obtain the detection system response, it is appropriate to be used during the research and development phase, while the DSRSs are under use before their disuse and classification as radioactive waste. The Particle and Heavy Ion Transport code System (PHITS) was used to perform the Monte Carlo simulation in the present work and the result of the GEANT4, FLUKA, and MCNP are to follow. The main outcomes are waste package geometry optimization and the comparison of experimental data compared to Monte Carlo modeling has been done to demonstrate the effectiveness of MC simulations.

Primary authors: Dr GUEMBOU SHOUOP, Cebastien Joel (Cameroon National Radiation Protection Agency (NRPA)); NDONTCHUENG MOYO, MAURICE (ANRP); Dr BEYALA ATEBA, Jean Felix (National Radiation Protection Agency (NRPA)); Mr SIMO, Augustin (National Radiation Protection Agency)

Presenter: Dr GUEMBOU SHOUOP, Cebastien Joel (Cameroon National Radiation Protection Agency (NRPA))

Track Classification: Track 5 - Practical experiences in integrating safety and sustainable development