

Statistical methods to study consistency between declared and measured values on waste packages

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Radioactive waste is any substance that contains radionuclides for which no further use is planned or contemplated. Each type of radioactive waste requires a treatment and a long-term management solution adapted to control the radiological risk. For each manufactured waste package, the producer determines the activities of radionuclides that are present in the package, commonly called declared activities. Each producer has its own evaluation tools, according to its own processing methods, its industrial activity and its experience. During the storage process, compliance checks are performed on some packages and radioactivity measurements are made, called measured activities. This paper deals with statistical methods for large volumes that are used to conclude consistency (agreement) between declared and measured values on waste packages. To achieve this aim, we propose the use of different statistical methods: analysis of proportionality, equivalence, recoveries and expanded uncertainties. Guidelines that are meant to bridge the differences that often exist between different actors, various compendia and regulators are proposed.

Key words: radionuclides, declared activities, measured activities, proportionality, equivalence, recoveries, expanded uncertainties.