

Application of the Integrated Approach to Radiological Protection in Different Exposure Situations

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Abstract—Committee 5 has been given the objective of developing a framework for environmental protection based on an evaluation of the ethical and philosophical basis established in ICRP Publication 91. This was first described in 2008, when the ICRP published a document (Publication 108) which outlined the concept and use of twelve Reference Animals and Plants (RAPs). The RAPs are intended to span terrestrial, freshwater and marine ecosystems through selection of as few organisms as necessary to enable collection and development of datasets on radiation effects and radionuclide transfers and associated dosimetry. Other ICRP reports and task group outputs have expanded on different aspects of the system of radiological protection which now incorporates the environment. Most recently, the way to apply the system of radiological protection to demonstrate environmental protection has been described in the ICRP's Publication 124. In this publication, the Commission's objectives for environmental protection (Publication 103) and how the Derived Consideration Reference Levels (DCRLs) apply within different exposure situations (planned, existing and emergency) were laid out. The DCRLs are defined as the reference range of dose rates, above the natural background, within which deleterious effects of ionising radiation may occur in individuals of a given RAP type. This presentation will describe the ICRP approach to environmental protection and demonstrate how the system for radiological protection protects both humans and wildlife. It will highlight where there are differences between aspects of human and environmental radiological protection. For example, in the protection goal. Put simply, the environmental goal (to protect populations and biodiversity) differ from the goal of protecting individual humans. Furthermore, there are differences in the application of the system of radiological protection where for humans we have dose limits but for wildlife we do not. This is based on the fact that for there to be a limit there must be some benefit to the potential increased exposure which is being limited but for wildlife it is difficult to see how there may be such a benefit for a population of a potentially impacted wildlife population. However, the use of limits and constraints is not dissimilar to the intent behind DCRLs which are numeric benchmarks of importance in risk assessment. While the system has been established, there are still areas where further development/thinking is required. For example, we are exploring how simplified numeric criteria may be used in planned exposure situations that are protective of both the public and non-human species. For existing exposure situations, we need to better understand the potential impacts on animals and plants especially when considering the remediation options that may be applied. Understanding both the radiological and non-radiological consequences may be important in making decisions. In emergency situations, understanding the potential impacts on non-human species may be important for communication, although in practice little may be done to mitigate their exposure.

References

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