

Preliminary DCGL_W for Surface Soil of Kori-Unit 1 Considering to Habit Data of Representative Person

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The preliminary DCGL_W for the surface soil of Kori Unit-1 was calculated taking into account the habit data of residents living near the nuclear power plant in South Korea (1-y-old, 10-y-old child, and adult), following the ICRP 101a recommendation for radiation protection of the public to provide insight for the selection of human receptors. To calculate site-specific DCGL_W for the surface soil of Kori Unit-1 by using the RESRAD-ONSITE, site-specific data must be obtained through a site characterization survey. However, until now, Kori Unit-1 has only been subjected to the historical site assessment (HSA), which is a non-radiological survey. The DCGL_W was calculated by applying resident farmer scenario for conservative calculation. ³H, ¹⁴C, ⁶⁰Co, ⁶³Ni, ⁹⁰Sr, ¹³⁴Cs, ¹³⁷Cs and ²⁴¹Pu were assumed to be the radionuclides of interest. The available site-specific data were used to perform calculations that reflected the characteristics of the Kori Unit-1 site, and for the parameters for which the data were not available, the RESRAD default values and values specified in other documents specific to South Korea were considered. The sensitivity analyses were conducted using 2000 observations and 1 repetition. The Latin hypercube sampling (LHS) technique was used to sample the probability distributions for each stochastic input parameter. The correlated or uncorrelated grouping option and a random seed of 1000 were considered to maintain the prescribed correlation. As a result of the sensitivity analyses, the external gamma shielding factor, plant transfer factor for Sr, depth of roots, and density of the contaminated zone were identified as the sensitive parameters. The nuclides with significant difference from conservative DCGL_W depending to age of human receptor were ³H (increment of 127.45% and 230.48% for child and adult, respectively), ⁶³Ni (increment of 245.26% and 640.0% for child and adult, respectively) and ⁹⁰Sr (increment of 99.25% for adult). The main exposure pathway of these radionuclides were the food pathways. The conservative preliminary DCGL_W of ¹³⁷Cs and ⁶⁰Co, which is representative surrogate radionuclide was higher than Maine Yankee, but lower than Rancho Seco and Yankee Rowe.

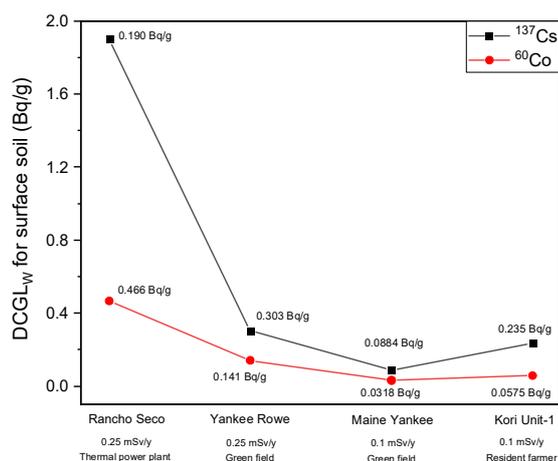


Fig. 1. DCGL_W comparison of representative surrogate nuclides

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