

## **<sup>14</sup>C Activity in Atmospheric CO<sub>2</sub> and Biological Samples Around the Nuclear Power Plant Krško, Slovenia**

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<sup>14</sup>C activity in the atmospheric CO<sub>2</sub> and in biological samples in the close vicinity of the Krško Nuclear Power Plant (NPP) in Slovenia has been regularly monitored since 2006 with the aim of estimating a possible influence of the NPP on environmental <sup>14</sup>C levels and on the effective dose of local population through food chain. Atmospheric CO<sub>2</sub> on two locations was collected every two months, or in shorter periods during some refuelling periods. Biological samples (apples, corn, wheat, grass, vegetables) were collected twice a year (in summer and autumn) in two circles around the NPP, inner and outer, and at the control point 12 km from the plant.

Increase of <sup>14</sup>C activity in atmospheric CO<sub>2</sub> was observed during and immediately after the refuelling of the power plant, performed every 18 months. Good correlation between the total <sup>14</sup>C activity released in gaseous effluents and the <sup>14</sup>C activity of the atmospheric CO<sub>2</sub> has been observed. <sup>14</sup>C activity in plants collected close to the Krško NPP is always higher than the activities on the control point, and depends both on the distance from the exhaust of the plant ventilation system and on wind direction: it is higher on the location in the SW-NE direction that coincided with the most pronounced wind directions. Higher <sup>14</sup>C activities have been determined in plants collected in summer after the spring refuelling than in those collected during the following vegetation period after the autumn refuelling. This can be explained by the uptake of the CO<sub>2</sub> of higher <sup>14</sup>C activity for the process of photosynthesis after spring refuelling. To estimate the realistic effective dose due to ingestion to the population in the vicinity, a model of food consumption has been proposed. The calculated dose for the population at the NPP vicinity is not significantly different from the dose for the population at the control point.