

The Mayak Worker Dosimetry System (MWDS-2013): Implementation of the Dose Calculations

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The calculation of internal doses for the Mayak Worker Dosimetry System (MWDS-2013) involved extensive computational resources due to the complexity and sheer number of calculations required. The required output consisted of a set of 1000 hyper-realizations: each hyper-realization consists of a set (1 for each worker) of probability distributions of organ doses. This report describes the hardware components and computational approaches required to make the calculation tractable. Together with the software, this system is referred to here as the 'PANDORA system'. It is based on a commercial SQL server database in a series of six work stations. A complete run of the entire Mayak worker cohort entailed a huge amount of calculations in PANDORA and due to the relatively slow speed of writing the data into the SQL server, each run took about 47 days. Quality control was monitored by comparing doses calculated in PANDORA with those in a specially modified version of the commercial software 'IMBA Professional Plus'. Suggestions are also made for increasing calculation and storage efficiency for future dosimetry calculations using PANDORA.

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