

Mayak Worker Dosimetry System (MWDS-2013): Phase I—Quality Assurance of Organ Doses and Excretion Rates From Internal Exposures of Plutonium-239 for the Mayak Worker Cohort

M.-D. Dorrian¹, A. Birchall² and V. Vostrotin³

¹Centre for Radiation Chemical and Environmental Hazards, Public Health England; ²Global Dosimetry Ltd., UK; ³Southern Urals Biophysics institute (SUBI), Russia.

The calculation of reliable and realistic doses for use in epidemiological studies for the quantification of risk from internal exposure to radioactive material is fundamental to the development of advice, guidance and regulations for the control and use of radioactive material. Thus, any programme of work carried out which requires the calculation of doses for use by epidemiologists ideally should contain a rigorous program of quality assurance (QA). This paper describes the initial QA (Phase I) implemented by Public Health England (PHE) and the Southern Urals Biophysics Institute (SUBI) as part of the work programme on internal dosimetry in the Joint Coordinating Committee for Radiation Effects Research Project 2.4 for the 2013 Mayak Worker Dosimetry System. SUBI designed and implemented new software (PANDORA) to include the latest Mayak Worker Dosimetry System and to calculate organ burdens, urinary excretion rates, intakes and absorbed doses, while PHE modified their commercially available IMBA Professional Plus software package. Comparisons of output from the two codes for the Mayak Worker Dosimetry System 2013 showed calculated values of absorbed doses, intakes, organ burdens and urinary excretion agreed to within 1%. The 1% discrepancy can be explained by the approximation used in IMBA to speed up dose calculations.

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