

Modeling and Optimization of Radioactive Wastewater Monitor

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Abstract. Optimization of the radioactive wastewater monitor is discussed in the paper. The motivation of our work is to assess the possibilities of replacing the NaI:Tl detector with a better energy resolution detector to eliminate false alarms caused by natural radiation. The paper is a continuation of our previous study [1]. The paper evaluates not only the energy resolution, but also the efficiency and the detection limits. NaI:Tl, LaBr₃:Ce, and HPGe detectors are compared. The resolution comparison is based solely on the measurements with the point sources. The efficiency evaluation is based on the modelling of the measuring system by the MCNP5 code. Calculation of the detection limits is based on the measurements with several shielding materials. Based on the study, replacement of the detector can eliminate false alarms and will meet metrological and legislative requirements.