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"Zero Point" Background Screening for Fallout Emission Assessment

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Nuclear event radionuclide detection is the next step towards complementing data about any abnormal event recorded by seismic, hydroacoustic and infrasound station networks prior to asking for the approval of the on-site inspection (OSI). Radionuclides travel hundreds of kilometres away from their source under favourable meteorological conditions. In order to determine and assess anthropogenic radionuclide emission and determinedly distinguish it from background global nuclear tests or previous emissions from nuclear facilities, it is favourable to screen background "zero point" anthropogenic radionuclide isotopic composition and activity values around operating nuclear facilities. In this work radiochemical radionuclide separation, alpa-, gamma- and mass-spectrometry measurement techniques were combined together in order to determine and assess anthropogenic radionuclide activity and its isotopic composition in soil samples within 70 km radius around Astravets nuclear power plant (NPP) in Lithuania territory. Alpha spectrometric measurements were performed with state of the art "Ortec" alpha spectrometer while gamma spectra were recorded by SILENA gamma-spectrometric systems with an HPGe coaxial detectors. Pu isotopic ratios were measured by a sector field mass spectrometer. Cs-137/239, Pu-240, Pu-238/239, Pu-240, Pu-240/239Pu isotopic values revealed that a global Northern hemisphere nuclear test fallout is prevailing in major sampling sites within 70 km radius around Astravets NPP in Lithuania territory.

Promotional text

Nuclear event radionuclide detection is the next step towards asking for the approval of the On-Site Inspection. Radionuclide isotopic values revealed the origin of anthropogenic radionuclide in sampling sites within 70 km radius around Astravets NPP in Lithuania territory.

E-mail

andrius.puzas@gmail.com

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Primary authors: Mr PUZAS, Andrius (Center for Physical Sciences and Technology, Lithuania); Dr BERNHARDSSON, Christian; Dr PÉDEHONTAA-HIAA, Guillaume; Dr JÖNSSON, Mattias; Dr TARASIUK, Nikolaj (Center for Physical Sciences and Technology, Lithuania); Dr KONSTANTINOVA, Marina (Center for Physical Sciences and Technology, Lithuania); Mrs GVOZDAITĖ, Rasa (Center for Physical Sciences and Technology, Lithuania); Dr DRUTEIKIENĖ, Rūta (Center for Physical Sciences and Technology, Lithuania); Ms JUZIKIENĖ, Vida (Center for Physical Sciences and Technology, Lithuania); Dr STENSTRÖM, Kristina; Prof. MATTSSON, Sören; Dr BARKAUSKAS, Vytenis; Prof. REMEIKIS, Vidmantas (Center for Physical Sciences and Technology, Lithuania)

Presenter: Mr PUZAS, Andrius (Center for Physical Sciences and Technology, Lithuania)

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