ID: Type: **Oral**

Civil Xe-Emissions: From Source to Receptor

Xenon emissions from medical isotope production facilities (MIPFs) and other nuclear installations affect verification capability of the International Monitoring System (IMS) of the Comprehensive Nuclear Test Ban Treaty Organisation (CTBTO). While the best way to address the issue is mitigating emissions at the source, retro-fitting mitigation systems in existing MIPFs can be very costly. Consequently, it is currently being explored as part of an IAEA Coordinated Research Project (CRP F23031) how stack monitoring data from MIPFs and other nuclear facilities, together with Atmospheric Transport Modelling (ATM) can be used to model the civil xenon-background at monitoring stations away from a source, and so reliably discriminate against Xe-detections resulting from clandestine nuclear activities. In this paper we report on the advancement of a compact stack monitoring system, based on a CZT (cadmium-zinc-telluride) 1 cm3 semi-conductor detector. We will present results from environmental monitoring of atmospheric Xe-133 activity concentrations throughout Germany. Monitoring data from 2014 are compared with results from Atmospheric Transport Modelling (ATM). The ATM used emission data from a large MIPF and other nuclear facilities in Europe (at time resolutions ranging from <1h to 1 y) and weather data from the ECMWF (European Centre for Medium-Range Weather Forecasts) as inputs and the atmospheric transport model Flexpart. Inconsistencies are discussed and knowledge needs identified to strengthen the ability to reliably discriminate civil from clandestine sources of Xe in the atmosphere for verification purposes.

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