

2.4-O2. Impact of worldwide Xe-133 atmospheric background on IMS network coverage

Monitoring atmospheric concentration of radioxenon is relevant to provide evidence of atmospheric or underground nuclear weapon tests. However, when the International Monitoring Network (IMS) design was set up, the impact of radiopharmaceutical facilities and Nuclear power plants was not perceived at all. It is now well known that during normal operation, these facilities proceed to daily pulsed or continuous releases of radioxenons into the atmosphere leading to a significant worldwide background. Consequently, the effective IMS network capability to discriminate civil sources from nuclear tests may be degraded compared to the expected one. In this study, the evaluation of the global Xe-133 atmospheric background was updated, taking into account the most comprehensive inventory of facilities and realistic releases as possible. The mean industrial contribution at each IMS station is calculated and compared to measurements. In a second step, the average annual coverage of the IMS network was calculated based on backward atmospheric transport modeling considering realistic nuclear test release scenarios. Calculations were carried out considering the current operational 29 station network and the planned 39 station network. Finally, the global IMS network coverage loss due to industrial background is assessed depending on nuclear test atmospheric source terms.

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