ID: Type: **Poster**

# 2.4-P12. Source term estimation by combination of atmospheric transport modeling and dose rate measurements

It has been shown in the past that the noble gas background resulting from civilian nuclear applications can make the discrimination between nuclear tests and civilian sources difficult. A good knowledge of this background is required to enable this discrimination. However, the radioxenon emissions from civilian sources are not always known and are quite complex. In this context, the estimation of the source term from stack releases based on nearby (dose rate) monitoring stations was studied. As a test case, the Ar41 releases from the Belgian Reactor 1 at SCK●CEN were used. These releases are detected by the early warning network TELERAD, operated by the Federal Agency for Nuclear Control, surrounding the reactor. A one day period, in which the reactor was operated, meteorological and radiological measurements were available, was selected to determine the Ar41 source term. The source term estimation was done with a simple diffusion-convection model, which was created in Comsol Multiphysics®. The source term obtained was then compared to the Ar41 release based on the power at which the air-cooled reactor operated. This methodology could be applicable to other sources, such as radioxenon emissions.

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**Track Classification:** 2. Events and their characterization