

Calculations on the Production of Ar-37 in Nuclear Power Plants in Regard to the Verification of the Nuclear-Test-Ban Treaty

Context. The verification regime of the CTBT focuses highly on radionuclides. Currently four xenon isotopes are used to distinguish between civil source emissions and those of suspected nuclear tests. Although the use of xenon isotopes is theoretically well understood and established, its applicability may be limited by anthropogenic background and detection of only some of the four isotopes required. Another radionuclide, that is currently an important instrument for on site inspections, is Ar37. It is unknown, whether there is an anthropogenic background of Ar37 that might affect on site measurements. **Aims.** We set out to determine the production of Ar37 in nuclear reactors for assessing potential anthropogenic concentrations in the atmosphere. A potentially important process of Ar37 production inside a power reactor is via neutron capture of Ar36 in the moderator of water cooled reactors, since some air including stable Ar36 inevitably is dissolved in the water. **Methods.** We performed first calculations on the amount of Ar37 that will be produced due to neutron capture reactions in the reactor core. We will also highlight other possible production pathways that might lead to Ar37 in a nuclear power plant.

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