

Size Distribution of Radioactive Particles in Loviisa NPP

Miska Hirvelä

Fortum P&H / Loviisa NPP

Email: miska.hirvela@fortum.com

Airborne particle activity concentration is needed to be measured in NPPs for example either when defining the discharges or when estimating the air contamination on Radiation Controlled Area, RCA. For precise results it is important to know the Activity Median Aerodynamic Diameter, AMAD. Sampling lines may also have significant impact to the collected size distribution.

Number concentration, AMAD-values and electric charge level of particles were studied in Loviisa NPP using two methods: Virtual Impactors and Electrical Low Pressure Impactor (ELPI™)

Results showed that the total number concentrations on RCA and in ventilation stack are quite low even during outage time. Typical values are varying usually between 1000 - 5000/cm³. Peak values were around 40000/cm³. In size distribution the mode settles often to around 0,1 µm. However when the AMAD values were examined it was clear that the most activity is concentrated to particles over 1,0 µm. AMAD values for most common nuclides like Ag-110m, Sb-124 and Nb-95 varied between 1,7 and 2,3 µm with geometric standard deviation 1,6 - 1,8. There was no evidence of particle charging and the model of discharge particle sample lines showed decent collection efficiency for measured particle sizes.