



## **Statistical application of ALOHA local scale air dispersion model for non-radioactive accidental releases at Paks Nuclear Power Plant**

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The ALOHA Gaussian air dispersion model developed by the National Oceanic and Atmospheric Administration (NOAA) was applied for the local environment of the Paks Nuclear Power Plant (Hungary) for non-radioactive chemicals. This model has an advantage of extremely short runtime and simplicity. Its main purpose is to provide authorities with an easy-to-use tool for estimation of the consequences of an accidental release within one hour and 10 km from the source. Although the two-dimension Gaussian model cannot handle complex terrain and fast changing meteorology. However, its fast runtime and simple algorithm makes ALOHA an effective tool for sensitivity and statistical studies. In this presentation, we used the hourly observation data of the last ten years (2000-2009) from the meteorological station at the Paks NPP to provide input for about 35 000 runs of ALOHA for a hypothetical release of 100 kg ammonia. Assuming an hourly release during the 10 years, we studied the distribution of size and direction of the area polluted over the ERPG-1 25 ppm threshold in 13 typical atmospheric conditions over the Carpathian-basin. We showed that the area to the west from the NPP is very rarely affected by the plume, while directions to the southeast and north are the most endangered areas. These results give a good approximation for the distribution of continuously released chemicals as well.