

THE EVALUATION AND CHARACTERISATION OF FUGITIVE EMISSIONS FROM A LARGE INDUSTRIAL SITE

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The assessment of fugitive emission rates represents a significant challenge to industries in general, and quantification of these emissions forms part of BNFL's authorisation to discharge materials to the atmosphere. Annual fugitive emission rates are estimated by subtracting the contributions of monitored stack emissions from measured concentrations, with the difference representing the fugitive emission contribution. Numerical modelling tools are used, firstly to calculate the sampling point air concentration due to the monitored stack emissions and secondly to back-calculate a fugitive emission source term. Consequently, the reliability of the calculated fugitive emission rate is dependent on how accurately the models predict dispersion in and around the complex Sellafield site where the flow field is severely affected by building structures. A sensitivity analysis into the use of different modelling functionality, configuration and input data on the derivation of the fugitive source term is described. Numerical modelling tools are used independently and in conjunction with effective stack heights and dispersion factors derived from wind tunnel experiments utilising a scaled model of the Sellafield site. Possible enhancements to the methodology used to predict the fugitive emission rate have been identified and are ongoing. These include a LIDAR aerial survey of the site to verify and upgrade the wind tunnel model and improve model topographical input data. The establishment of a more detailed monitoring programme using a high volume cascade impactor to measure the particle characteristics and possible improvements to the numerical modelling methods through the use of CFD modelling tools is also described.