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TRACER RELEASES IN LONDON: PRESENT ACTIVITIES AND FUTURE PROSPECTS

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For there to be absolute confidence in emergency response models, it is desirable to validate these models by comparison with data from field experiments. Therefore what is required is a controlled release of an inert gas-phase tracer and measurement of its concentration-time profile at a range of locations downwind of the release point. These data, together with supporting meteorological measurements can then be used to compare with models. Ideally the inert tracer must have the following properties;

i. Non-toxic
ii. Non-depositing
iii. Have a very low background concentration
iv. Can be detected with high sensitivity

There are many candidate tracers that match 1, 2 or 3 of these criteria, but very few compounds that match all 4. One class of compound is the perfluorocarbons (PFCs), which are saturated, fully fluorinated hydrocarbons. The PFCs are totally inert and non-depositing and are currently present in the atmosphere at the part per quadrillion level, i.e. 1 part in 1015. Using gas chromatography coupled with mass spectrometry running in negative ion chemical ionization mode it is possible to detect these compounds at the required sensitivity. Therefore, one can carry out experiments and only have to release very small amounts of compound, which is desirable, and still detect the compounds downwind. In this paper we will describe some preliminary data from experiments carried out during the DAPPLE (Dispersion of Air Pollution and its Penetration into the Local Environment) in 2003.

It is also desirable to learn about the behaviour of material (gaseous or particulate) that undergoes deposition after release and we shall also briefly describe a methodology to design a range of reactive tracers that will provide additional important information of great relevance to emergency response. Such reactive tracers may be especially useful in assessing the impact of an indoor release of material.