

**ESTIMATION OF THE EFFECTS OF SF₆ AND PFCs RESERVOIR TRACERS ON
ATMOSPHERIC QUALITY IN THE NORTH SEA
USING DATA FROM THE AEOLUS STUDY**

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The oil exploration and production industry uses extensively and depends heavily on non-radioactive tracing substances like SF₆ and PFCs for several purposes related to reservoir characterisation and enhanced oil recovery. These compounds are potent greenhouse gases with very high global warming potential (GWP) and extremely long atmospheric lifetimes. This document presents the preliminary 3-D modelling studies of the effects of SF₆ and PFCs reservoir tracers on atmospheric quality in the North Sea using the HIRLAM /UAM-AERO modelling system. For these applications, several different meteorological conditions and a “worst case” scenario were assumed. According to this scenario, the amount of tracers in gas phase is released to the air from the production wells during a specific window in time which is rather narrow compared to reality. This window has been defined as the time of maximum release of the tracers according to the in-situ measurements. Consequently, the results reveal the maximum impact to the atmosphere that could occur from such emissions. The emissions of SF₆ and PFCs are predicted to affect large parts of the domains over the sea region, while in most cases a smaller impact is yielded over the land. In the vertical, the model predicts some kind of influence of the emitted constituents up to 6km above sea level. This data will be used further to assess the impact of SF₆ and PFC reservoir tracers on global warming and formulate recommendations and guidelines to the oil industry regarding the use of the currently employed tracers.