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# PFC EMISSIONS FROM AUSTRALIAN ALUMINIUM SMELTERS

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Perfluorocarbons (PFCs) are very powerful and long-lived greenhouse gases that are emitted to the atmosphere predominantly from the global production of aluminium metal. They are included in the Kyoto Protocol 'basket' of gases, even though their cumulative contribution to past increases in radiative forcing due to the increases in long-lived greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, CFCs, HFCs, SF<sub>6</sub>, PFCs) is less than 1%. This is because, once released to the atmosphere, their greenhouse impact is essentially irreversible, due to their multi-millennium atmospheric lifetimes, and technologies exist or likely could be developed to significantly reduce their emissions.

Australian PFC emissions are included in the National Greenhouse Gas Inventory (NGGI), based on calculations using approved IPCC (Intergovernmental Panel on Climate Change) methodologies, involving estimates of Australian aluminium production on a smelter-by-smelter basis, and smelter-dependent PFC emission factors, obtained from an International Aluminium Institute (IAI) global survey of aluminium smelters.

Since early 2004, state-of-the-art PFC measurement instrumentation has been in operation at Cape Grim, in NW Tasmania (Figure), to monitor global PFC trends and estimate global PFC emissions. However, three of Australia's six aluminium smelters, producing 40% of Australia's aluminium, are located within a 400 km radius of Cape Grim. Under the right weather conditions, PFC plumes from the Point Henry and Portland (Victoria) and Bell Bay (Tasmania) smelters are regularly observed at Cape Grim (Figure).

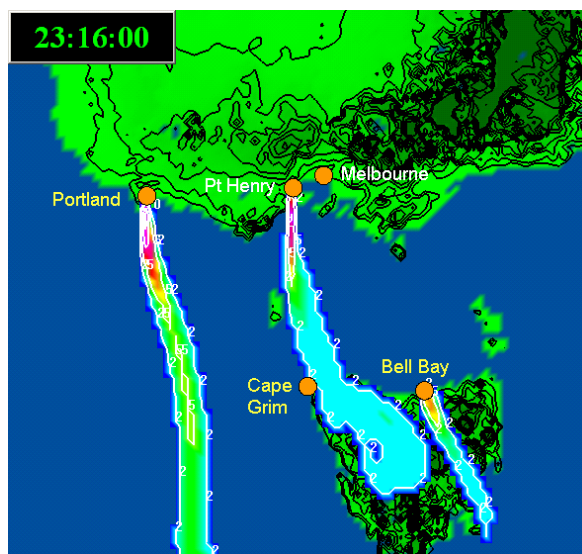
The magnitude and movement of these PFC plumes over SE Australia has been modelled using the CSIRO regional transport model (TAPM – The Air Pollution Model), incorporating smelter specific aluminium production and NGGI Australian-average PFC emission factors. Comparison of observed and modelled PFC plumes at Cape Grim suggests that the PFC emission factors for the SE Australian

smelters are likely to be lower than the Australian average factors in the NGGI.

The installation at Aspendale of PFC measurement instrumentation in late 2005/early 2006 will significantly enhance the accuracy of PFC plume measurements, in particular for those from Point Henry (60 km from Aspendale).

## References

Fraser, P., P. Krummel, L. Porter, P. Steele, S. Baly, C. Rickards, B. Dunse and N. Derek, HCFCs, HFCs, PFCs, halons, CFCs, chlorocarbons, hydrocarbons and sulphur hexafluoride; the AGAGE in situ GC-MS-Medusa program at Cape Grim, 2004, Baseline 2003-2004, submitted August 2005.



Location of Cape Grim and the SE Australian aluminium smelters and model (TAPM) derived PFC plumes.