

ELEMENTAL ANALYSIS AND SOURCE APPORTIONMENT OF AIR PARTICULATE AT AN INDUSTRIAL AREA OF WELLINGTON, NEW ZEALAND

P.K. Davy¹, A. Markwitz², W.J. Trompetter², D.C. Weatherburn¹

¹Resource Analysis, Victoria University of Wellington, Wellington, New Zealand

²Institute of Geological and Nuclear Sciences, New Zealand

Traditional gravimetric analysis of airborne particulate matter is unable to provide information on the sources contributing to air particulate concentrations. Ion Beam Analysis can be used to identify the elemental composition of air particulates. This is a key tool for identifying the sources and determining the relative contribution of biogenic and anthropogenic sources to air particulate pollution. Information on source contributions to ambient air particulate concentrations is a vital tool for air quality management. Analysis of ambient air particulate in New Zealand provides a unique challenge due to a strong maritime influence and a marked difference in particle composition compared to continental air masses. PM₁₀ and PM_{2.5} have been collected at the industrial area of Seaview, Wellington over the past two years using a GENT stacked filter unit sampler. Concentrations of elements with atomic mass above Neon were determined using Ion Beam Analysis and elemental carbon concentrations were determined using a reflectometer. Specific ambient source elemental 'fingerprints' were then determined by factor analysis and the relative contributions of various local and regional sources were assessed. The significant factors (sources) were determined to be: seasalt, soil, industry, and combustion sources. PM₁₀ and PM_{2.5} concentrations in Seaview are also presented. Source identification included local industrial contributors to metallic hazardous air pollutants, particularly lead.