such as GC-AMS and LC-AMS which could make AMS more widely applicable in the life sciences. Graphite ion sources provide a more efficient use of accelerator time for the measurement of large samples because of the higher carbon currents attainable. The precisions attainable in this way are so good that re-evaluation of possible sources of systematic error (such as low level contamination and sample size effects) is essential. Hybrid ion sources capable of operating on either gas or graphite allow the advantages of both techniques to be exploited. With minor modifications to the gas ion source at Oxford we are now able to run on both sample types. Currents from gas are typically 10–12 $\mu$A and those from graphite 40–50 $\mu$A. Maximum currents from graphite exceed 300 $\mu$A. We discuss the implications of this for the future development of radiocarbon AMS facilities designed for a wide variety measurements and research.

**APPLICATION OF ANTHROPOGENIC $^{129}$I AS A TRACER OF NUCLEAR EMISSIONS: A STUDY AROUND POTENTIAL POINT SOURCES AT A NUCLEAR FUEL REPROCESSING PLANT AND TWO NUCLEAR POWER PLANTS IN UPSTATE NEW YORK**

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We have investigated the presence of anthropogenic $^{129}$I in upstate New York where several potential point sources of this long-lived radioisotope exist. For the study samples were collected of surface waters, soils and biological materials around the nuclear fuel reprocessing facility at West Valley near Buffalo (operated between 1966–1972), and near two active nuclear power plants at Ginna near Rochester and at Nine Mile Point near Oswego, both along the Lake Ontario shoreline, as well as at several other sites in and outside upstate New York.

A striking signal of $^{129}$I levels of $10^{11}$ atoms/L of discharge was detected just outside the West Valley site boundary in Buttermilk Creek which drains the site. This signal can be tracked into Lake Erie via Cattaraugus Creek which receives Buttermilk Creek before flowing into Lake Erie at Silver Creek. Levels in other creeks in the region of the reprocessing plant were on the order of $10^9$–$10^{10}$ atoms/L, and showed marked directional trends that could be correlated with predominant wind directions at the time of minor releases at the site. Levels of $^{129}$I in surface waters decreased with distance from West Valley and were constant at $10^8$ atoms/L for the entire upstate New York area outside a 50-mile radius of the site, including around the two nuclear power plants in the region. $^{129}$I levels in surface waters outside upstate New York in areas such as the Adirondacks region of eastern New York, Maine, Vermont, Canada, etc. are on the order of $10^7$ atoms/L. Although these concentrations are an order of magnitude lower than levels in upstate New York, they are still elevated by over three orders of magnitude above pre-nuclear values. Waters and plants around an active nuclear power plant in Ohio also show $^{129}$I levels within this same order of magnitude as other non-point source locations outside upstate New York.

Soil, grass and aquatic plant samples collected from these various locations and were prepared for AMS measurement by alkali leach/fusion extraction and subsequent extraction into carbon tetrachloride. This data also show similar spatial trends, with highest levels around West Valley. Some data for aquatic plant/water and grass/soil bioconcentration factors will also be presented. As part of the same study, we made some pilot measurements of $^{129}$I levels in tree-rings obtained from trees at West Valley and at Rochester.