Data obtained so far suggest that ring-porous woods such as elm, maple and locust are better indicators of \( {^{129}}\text{I} \) preservation in annual tree rings than are diffuse-porous woods such as Cherry. The limiting of the water-conducting tissue, xylem, to the outermost annual ring in ring-porous woods appears to minimize transport of iodine across tree rings via the hydrologic system, in contrast to diffuse-porous woods in which the xylem is distributed through all the growth layers of the tree.

\( {^{129}}\text{I} \) levels in all the above reservoirs, *i.e.*, waters, aquatic vegetation, grass, soil, and trees in the West Valley region from this study and from other workers were all compared with total \( {^{129}}\text{I} \) estimated to have been released from the site during its operation. Despite a striking signal of \( {^{129}}\text{I} \) outside the site boundary over two decades after the site was closed, the total \( {^{129}}\text{I} \) around the site is in fact only a very small fraction of this radionuclide released at the site. This indicates that most of the \( {^{129}}\text{I} \) has migrated off-site by this time, leading to a signal that can be tracked to the Great Lakes and also causing a stronger presence of this isotope in upstate New York than elsewhere.

**CHEMICAL PREPARATION OF ENVIRONMENTAL WATER AND BIOLOGICAL SAMPLES FOR THE DETECTION OF ANTHROPOGENIC \( {^{129}}\text{I} \) BY AMS**

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We have carried out an analysis of anthropogenic \( {^{129}}\text{I} \) levels in upstate New York where an inactive nuclear fuel reprocessing facility and two active nuclear power plants are housed. Recent \( {^{129}}\text{I} \) produced since the onset of the nuclear era has found its way into all reservoirs in exchange with the atmosphere, and has led to elevated \( {^{129}}\text{I}/\text{I} \) ratios there. In order to evaluate levels of this isotope around potential point sources in the study area, we prepared samples of surface waters, aquatic vegetation, soils, grasses and wood collected around these specific sources and other locations for background comparison for AMS analysis.

Rainwater and surface waters collected from creeks and lakes have extremely low concentrations of iodine averaging 0.2 \( \mu\text{g}/\text{L} \) for >70 samples measured. This necessitated the vacuum distillation of one to two liters of water for each sample down to a few hundred milliliters, to increase iodine concentration in the samples to levels where detection by ion chromatography was possible. The original iodine concentration in each sample was then calculated from the pre- and post-distillation sample volumes, and the concentration after distillation. Carrier iodine of known \( {^{129}}\text{I}/\text{I} \) ratio and iodine concentration was added to the sample after vacuum distillation in order to increase the bulk of the sample and to eliminate contamination of the ion source by hot samples, *i.e.*, those high in \( {^{129}}\text{I} \), during AMS measurement. The sample and carrier was extracted into carbon tetrachloride after conversion to periodate to achieve isotopic equilibrium and then back-extracted into the aqueous phase following standard procedures (see Fehn *et al.* 1992).

Biological samples such as vegetation and soils have much higher concentrations of iodine, typically 1–5 mg kg\(^{-1}\), yet pose a different challenge in the form of extracting iodine successfully from organic materials. After experimentation with methods such as oxygen combustion in a Parr oxygen bomb, an alkali leach/fusion extraction was chosen as the best of available alternatives for extracting iodine from biological materials. This process is a modified version of one originally utilized by K. Nishiizumi (1982) for meteorite samples with successive adaptations by J. Fabryka-Martin (personal communication) and others. Sample size required usually varies from 1 to 10 mg, depending on concentration of iodine in sample type and the amount of carrier iodine which could be added which in turn depends on the expected \( {^{129}}\text{I}/\text{I} \) ratio in the sample. Saturated sodium hydroxide was