MINERAL SPRING WATER IN VICTORIA, AUSTRALIA: POTENTIAL HEALTH IMPLICATIONS OF NATURALLY OCCURRING ARSENIC AND ANTIMONY SULPHIDES LINKED TO A MINING AFFECTED LANDSCAPE

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Significant global consumption of spring and mineral water is fuelled by its perceived therapeutic and medicinal qualities, cultural habits and taste. The Central Victorian Mineral Springs Region, Australia comprises around 100 naturally flowing artesian springs that have high CO_2 content and exhibit distinctive tastes. The area has a rich settlement history by miners in the 1850's and the first commercial operations of a health resort in 1895. The landscapes were affected by gold mining activities and the occurrence of with geographically proximal mine waste, mullock heaps or tailings.

Surface and subsurface sampling reveals highly elevated metalloid values in soil and rock specimens. For example, arsenic and antimony concentrations of up to 2250 mg kg^{-1} and 32 mg kg^{-1} respectively are recorded. The arsenic concentration is more than 50 times that of the WHO guideline for soils (40 mg kg^{-1}). These and other metalloids have similar chemical behaviour, geochemistry and potentially significant toxicity if mobilised. The potential for aquifer contamination by surface and near-surface naturally occurring metalloids is considered.

Over the last ten years, repeated mineral springs sampling has revealed elevated metalloid values. In 2003, a maximum of 0.038 mg/L of arsenic was recorded at a popular tourist spring which is in excess of the Australian Drinking Water Guideline (0.007 mg/L). Recent sampling has confirmed elevated levels at several sites and for a variety of metalloids. This is of concern because long term exposure to arsenic in drinking water is implicated in bladder, lung and skin cancer, and other cancers. It is also implicated in non-cancer diseases such as diabetes mellitus, hypertension, and cardiovascular diseases. Despite the known elevated levels, mineral water source points remain accessible to the public with some springs actively promoting the therapeutic benefits of the waters. Given that some consumers seek out the waters for their medicinal properties it follows that they may already affect health negatively or health compromised. The risk to these consumers needs to be considered and appropriate and verified analyses made available to the public.

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