

**Dissolution and attenuation of arsenic at an historic quartz vein-hosted gold mine,
Waiuta, New Zealand**

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Abstract

Historic mining and extraction processes used at mine sites in the Reefton Gold field have left a legacy of ongoing As contamination. The Prohibition Mine site at Waiuta, in the southern sector of the Reefton gold field, is a popular public viewpoint administered by DoC. Mine wastes contain secondary arsenic minerals including scorodite (As^{V}) and more soluble arsenic trioxides (As^{III}). The presence of anthropogenic arsenic trioxides indicates that ore processing procedures have an important control on the available As source. Water in a wetland pond at this site contains As levels up to 77 g As /m^3 , nearly 10 000 times higher than drinking water limits. This site represents a major point source for As in the surrounding environment. Arsenic attenuation in the aqueous system is strongly controlled by the presence of suitable sorption sites, commonly iron oxyhydroxide (HFO). The Waiuta area shows very little evidence of HFO production and As levels above drinking water level are persistent downstream of the river draining the mine site. The spatial scale of As transport at this site is greater than in the northern area of the Reefton Gold field where HFO is abundant and causes strong attenuation by adsorption.