

Critical Metal Distribution in the Renison Bell Tin Deposit, Western Tasmania

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Critical metals are vital and scarce resources required for modern technology, infrastructure, and the transition to a renewable- and green-energy future. Tasmania's ore deposits have the potential to contribute significantly to growth in both the Australian and international critical metals inventory. Renison Bell is a world-class tin deposit in western Tasmania and is Australia's largest tin producer. It is a carbonate-replacement tin deposit related to a magmatic-hydrothermal skarn system produced by the Devonian Pine Hill Granite. The ore is hosted by Neoproterozoic dolostones that were mineralized with pyrrhotite, chalcopyrite, and cassiterite. Structures associated with the Federal Bassett Fault host high-grade tin mineralization (2% average). Renison Bell has copper as a by-product, which mostly occurs in chalcopyrite. We are assessing Renison's potential for other critical metals in sulfides and oxides within a new cross-section by detailed geological logging and analytical work to determine geological and spatial controls on critical metal deportment.

Petrographic observations and scanning electron microscope (SEM) analyses on ore and wallrock samples from Renison Bell have revealed the presence of minor mineral phases that contain critical metals as major elements, including native bismuth and tungstates (scheelite, ferberite and wolframite). The major sulfide phases (pyrrhotite, pyrite, chalcopyrite, and arsenopyrite), as well as cassiterite and native bismuth, are being analyzed to assess their trace critical metal content. Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) analyses have revealed relative high concentrations of cobalt (<3,800 ppm) and nickel (<1,450 ppm) in pyrite, indium (<1,620 ppm) in chalcopyrite, cobalt (<82,300 ppm), nickel (<18,400 ppm), antimony (<5,500 ppm) and tellurium (<380 ppm) in arsenopyrite, and vanadium (<930 ppm) and scandium (<210 ppm) in cassiterite. Some of these metals are related to the main mineralized structures and dolostone layers, but other metals may have been remobilized from the wallrock.