

**Thallium Mineralogy of the Taron Epithermal Cesium Deposit: Implications
for Economics, Mining, Metallurgy and the Environment**

By

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Abstract

The Taron Project (Cascadero Copper Corporation) is a Miocene epithermal cesium deposit. It is situated in a graben-like structure composed of late Tertiary sedimentary and volcanic rocks (graben fill) straddling the contact between the Eastern Cordilleran Ranges and the Altiplano-Puna volcanic complex in the eastern central Andes. The deposit is dominated by cryptocrystalline silica, manganates, arsenates, and oxides. Previous assay results identify 2meter intervals of drill core with up to 0.74 wt.% thallium.

At the 2m interval scale, Tl has a positive correlation with Mn, Ba, Cu, and Mo; and bimodal relationships with Cs, As, Rb, and Ag. fp-XRF spot analysis indicates Tl has a positive relationship with Mn, K, Ba, Hg, and Cu. Reflecting smaller scale mineralogy relationships, Tl is negatively correlated with As, Cs, Rb, and Ca. XRD identified the hollandite supergroup as the primary thallium bearing mineral, indicating Tl is in the +1 oxidation state. Tl and Cs are not hosted within the same mineral: Tl is hosted within the hollandite supergroup; and Cs is hosted within pharmacosiderite. However, the two minerals are spatially associated with each other, as both inclusions and cross-cutting veins at the micron to cm scale.

These findings have significant mineral processing implications for the recovery of Cs from pharmacosiderite without contamination by highly toxic Tl. Zonation of Tl-rich zones and separate Cs-rich zones could have implications for mine planning and ore processing. Residence of Tl within manganates could potentially accommodate tailings disposal of Tl in a non bio-available form.