MINE READER

The Twin Metals Minnesota underground mining project will utilize state-of-the-art mining technologies. Extracting strategic metals involves several steps leading to usable end products:

MINING: Mineral-bearing ore (material with economic value) is extracted from half a mile or more beneath the surface. Non-mineral bearing rock — known as developmental rock — is also extracted and set aside in storage on the surface.

CRUSHING AND GRINDING: The mineral-bearing ore is crushed in several stages and eventually ground into a fine sand-like consistency, liberating and exposing the surfaces of the contained mineral particles.

METALLURGY: The mineral-rich ore is then processed through several stages of metallurgical extraction and separation. The exact metallurgical process Twin Metals Minnesota will use is still being examined as part of the project's prefeasibility study. However, one process that will be used is called "flotation."

FLOTATION: The finely ground mineral-bearing material is mixed with a specialized water-chemical-air solution, where the desired mineral particles attach to air bubbles, float to the surface and are skimmed off for further processing. The recovered mineral mix is called a "concentrate" and in the form of a "slurry."

TAILING: The non-mineral particles not captured in flotation — known as tailing — are sent to treatment facilities. Water is extracted from the tailing, treated per environmental standards, and then reused in mineral processing. For the Twin Metals Minnesota project, half of the sand-like tailing material is targeted to be back-filled into the underground mine for storage and structural support, with the other half stored in a modern surface disposal facility.

END PRODUCT: The recovered minerals are manufactured into metals, such as copper and nickel "cathodes," which are measured in tons; or bulk precious metals such as platinum, palladium and gold, measured in ounces. The metals are then sold to customers around the world to incorporate into end user products.