New Discoveries in a Mature Terrain Through Holistic Exploration Practices: A Story of Safford, Arizona

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Many mature mineral belts are often written off as being over-explored, and the Laramide porphyry belt of the American Southwest may be considered one of the most “mature” porphyry belts in the world. However, these “mature” terrains still hold significant discovery potential that has been overlooked for decades. These mature terrains have been discounted due to the extensive amounts of near-mine shallow exploration that has occurred because of the Exploration-to-Mining cycle demands on resource evaluation. Once a mine starts production, the emphasis almost always shifts from discovery-focused exploration to resource replacement styles of exploration. This leads to the shelving of quality technical targets and leaves opportunities for the next generation of explorers to uncover large new orebodies that were previously overlooked due to economic forces.

Freeport-McMoRan Inc. has recently focused on re-examining our near-mine opportunities in the Safford porphyry copper district of Arizona, leading to significant new geological and potentially economic discoveries, including one new porphyry center and the discovery of a faulted portion of the Dos Pobres deposit. The use of new technologies, collection of large amounts of detailed geochemistry, improved geophysics, updated detailed geologic mapping, implementation of SWIR and XRD data into 3D space, and rapid targeting updates were critical in the definition of these new porphyry centers. These efforts have also resulted in the identification of three previously unrecognized rock types, stratigraphic controls on volcanic rocks, and much better constraints on structural controls within the Safford district. This integrated holistic evaluation of districts will lead to a new wave of discoveries in mature terrains, which will likely have similar results in Greenfields applications.