

Discovery, Growth and Geology of the Emerging Multi-Million Ounce Agbarabo-Rhino-Kombokolo (ARK) Gold Deposit in the Kibali District, NE DRC

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The Kibali district, located in the north-eastern Democratic Republic of Congo (DRC), hosts one of the largest gold deposits discovered in Africa to date, the Neoarchean (2620-2610 Ma) Karagba-Chaffeur-Durba (KCD) deposit, with a total gold endowment exceeding 20 Moz. Brownfield exploration in the past 5 years has been aggressively testing for near-mine opportunities, the recent success of which has resulted in the discovery and growth of what is now becoming the multi-Moz, emerging Agbarabo-Rhino-Kombokolo (ARK) deposit; a collection of satellite mineral systems adjacent to the KCD deposit. The ARK ore system, geologically comparable to that of the KCD deposit, is hosted within a strongly folded and transposed volcano-sedimentary sequence composed of voluminous clastic sediments including conglomerates, wackes, argillites, banded iron formations (BIF) and chert. Analogous to KCD, ore shoots of the ARK system are both structurally and chemically controlled, preferentially localized within both megascopic and parasitic shallowly NE plunging fold-hinges hosted within favourable chemically reactive BIF and mafic volcanic rocks. Mineralization is dominated by pyrite replacement of magnetite-rich beds, with more reduced pyrrhotite-rich sulfidation within the mafic volcanic host rocks. Initial wide-spaced drilling identified the presence of a broad but highly erratic mineralized system, with lodes initially viewed as isolated narrow shoots. The discovery was driven by building the deposit to district-scale fold architecture, gaining an improved structural understanding of ore controls. The recognition that high-grade ore shoots within the deposit would have a limited strike extent (<50 m) resulted in the potential of the system being initially overlooked. Follow-up programs have subsequently identified multiple stacked ore shoots (+10) with multi-kilometre down-plunge continuities, culminating in discovery of the ARK system. Mineralization can now be traced between the tight highly transposed BIFs connecting individual ore shoots and linking ARK to the KCD system. Mineralization remains open-down plunge.