Stratigraphic and mineralogical characteristics of the Fishtie Cu-Co deposit in Zambia

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The Central African Copper Belt of southern Democratic Republic of Congo (DRC) and northern Zambia is one of the world’s major sources of metals and currently accounts for world ~48% of cobalt reserves which will be critical for the shift to a low-carbon economy. The Cu-Co deposits are hosted in the Neoproterozoic Katangan Supergroup. The Fishtie Cu-Co deposit is located in the Lusale basin, to the southeast of the Zambian Copperbelt. At Fishtie, the Grand Conglomerate, which is interpreted as a Sturtian-age glacial diamictite, directly overlies basement schist and quartzite. Cu-Co sulphides are hosted in both the Grand Conglomerate and overlying Kakontwe Dolomite. The current study aims to refine the geological and genetic model of the deposit and is based on detailed logging of 41 cores totalling 8,040m including newly collared exploration drill holes.

The Grand Conglomerate (Mwale Formation) is comprised of several lithofacies but can be broadly classified into two lithofacies including diamictite and siltstone. The upper contact of the Grand Conglomerate is commonly gradational with increasing dolomite contents from bedded siltstone to bedded dolomitic siltstone into the lowermost bedded silty dolomite of the overlying Kakontwe Dolomite. Kakontwe Dolomite at Fishtie is subdivided into four lithofacies: bedded silty dolostone, massive dolostone, bedded dolomitic siltstone and laminated dolostone. Individual lithofacies display significant thickness variations that appear to be related to syn-sedimentary fault movement.

Hypogene chalcopyrite and bornite occur as disseminations in siltstones within both the Grand Conglomerate and Kakontwe Dolomite. Sulphides are most abundant in coarser-grained beds. The bedded dolomitic siltstone of Kakotwe Dolomite was also locally significantly mineralized. The bedded silty dolostone, massive dolostone and laminated dolostone facies of the Kakontwe Dolomite were poorly mineralized. Up to several percent hypogene cobalt mineralization is recognized in the eastern part of the deposit. Current data suggests that cobalt content was not controlled by either lithology. Hypogene Cu-Co sulphides are related to the location of syn-sedimentary faults. Work is ongoing regarding the deportment and paragenesis of cobalt in the deposit.