Approach to building a geoenvironmental block model for the Walford Creek Project, AEON Metals.

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ABSTRACT

The Queensland Department of Environment and Science are enforcing regulatory changes designed to reduce environmental and financial liability of mining projects. A major change will be the requirement of a Progressive Rehabilitation and Closure Plan (PRC Plan) with mandatory planning and scheduling content. Waste characterisation is needed to classify the acid forming potential of mine materials so they can be managed appropriately. Furthermore, 'clean' cover material is required for construction and progressive rehabilitation over the life of mine. Quantifying the physicochemical characteristics, material balances of rehabilitation material, and its availability over the life of mine will verify if it can be used immediately or will require stockpiling. Therefore, we aim to produce a validated geoenvironmental block model which will define material units based on the net acid producing potential (NAPP), neutralisation potential ratio (NPR), metalliferous content and physical properties.

An extensive database including full suite assay was assessed from Walford Creek, a metalliferous copper - cobalt deposit in Northern Queensland (>300 drill holes). Pulp samples (300) from drill holes within the current extent of the pit shell were selected and acid neutralising capacity (ANC) was measured. A correlation was obtained between assay measured Ca mg/kg and/or Mg mg/kg and measured ANC. The correlation was applied to the database to derive calculated ANC (CANC). The maximum potential acidity (MPA) and CANC were used to calculate net acid producing potential (NAPP) and neutralising potential ratios (NPR) for the database. The results were used to define the first parameter for waste rock classes. In addition, the full suite of elemental data was used to develop the second criteria for the block model following the geochemical abundance indices (GAI) method to classify samples in terms of deleterious elemental content. To define the appropriateness of material for rehabilitation goals, logged quantitative and qualitative data from the lithogeochemical database such as hardness, depth and weathering were used to classify the samples into physical classes for the third block model criteria.

The three geoenvironmental criteria are then used to define rules and unit classes which can be propagated into a block model using Surpac™. The geoenvironmental units in the block model (following defined block dimension in the resource model) can then be scheduled using Deswik.LHS to develop a 3D waste rock dump model.