The Evolution of Structural & Lithological Domaining on the Spotted Quoll Nickel Sulphide Mineral Resource Estimate

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ABSTRACT

Spotted Quoll is a massive sulphide nickel deposit located in the Forrestania greenstone belt in the Archean Yilgarn block in Western Australia. Discovered in October 2007, mining has progressed from open pit to underground and currently uses long-hole open stoping with paste fill as the primary stoping method. Prior to 2019 the Mineral Resource Estimate of the orebody was defined by a single nickel grade domain of nickel greater than or equal to 0.8%, irrespective of the host lithology, a legacy of the original ore wireframe being built using explicit methods. While a number of obvious structural offsets were honoured within this nickel grade domain, only one modelled fault was used to domain arsenic. From 2019 onwards, implicit modelling in Leapfrog Geo was used to construct a geological model at the mine scale, which resulted in the definition of a high-grade core of massive to matrix nickel sulphides surrounded by a low-grade halo of stringer and disseminated nickel sulphides in the surrounding rock. As part of the evolution of the geological model and with the aid of Seequent Central to allow collaboration between on-site Mine Geologists, Perth based Resource Geologists and Melbourne based consultants, a detailed review of the structural mapping was carried out, which allowed numerous faults and shears – particularly in the lower half of the mine – to be identified. These were used to define further structural domains and to refine the understanding of the nickel and arsenic grade distributions within the mineralised envelope. The increased definition to the domains provided by the geological model resulted in a significant improvement to the accuracy of the Mineral Resource Estimate as measured by reconciliation using voids of the mined stopes determined from cavity monitoring survey (CMS).