Overcoming implicit modelling software limitations using Python scripting – An innovative geological modelling workflow for George Fisher Mine, Queensland, Australia.

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In the last decade, the use of advanced implicit modelling software/algorithms in mineral resource workflows has become a best practice in the mining industry. In most cases, these workflows can easily replicate the level of detail of explicitly modelled geometries, even for very complex deposits. These techniques are flexible and can produce fast results since software is responsible for generating 3D surfaces and solids based on geological and interpretation data.

Nevertheless, depending on how unique and complex some deposits are, intense manual editing and input are required to honour the geological context and produce the desired outcome. The current geological modelling workflow at George Fisher Mine (GFM) is based on the semi-automatic built-in tool that generates stratigraphic sequences (stacked lithology layers) based on logging and mapping data. This tool (Strat Sequence from Leapfrog Geo) works for the majority of areas in the mine but fails to capture observed mineralisation pinch-outs in operational areas and at extrapolated boundaries of the deposit.

These pinch-outs have the potential to negatively impact grade forecasts if not resolved manually. Using built-in software tools only, the alternative for a more accurate model is to generate each individual layer and adding tens of thousands of manual interpretation points to honour pinch-outs (based on the amount of existing drilling in the mine and number of layers). This approach would require an estimated minimum of 2 to 3.5 years of a full-time employee to be exhaustively completed.

This study presents an automated approach to generate pinch-out points using a set of Python scripts that only take a few minutes to run. The newly generated points are then combined into the commercial software workflow as interpretation points, honouring observed pinch-outs. The remarkable time difference between approaches removes chance of manual errors and allows mine geologists to spend valuable time in validation and testing of scenarios, ensuring they are more representative of the deposit’s geology.