

Toward robust and reliable implicit geological models

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ABSTRACT

In 2004 the mining industry was introduced to Leapfrog—the first implicit geological modelling software. In the 15 years since, Leapfrog has become popular for rapidly generating resource domain envelopes. However, many resource estimation practitioners do not seem to understand how to effectively generate these envelopes so that they are 1) geologically realistic and 2) have minimal impact on the resource figures. Recent significant downgrades to resource figures have affected the market, and comments within company releases commonly mention “...geology models built using Leapfrog...”. But is Leapfrog really to blame, or do the resource modellers lack the skills necessary to build authentic and realistic geology models using Leapfrog software? Many software providers tout their products as being the tool to make the modeller’s life easier, with a simple workflow and process to build magnificent models. But if modelling skills are lacking, how do we know if the models generated are realistic?

A review of images of Leapfrog-generated 3D envelopes available in public technical reports, such as the NI 43-101 reports, shows alarming issues that are immediately obvious to the experienced Leapfrog user. The authors believe you cannot generate a realistic model without having a basic understanding of the underlying geology; however, the new implicit modelling methods make generating a shell so easy that the underlying basis of the model often gets forgotten.

Between them, the authors have modelled more than 800 deposits. In this article, they present guidelines for effectively producing domain boundaries with Leapfrog. They discuss poor examples of models that have been sourced from public reports, and then suggest specific steps and tests that can be implemented by the practitioner to minimise inaccurate resource estimation results.