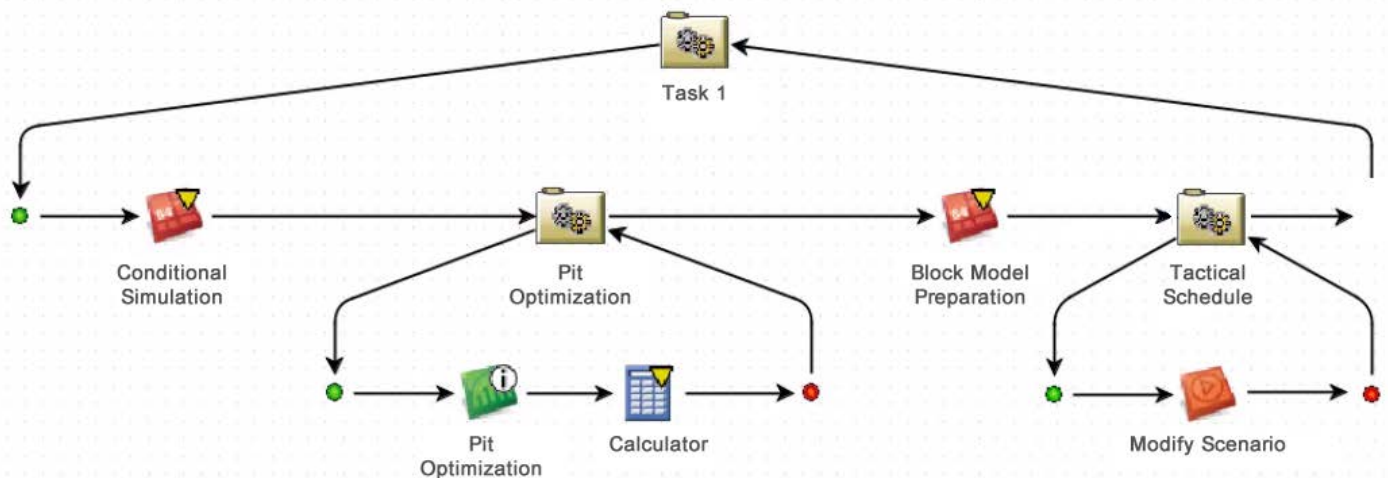# OPERATION MODELING AND SIMULATION

Increasing Confidence in Economic Optimization and Mining Execution

INTRODUCTION

Operation Modeling and Simulation enables you to accurately model your mining operations to simulate mine feasibility from conception through production. It pulls together vast sources of information into a fully integrated and optimized mine plan that can then be turned into executable mine schedules.

With Operation Modeling and Simulation, you gain the ability to create and review many more planning options than you can today, to boost your confidence in the one that is ultimately chosen. In addition, should economic conditions change in the marketplace, or operational objectives change at the mine, you will also have off-the-shelf plans ready to be implemented.

Operation Modeling and Simulation provides you with a suite of visual and flexible tools for creating simulation process flows—consisting of a variety of applications, including commercial software, internally developed programs, and Excel spreadsheets—in order to automate the exploration of planning alternatives and identification of optimal performance parameters.

Solution Highlights

- Produce plans to a defined level of confidence using simulation and decision support.

- Understand the driving factors and levers in your mining process.
- Have Confidence in your Strategic and Tactical plans before execution.

Combine Strategic and Tactical Planning with Process Automation and Optimization

Operation Modeling and Simulation integrates and automates the processes and tools you use to drive economic analysis, optimization, and mine planning. With it, you have more support for developing robust plans by analyzing and understanding all real-world critical influencing factors. You will also have added capabilities to help you uncover relationships between variables that would otherwise remain hidden.

Through automation and analytical tools that help you to quickly identify different planning options, you will have more time available to run and analyze a large number of different what-if scenarios. The complexity of scenarios you will be able to run will also increase, as will your ability to test and analyze different combinations of influencing factors such as grade, equipment, and commodity prices. Decision support is aided with interactive visualization to make it easy to analyze multiple alternatives.

Continuous Improvement

Operation Modeling and Simulation helps build a better continuous improvement culture by embedding simulation to justify improvement ideas. It enables collaboration, allowing involvement of a broader set of stakeholders, which facilitates better adoption.

Design of Experiments and Design for Six Sigma

Operation Modeling and Simulation combines process automation and analysis with optimization and life-of-mine planning to enable you to leverage advance techniques such as Design of Experiments (DOE) and Design for Six Sigma. With this you can thoroughly explore vast arrays of what-if scenarios. In addition, Operation Modeling and Simulation can also combine process automation and analysis with production scheduling to allow the creation of Stochastic schedules.

With a multitude of inputs affecting the output, an engineer often doesn't know what the inputs are that are really critical. By conducting Design of Experiments, one can figure out the critical factors and get an initial idea of what the best plan might look like.

Investigate Uncertainty

In mining there are inherent variations that affect total mine production, equipment performance and the representation of the orebody. With Operation Modeling and Simulation, you can improve reliability and robustness by pushing a nominal value to a "safer" value to stabilize the eventual mining outcomes.

Additional Components to Thoroughly and Quickly Explore the Planning Space

Optimization

Offers a comprehensive selection of parallelized optimization techniques that can be applied to a variety of problems.

Quality Methods

Provides stochastic methods that account for variation in planning and the operating environment.

Increase Confidence

With Operation Modeling and Simulation you will make "smart" decisions early in the planning process, preventing reactive planning during execution. You will also have increased confidence in economic analysis and mine plans, and have off-the-shelf plans ready for when the market, mining conditions or business drivers change. An enhanced ability to uncover relationships between influencing factors that would otherwise remain hidden will also be gained.

Perfect Mine and Plant

Operation Modeling and Simulation is part of the Perfect Mine and Plant Industry Solution Experience for mining. With Perfect Mine and Plant, all levels of your organization, from executives to operational staff, collaborate and use data in new and more powerful ways to uncover improvements to efficiency, productivity, and cost control at mining operations.

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