

# PRODUCTION FORECASTING

## WHAT IS PRODUCTION FORECASTING?

Production forecasting is the application of geometallurgical data to predict, plan and optimize production throughput (tonnes per hour – tph and  $P_{80}$ ) and recovery with a measured degree of accuracy and precision. It answers the questions:

- What recovery can be expected from the ore being processed?
- How should the ore be mined and processed to optimize recovery?
- When will production experience challenges?
- How can these challenges be addressed to minimize the effect on productivity and profitability?

On a longer term, the knowledge and experience gained from production forecasting allows you to further optimize the mining and throughput relationship. Every production forecasting contract consists of the same core steps:

- Sample
- Flotation and grinding tests to get geometallurgical parameters
- Merge geometallurgical parameters into the block model
- Forecast performance using simulation
- Value blocks, plan mining activities, reconcile forecast to production
- Refine and optimize

## WHY USE PRODUCTION FORECASTING?

Benefits of production forecasting with SGS include:

- Increased profitability and decreased expenditure through mine plan forecasting, plant forecasting, and reduction of inventory
- Ability to identify a decrease in production (due to the ore and not operational issues) and thus better manage shareholder expectation

- Decreased risk and increased bankability
- Access to the SGS global network of technical expertise

## COMPONENTS OF PRODUCTION FORECASTING

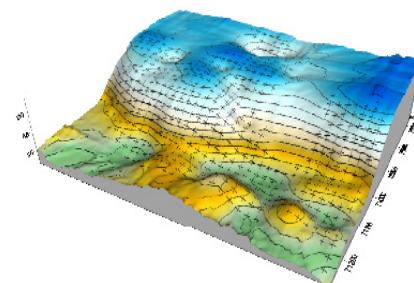
### TESTING: THE BACKBONE OF PRODUCTION FORECASTING

The SPI test for comminution and the MFT test for flotation are the backbone of SGS' production forecasting approach. In Year 1 SGS supplies, for installation on site, one SPI<sub>®</sub> Lite mill to enable you to perform your own SPI<sub>®</sub> Lite tests. The SPI<sub>®</sub> Lite test yields an SPI<sub>®</sub> value and a Bond Work index – from the same sample and the same short test. Use of the on-site SPI Lite mill enables you to do shorter term throughput planning and forecasting (monthly) to further increase the accuracy of longer-term forecasts (quarterly, annually).

The SPI<sub>®</sub> Lite test is always a supplement to, and not replacement for, full SPI<sub>®</sub> testing. Each year, a minimum of 50 samples would be sent to SGS for full SPI<sub>®</sub> testing. This core, high precision data is the foundation for the extension of the geometallurgical model while the SPI<sub>®</sub> Lite test provides the detailed in-fill data. The mill is regularly calibrated to the full SPI<sub>®</sub> test.

Technical features of production forecasting with SGS include:

- Very high forecast precision because you can conduct unlimited SPI<sub>®</sub> Lite tests on site
- SPI<sub>®</sub> and Bond Work Index values from the same sample and the same test results in accurate reconciliations
- Forecasting simulation training increases throughput and/or lowers costs
- Geometallurgical services address both forecast accuracy and precision



### GEOMETALLURGY

The first objective in production forecasting or planning is the creation of the geometallurgical model. The application of geometallurgical technology to production forecasting results in a more rigorous and reliable forecast. Geometallurgical production forecasts consider geological, metallurgical, mineralogical and chemical influences on recovery, instead of simply relying on chemical assays.

The geometallurgical model is created by populating the resource model with geometallurgical data derived from specific testing and then extracting the ore block information from the populated resource block model with the relevant information needed for simulation (forecasting or forecasting).



# SGS

SGS simulation packages such as CEET (Comminution Economic Evaluation Tool) and FLEET (Flotation Economic Evaluation Tool) are then used to generate production parameters such as tph and  $P_{80}$  and thus blocks can be valued and cash flow predicted. Once mined and milled, the actual production can be very accurately reconciled to the predicted models and the models tuned.

## PRODUCTION FORECASTING WITH SGS IS SUCCESSFUL

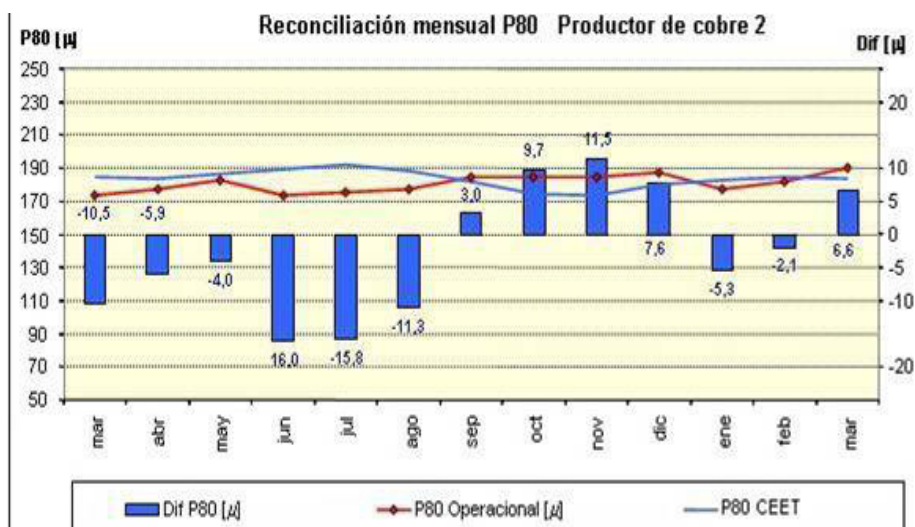
A high degree of precision and accuracy is attainable with the SPI test and geometallurgical model reconciliations. The graph below shows the reconciliation over a 1-year period for a SGS' 5-year production forecasting contract. In this case, the reconciliation of the grinding product size is expressed as absolute differences (in  $\mu\text{m}$ ). These differences show an absolute variability range of  $\pm 12$  mm, which is outstanding and within the anticipated uncertainty.

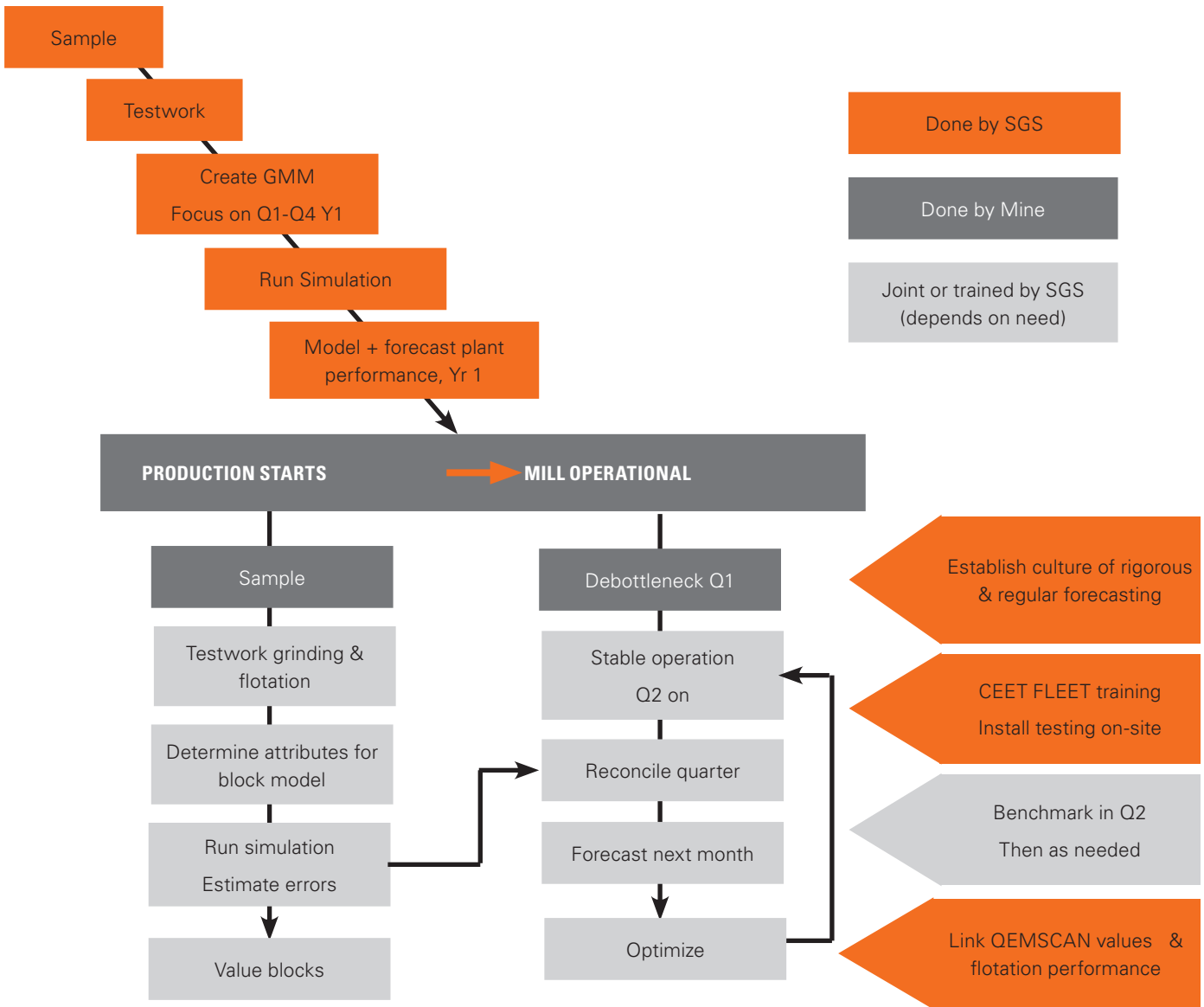
## THE SGS PRODUCTION FORECASTING CONTRACT

Depending on your specific circumstances, a SGS Production Forecasting contract can begin:

- At preproduction/prestart-up
- With the commencement of mining
- During any year of production

SGS provides production forecasting services on a five year contract basis. Year 1 and Year 2 have fixed training and technical deliverables. Year 3 involves close supervision and in Years 4 and 5 we step back to provide review so that at the end of the contract you are self sufficient. Alternatively, SGS can provide the manpower to work with your team. How we envision these activities is depicted below.





**CONTACT INFORMATION**

Email us at [minerals@sgs.com](mailto:minerals@sgs.com)  
[www.sgs.com/mining](http://www.sgs.com/mining)