

MULTI-SITE GOLD PRODUCER — SOUTH AMERICA

One model. Four mines. A board deadline.

How one architectural decision changed what leadership could see, decide, and defend in front of a board.

BEFORE

In late 2024, a multi-site gold producer operating four Gold mines in South America was heading into budget season with a problem nobody could fully explain. The operation had a plan. It also had a pattern: execution kept slipping into reactive mode, the board kept asking questions leadership couldn't answer with confidence, and a capex decision on fleet allocation was approaching without a defensible basis for making it.

A previous consultant had already tried to help. The model they delivered was harder to understand than the original problem. The client's own statistician built Excel workarounds to fill the gap, but those took a week to run and produced results that were still difficult to stand behind in front of a board. The VP of Continuous Improvement needed answers across four operationally distinct mines, under a hard deadline, with a budget that ruled out four separate models.

The four mines were distinct in the ways that matter. Open-pit and underground operations ran across development headings with variable haul profiles, while the oxide processing operation operated under strict TOC limits that directly governed crusher feed quality. The throughput of the haulage and crushing operations was determined by the movement of material upstream. The seasonally constrained operation could not deploy certain fleets during the MASA rainy period, making quarterly output targets genuinely uncertain. Each site had its own planning complexity, and none of the existing tools could represent how those complexities interacted across the portfolio.

THE DECISION THAT CHANGED EVERYTHING

Is this four problems — or one system with four configurations?

HOW MOST FIRMS APPROACH IT

The default path is to scope each mine separately. Clients rarely present a portfolio problem. They present four mine problems, and consultants respond to the brief as given. Separate scopes contain risk. If one model fails, the others are unaffected, and four independent deliverables are easier to manage, price, and hand off. The result is four models with four rule sets that diverge the moment the engagement ends.

WHAT SIMWELL PROPOSED INSTEAD

Before writing a line of code, SimWell stepped back to ask whether the four mines were actually four distinct problems or variations of a single system. They were variations. Same mill chain. Same material flow logic. Same core planning constraints with site-specific parameters. SimWell proposed a single, parameterized architecture: core logic built once, each mine configured through an input scenario manager. Switching between mines meant changing inputs, not rebuilding models.

"If you plan ahead and find the similarities across all of them, it's the natural solution. People don't do it because they don't plan. They just start doing it."

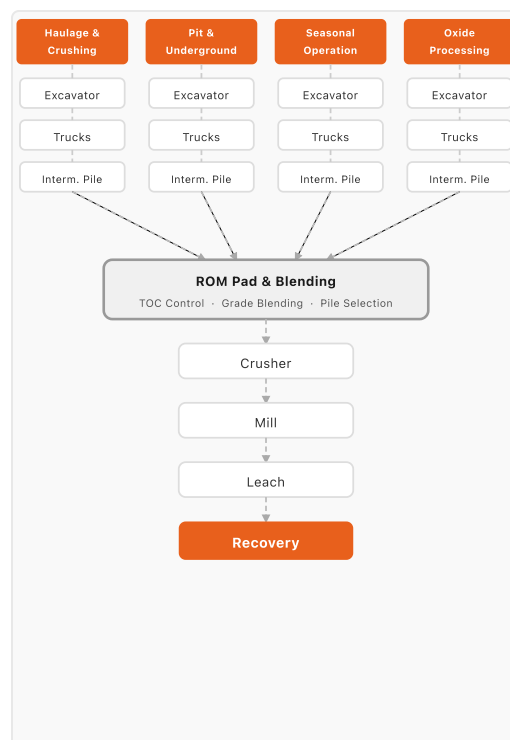
— Mary Klinecivicius, Solution Owner, SimWell

WHAT DID THAT DECISION ENABLE?

The unified AnyLogic model represented the full mine-to-mill chain across all four operations: block sequencing, equipment availability, MASA wet-season constraints, ROM pad blending with TOC enforcement, grade blending recalculated every 50 cycles, and continuous plant modeling through the crusher, mill, and leach. All scenario inputs were exposed through the scenario manager so client engineers could run analyses without SimWell involvement. The model ran on a one-year horizon, matching the board and capex cadence it was built to support. The board discussion was grounded in how the system actually behaved over twelve months, not how averages suggested it should.

WHAT THE MODEL REVEALED

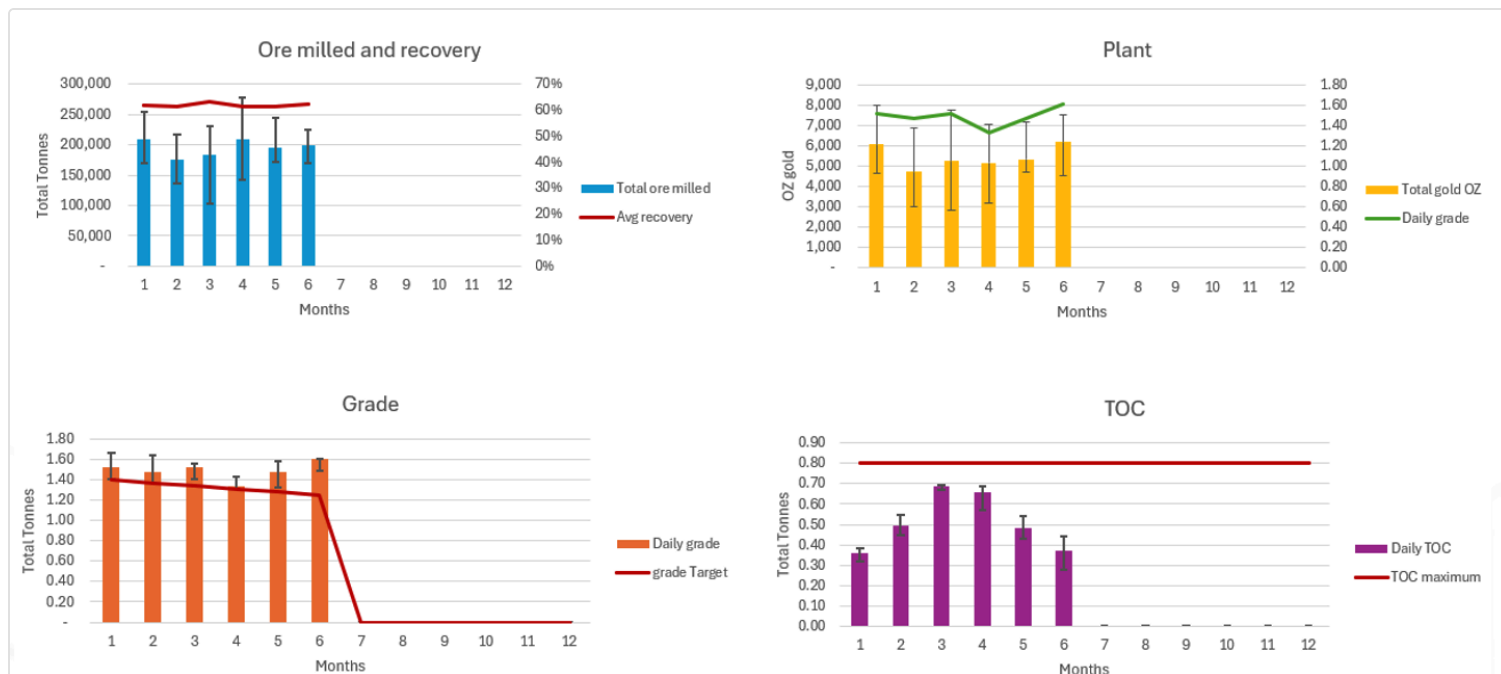
- **Fleet assumptions were inflated.** Actual haul distances were shorter than planned. In several scenarios, adding trucks increased congestion rather than throughput because the constraint sat downstream. Capital that would have gone to fleet belonged elsewhere.
- **Operator deviation was systematic.** Operators regularly deviated from plan due to ground conditions and safety constraints. Incorporating probabilistic behavior yielded results that matched actual throughput. Deterministic spreadsheets could not.
- **Flow imbalances compounded downstream.** Small mismatches between ore and waste streams created crusher instability and altered recovery. The effect was disproportionate to the upstream deviation and invisible in spreadsheets.
- **Seasonality reset annual expectations.** Averaged planning assumptions consistently over-promised in the first half of the year. Once seasonal patterns were modeled explicitly, the production curve became honest.



One architecture. Four mines. The same mill chain receiving material from all four operations, modeled as a unified system.

AFTER

The model changed what leadership could see. It also changed what they could do.



Simulation output across the 12-month planning horizon. Variance bands show the range of outcomes under realistic operating conditions. The TOC chart shows daily values against the hard maximum constraint — the pattern generating crusher instability that was invisible in spreadsheets.

- **Capital went to the real constraint.** Simulation showed where additional trucks would not improve throughput and where reducing fleet would compromise production. Avoiding a single unnecessary fleet purchase protected millions in capital. The decision moved from opinion to constraint analysis.
- **Leadership walked into the board meeting with a defensible plan.** The VP of Continuous Improvement had scenario-tested, probability-based answers on production risk. Averaged spreadsheet assumptions gave way to outputs that the team could explain and interrogate under scrutiny.
- **A week of analysis became hours.** Scenarios that previously took days to run and still couldn't be fully defended now ran in hours and produced results the team could stand behind.
- **Planning teams worked from shared logic.** Mine operations, planning, and corporate leadership evaluated performance against the same model. Divergent spreadsheet interpretations gave way to a single system everyone could interrogate.
- **The client owns it.** By the end of the engagement, the client's own engineer configured 90% of the final mine independently. The model is operational infrastructure, not a consulting dependency.

4

MINES MODELED IN
ONE ARCHITECTURE

1

MODEL MAINTAINED
INSTEAD OF FOUR

90%

FINAL MINE SELF-CONFIGURED
BY CLIENT ENGINEER

Operations that plan in spreadsheets and execute in reactive mode often discover that the gap is structural. Simulation makes that gap visible *before* it shows up in production. SimWell works with mining operations teams to build that visibility — and to leave the capability inside the organization when the engagement ends.