

## CASE STUDY



AN INTEGRATED MINING  
AND CHEMICALS COMPANY  
SEES \$45- \$80M IN NPV  
IMPROVEMENTS FROM  
RIVER LOGIC



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# SUMMARY

*This multi-billion dollar, globally Integrated Mining and Chemicals Company leverages River Logic for its mid-term and long-term planning.*

The monthly planning solution looks across a 24-month horizon and helps the company determine which products are most profitable on a per product and/or per customer basis. The long-term planning solution supports the company's yearly strategic planning and looks across a 30+ year time horizon to help the customer understand, on a yearly basis, the best way to get their starting products out of the ground, given the existing mine plans that its geologists have compiled and the future market predictions. The initial implementation is valued at \$45-\$80M Net Present Value (NPV) improvement, realized within the first 6 months of deploying River Logic.



# COMPANY OVERVIEW

*The company operates globally with almost two dozen mining sites and processing facilities and thousands of employees. It mines for three naturally occurring minerals that are processed to produce their primary product. The primary product has around 20 code variations that are determined by purity, size, weight, and other chemical characteristics. In addition to primary product, the company also sells secondary products.*

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**THE COMPANY NEEDED TO HAVE THE ABILITY TO TAKE INTO ACCOUNT UPSTREAM DECISIONS AND DOWNSTREAM DECISIONS PLUS SHIPPING VARIABLES IN ORDER TO OPTIMIZE THEIR ENTIRE VALUE CHAIN.**

## **Trade-offs Between Upstream and Downstream Processes**

There are multiple attributes of the mined ore that have variability (concentration, chemical form, impurities present, etc.). The way mined ore gets processed depends on those attributes. There can be variations in blending, additional steps added, recycling, removal of precious minerals, etc. The minerals are either used as feedstock in their natural form or in an upgraded form — the latter which is produced through secondary processing. The minerals are then put onto large barges and shipped to chemical processing plants in order to make end products. The company also has decisions to make with respect to further purifying and selling bi-products that needed to be taken into account in their decision-making process.

Depending on what comes from the mines and the processing options at the mine, cost and efficiency of final production and potential end products are impacted. The company needed to have the ability to take into account upstream decisions (processing at the mine sites) and downstream decisions (what end products are produced) in addition to shipping variables in order to optimize their entire value chain. They needed the ability to see when it was better to de-optimize the process upstream in order to realize net improvements across the entire value chain.





# THE CHALLENGE

*The Mining and Chemicals company's decision-making process is multifaceted. Since the company mines its own feedstock, it has the option to sell the feedstock or move it along in the manufacturing process.*

The company must appropriately handle variations in purities of starting products (i.e., feedstock) in addition to considering logistical and financial impacts of selling and further purifying bi-products whether to buy, sell, or continue certain quantities of feedstock in the manufacturing cycle. As previously mentioned, some of the mined

product gets processed near the mine in order to offset transportation costs and increase the purity of the shipped product. Thus, there are trade-offs to consider when determining what product and quantities get processed, where they get processed, and how products are transported to the next manufacturing plant or end customer.

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**THE COMPANY FOUND THAT USING EXCEL FOR PLANNING PURPOSES WAS FAR TOO CUMBERSOME. PLUS, IT HAD NO UNDERSTANDING OF THE IMPACT OF THESE DECISIONS ON PRODUCT AND CUSTOMER PROFITABILITY.**



All of these factors contributed to an incredibly complex planning process, one packed with significant trade-offs, variables, and constraints that need to be evaluated holistically. The company found that using Excel for planning purposes was far too cumbersome. Plus, it had no understanding of the impact of these decisions on product and customer profitability. Furthermore, the company was unable to take into account the impact of fluctuating exchange rates and numerous currencies on their decisions. It was clear that the business needed an overhaul in their planning and analytics approach.



**THE COMPANY SUFFERED AN INCREDIBLY COMPLEX PLANNING PROCESS, ONE PACKED WITH SIGNIFICANT TRADE-OFFS, VARIABLES, AND CONSTRAINTS THAT NEED TO BE EVALUATED HOLISTICALLY.**





# THE SOLUTION

*With River Logic, the customer now has a solution that allows all of its mining and manufacturing processes to be represented in a single Intelligent Model — a model that not only shows how its business works from mine to customer, but one that describes the financial components of the cycle every step of the way.*

The integrated Mining and Chemicals company utilizes two planning and decision support solutions for its mid-term and long-term planning:



One planning and decision-making solution supports a monthly planning process that looks across a 24-month horizon. This model helps the company determine which products are most profitable on a per product and/or per customer basis. The model helps them answer questions like:

- ✔ Should we sell, process, or buy what is mined? What about chemicals that are co-produced during processing?
- ✔ What gets upgraded and what gets sent to the chemical processing plants?
- ✔ What quality Slag/SR should be produced?
- ✔ Should we process certain products near the mine or transport the lower quality?
- ✔ Which feedstock goes to which chemical processing plant?
- ✔ Which lines, at which plants should make which quality/grade of product?



**WITH RIVER LOGIC, THE CUSTOMER NOW HAS A SOLUTION THAT ALLOWS ALL OF ITS MINING AND MANUFACTURING PROCESSES TO BE REPRESENTED IN A SINGLE INTELLIGENT MODEL**



The second planning and decision-making solution supports strategic planning that looks across a 30+ year time horizon and supports a yearly planning process. This solution helps the customer understand, on a yearly basis, the best way to get their starting products over the next 30 years, given the existing mine plans that its geologists have compiled and the future market predictions. They're able to answer questions such as:

- ✓ Do we have enough mines? What if we were to opt for more? Where and when should it open?
- ✓ What are the benefits of upgrades versus new structures?
- ✓ Where should we spend our capital?
- ✓ How will these decisions impact timing and yields?
- ✓ Which mine should feed which plant/s?
- ✓ Should we automate? If so, where, and what is the impact on KPIs?

Modeling complexities that exist for this company require advanced analytics (optimization), as well as the ability to consider validated financial data — both of these requirements are supported by the River Logic platform that modeled and validated the business in a pilot phase before scaling across the enterprise.



# THE IMPACT

Using River Logic, the company is able to validate the best courses of action, resulting in a 3-5% improvement in Net Present Value (NPV) within the first 6 months of deploying River Logic. Insights from River Logic continue to help them better understand their business and their planning process by pointing to several previously hidden insights/surprises in their current planning process, such as:

- ✔ Forecast sales prices that cause swings in production that do not make sense
- ✔ Sales price forecasts that seem unrealistic
- ✔ And More...



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## 3-5%

IMPROVEMENT IN NET PRESENT VALUE  
WITHIN THE FIRST 6 MONTHS



# ABOUT RIVER LOGIC

River Logic has been a global innovator in prescriptive analytics (optimization) since 2000. Its platform — designed for business users — enables enterprise-wide optimization, collaborative planning, and performance management, all delivered through a revolutionary user experience. By understanding how to best utilize cross-functional resources and manage trade-offs, companies can make more impactful decisions.

River Logic goes to market primarily through partner organizations like PwC, Deloitte, West Monroe Partners, and Microsoft, helping them develop high-value applications that monetize their industry expertise. Recent clients include Unilever, BHP Billiton, Boise Cascade, McKee Foods, Yorkshire Water, and the Russian Post.

Typical client value-add ranges from 10% cost reduction to 2-5% of sales in additional profit. River Logic strives to help every customer achieve at least 10X return on investment, but it's common for customers to see even higher returns.

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