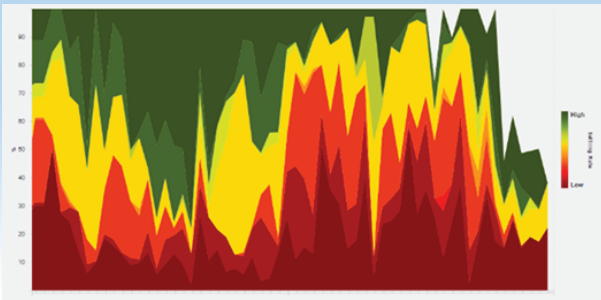


MATERIAL TRACKING MODEL CASE STUDY

Client: JSC “AK Altynalmas”



Example time series tracking of material lithology.



PROJECT OBJECTIVE

The project objective for IntelliSense.io was to provide real-time insight into the material characteristics of the feed throughout the plant and to provide visibility on unmeasured stream properties. This knowledge is needed to maximise value in the processing plant.

CHALLENGE

To help drive optimal decision making in each step of the processing plant the operator would like to know the composition of the material at each point of the circuit and when particular material will arrive at target equipment (i.e. a thickener). In addition, many important stream flows and properties are not directly measured, either due to lack of expensive instrumentation that is difficult to maintain or because it is physically impossible to install the required instrumentation in the desired location. Specifically, the solid feed rate to two ball mills could not be measured directly as the slurry is fed from a distribution box in a trough. Reconciling upstream and downstream flows allow for estimation of the total solids fed as well as the recycle ratio around the ball mills.

SOLUTION

The IntelliSense.io Material Model tracks material flows and attached properties (e.g. volumes, key minerals/elements, hardness, throughput, recovery, acid mine drainage, lithology, source) with associated uncertainty from the pit throughout the processing plant, providing real time information and predictions of when material will arrive at a particular point. The expected flow of material can be simulated to indicate the material properties that will arrive at processes of interest in the future, allowing preemptive action to be taken to improve processing efficiency. The image below shows real time lithology being tracked.

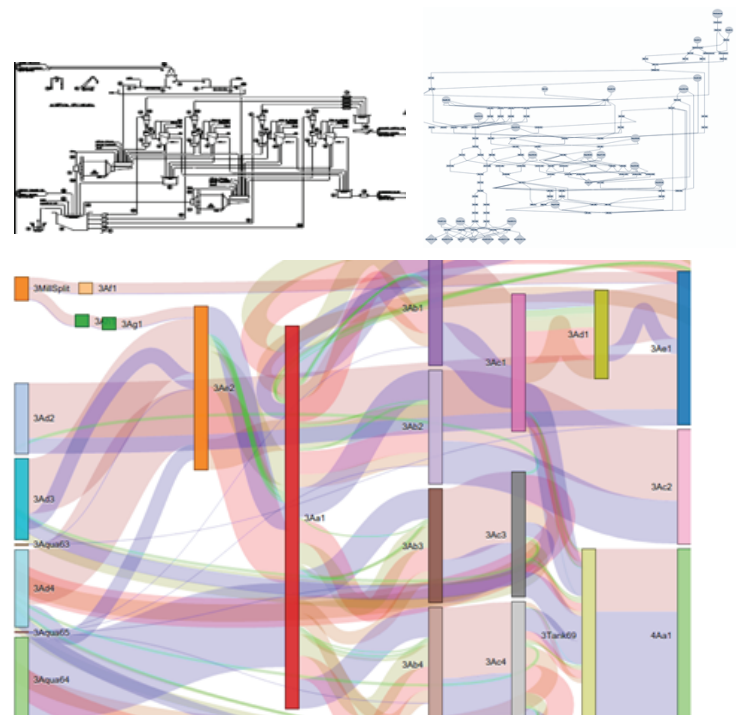
The picture on the right provides a visual representation of how the material model can provide detailed information at any point in the flow. This will benefit, for example, a grinding optimisation application because the grinding app can be fed with characteristics of the ore that will be entering the mill. This information helps in determining optimal set points and what material is the best to send to the mill in the context of the state of the circuit as a whole.

BENEFITS

The following are general benefits of the Material Model:

- Complete knowledge of what is and what should be going into each step of the processing plant
- Real-time monitoring of the material feed and accurate knowledge of material composition at each point of the circuit with uncertainty
- Visibility on stream flow rates and properties in hard to measure locations
- Real-time calculation of residence times in every piece of processing equipment, indicating for example risks of over- or under- grinding or failure to maintain inventory in intermediate sumps.

For Altynalmas, a particular outcome from the project which delivered value in their operations was knowledge of the solid flow rates into the ball mills, which did not exist before application of the Material Model.



Make Intelligent Decisions.