

Veolia provides nickel mill with process optimizations to increase capacity

CASE STUDY | Mining & Mineral Processing

| Background

A nickel mill in Northern Ontario, Canada, with a capacity of 1500 tonnes of ore per day that depended on the success of thickening their tailings in order to be in compliance with proper operation of their tailings dam.

| Challenge

When ore goes through the mill, they extract nickel concentrate using flotation cells. The waste goes to a thickener, and those tailings then go to a basin. The water on top of the basin is supposed to be clear so it can be reused in the process, which is beneficial because the basin doesn't fill up. The mill is limited by regulations on how much water they can use from the local waterways, so they need to be able to reuse water to stay in compliance.

With a properly functioning tailings dam, the Ministry of the Environment will consider an increase to the daily milling capacity, which is the financial bottleneck for the company. The daily maximum capacity of 1500 tons does not allow them to produce the volume required to meet profitability targets. So, thickening the tailings is a main component for the tailings dam to be in compliance to meet the Ministry of the Environment's regulations.

| Solution

After considering multiple alternatives, Veolia was the only company that could comply with the regulations to allow the mill to continue to run. Veolia developed a program consisting of an inorganic coagulant, polymeric coagulant KlarAid* PC1194, and anionic flocculant PolyFloc* AP1138.

| Results

Veolia targeted 55-70% solids to allow an increase in the amount of solids into the tailings. Inorganic coagulant and KlarAid PC1194 were used for surface charge neutralization and initial coagulation. Then PolyFloc AP1138 was used as a flocculant to increase particle size and improve settling. The combination of these products, along with optimal dosages, allowed the customer to reach their goal of 60% solids in their tailings so they could operate the tailings dam to its specifications.

Veolia was also able to identify mechanical improvements to their process. The tailings pumps were all manual, with no automatic control. Veolia's solution included linking some of their pumps back to their control systems and installing equipment to monitor density of the tailings. This allowed them to reduce the tailings pumping if levels were low and preventing it from getting high and plugging up the thickener.

Thickened tailings, versus conventional tailings, are also more environmentally friendly, which generates enough water to be recycled in the mill process. This greatly reduces the amount of water that needs to be taken from the nearby river. With the help of Veolia, the customer succeeded in this process and is now able to increase its permitted milling capacity to 2000 tonnes of ore per day. Now the customer will be able to produce larger volumes and meet financial expectations.

Not only did Veolia gain the trust of the customer, but Veolia also was able to help the customer cut costs, aid in the continuation and increase of production, and achieve challenging environmental goals.

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