

Screen Eliminates Tailing Pond at Chrome Producer in South Africa

- Attractive ROI with nine month payback period
- Solids containing 13-20% moisture discharged by the screen
- 85-90% mass recovery

Background

At foundry and metallurgical chrome processing plants in South Africa, fine tailings (typically -0.8mm) from a beneficiation plant are thickened and pumped to a unit consisting of a dewatering screen and hydrocyclones. The beneficiation plant typically includes spirals, a Derrick® Stack Sizer®, and hydrocyclones.

At one plant, the dewatering screen was consistently underperforming. Deficiencies included dewatered solids having high moisture content, fine solids bypassing into the screen undersize, and failure to handle the required tonnage. These operational issues prompted the customer to look for alternatives such as either developing a tailings pond or adding a high-performance dewatering screen.

Solution

Since 2017, the plant had achieved favorable results using Derrick Stack Sizers. The encouraging prior experience led the customer to inquire about Derrick's dewatering screen capabilities. Derrick recommended a HI-G® dewatering screen fitted with a combination of 150, 300, and 500 micron Polyweb® urethane screen panels to capture the fine solids. Feeding the screen consistently with 50 to 55 percent (w/w) was key to successful operation of the screen. Based on the customer's prior favorable experience with Derrick screens, they took the next step and replaced the existing screen with Derrick's high frequency HI-G dewatering screen.

The dewatering screen is operated in closed circuit with two-stage dewatering cyclones and a thickener. As illustrated in the flowsheet, spiral tailings are pumped to the primary cyclone. The underflow of both the primary and dewatering cyclones, along with the thickener underflow, are fed to the screen for dewatering. The screen undersize is pumped to a secondary cyclone, and the overflow from both cyclones is sent to the thickener.



Plant View (Derrick Dewatering Screen, Hydrocyclone, and Thickener)



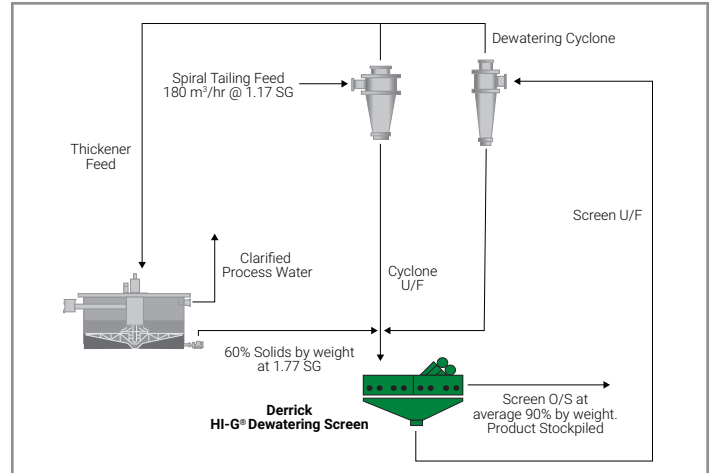
Dewatering chrome tailings with Derrick HI-G Dewatering screen

About 20 tons/hour of solids with 13 to 20 percent moisture content is discharged by the screen. Based on the financial data (Capex, Opex, Annual savings) provided by the customer, an economic study shows a very attractive return on investment (ROI) and Payback period as shown in the table below.

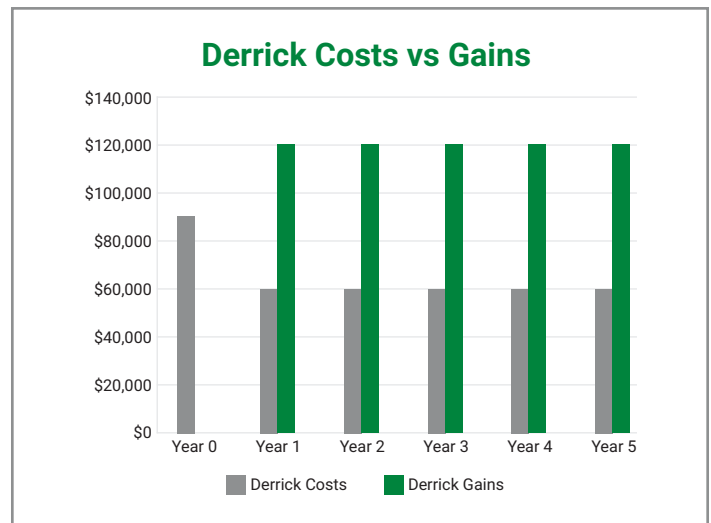
ECONOMICS	
One Year ROI	112%
Payback Period	9 months

Conclusion

Derrick's screening solution has provided superior dewatering performance and helped eliminate the tailings pond option, for which land and environmental clearance requirements would have delayed the project by several years. According to the customer, from a net present value perspective, the Derrick screen paid for itself in one day!



New flowsheet with Derrick Hi-G Dewatering Screen



For more information, please contact your local Derrick sales representative.

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