



A Rockwell Automation Company

National Steel Pellet Company PID Loop Tuning Assist

The Client:

National Steel Pellet Company is one of the major players in North American iron ore pellet production. In 1998, the NSPC plant shipped 5,345,118 gross tons of pellets, which represent a world record for a single

grate/kiln line. The mine and plant are located in Keewatin, MN, on the Western Mesabi range.

The Requirement:

The plant is undergoing modernization of the control system, which includes converting process control from wall mounted MICON controllers to new Quantum PLCs.

The objective was to eliminate instability in the SAG mill sump level control while maintaining the inlet

water line valve position close to operator-entered set-point without changing the configuration. Currently, the level is controlled by a PI controller which uses the inlet water line valve as manipulated variable. The pump speed is used by another PI controller to maintain the valve position close to operator-entered set-point.

The Design Solution:

The SAG mill sump level instability was caused by strong interaction between the two Quantum control loops involved in the level control. In order to achieve stable level control, it was necessary to de-couple these loops, which has been achieved by tuning the level loop controller more aggressively than the valve position controller. Level oscillations were completely eliminated.

The old MICON control loops had apparently been de-coupled by employment of "output dead band" control on the valve position pump speed loop.

It was recommended that the customer convert sump level control to a more flexible scheme by directing level PI controller output to the pump speed controller

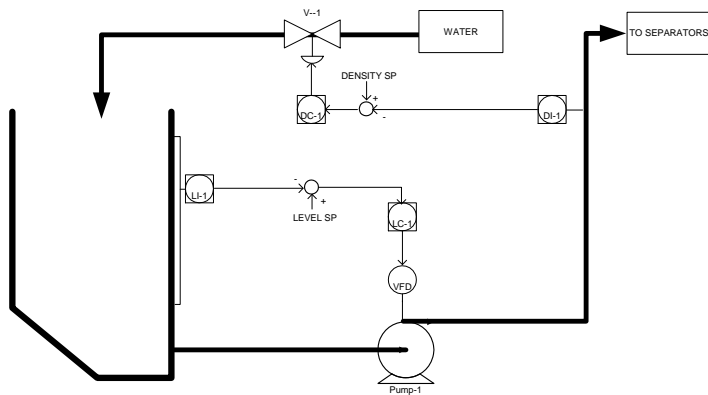
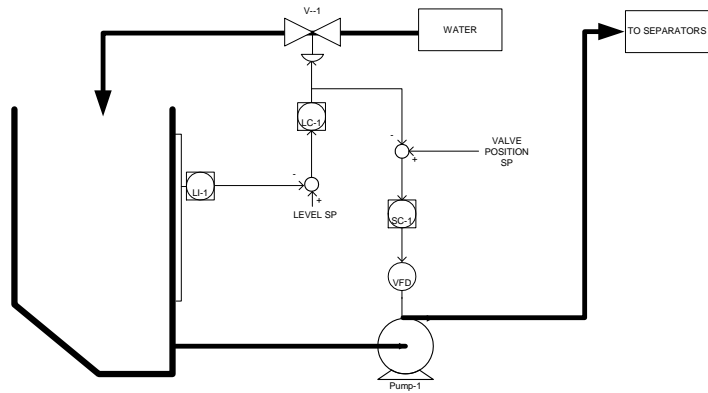
and leaving the inlet water valve for future slurry density control. In the meantime, while no on-line density meter is available, the valve position can be manually adjusted by the operators.

A second recommendation was made to further improve mill operation by providing for more consistent density in the mill itself. Using existing mill feed rate and water intake flow rate controls, the water flow loop controller could be converted to a ratio loop controller configured to adjust water intake rate based on feed rate.



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System Specifications:

- PLC is a Modicon QUANTUM
- Graphic package: Intellution FIX32

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com