CASE STUDY

VARB—PF Diffuser at Ontario Power Station, Canada

Background

In September 2006, The Greenbank Group installed a coal balancing solution to the two outlets of the a mill at Ontario Power Generation's plant in Nanticoke, Canada.

The scenario consists of a mill with two outlets that then travel horizontally for the majority of their run before turning 90º into the vertical. The two runs are shown in figure 1. There is then less than 5 pipe diameters before the primary pipe is split into four by quadrifurcations. The nominal bore of the primary pipe is 711mm (approximately 27") and the secondary pipes at 356mm (approximately 14").

The station suffers from a variety of problems, poor carbon in ash, high NO_X, poor low load flame stability and poor efficiency. These are all problems linked to bad distribution. The plant had already identified their poor distribution as an area for improvement. The original distribution measured +/- 50% RMS

GAIM Ltd. (part of The Greenbank Group) provided CFD analysis to identify which VARB solution would be appropriate. It was decided that an aggressive H-VARB solution would be needed. The scenario had a tight horizontal to vertical bend and a limited envelope for any installation, as a result a H-VARB was utilized along with a control gate device.

The station decided to use its PfMaster (supplied by The Greenbank Group) sensor system on this configuration to verify the results and allow online fuel powder balancing.

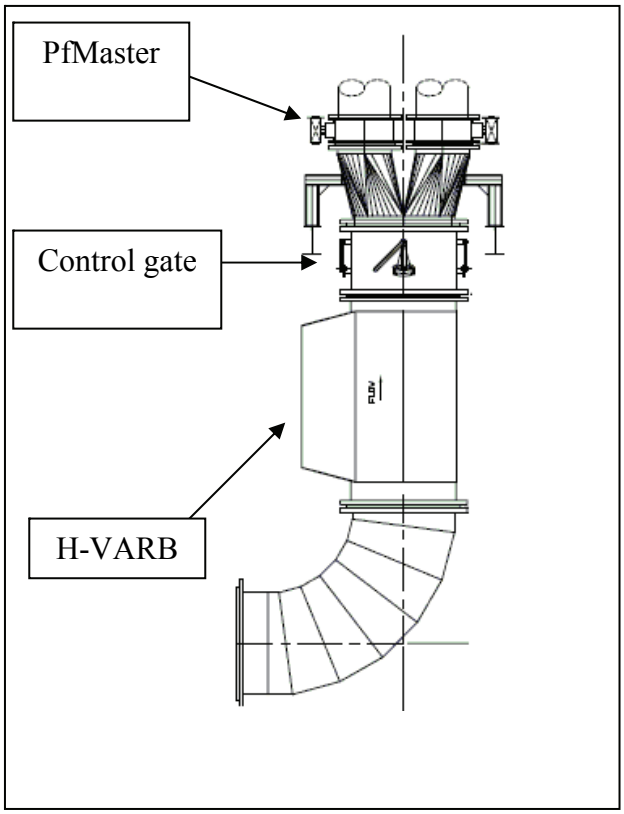


Figure 2: Installation layout showing all compo-

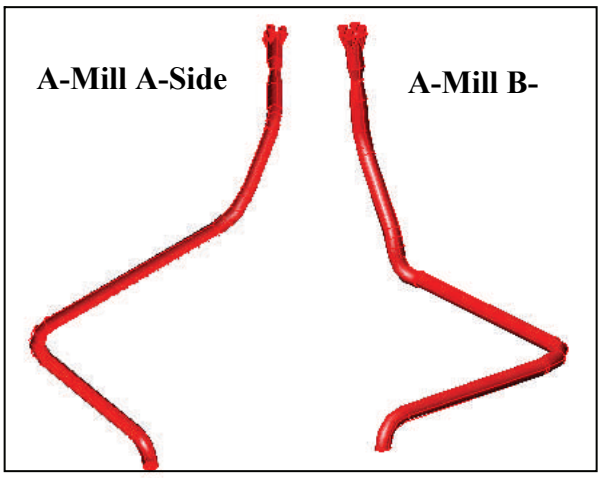


Figure 1: A-Mill A side and A-Mill B

Installation and Operation

The pre-installation data was matched with the CFD investigation highlighting the same areas of high stratification. The results indicated that two outlets of the quadrifurcation got the majority of the pulverised fuel.

The C.F.D. investigation indicated the orientation of the H-VARB device and possible initial positions for the control gate plates.

Following installation, observations from the PfMaster system allowed complete balancing of the system to within the given guarantee.

Figure 3: H-VARB in position at Nanticoke

Results and Fuel Balance Splits

Both quadrifurcations were successfully balanced to within +/- 15% of the RMS across all eight burners fed to the mill.

These test results were carried out across a range of mill loading conditions from full load to a quarter load to show that the results never deviated from the guaranteed splits.

The results for the two quadrifurcations are shown below.

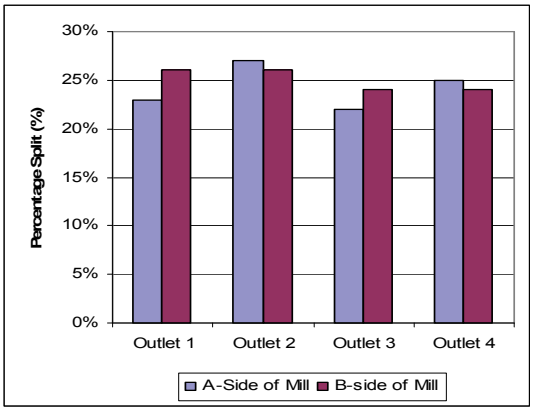
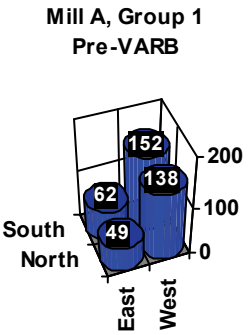
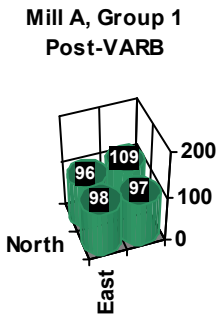


Figure 4: Graphs showing comparison between A-Side and B-Side

A Side			
Outlet 1-1	Outlet 1-2	Outlet 1-3	Outlet 1-4
23%	27%	22%	25%
B Side			
Outlet 2-1	Outlet 2-2	Outlet 2-3	Outlet 2-4
27%	26%	22%	25%





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