CASE STUDY

VARB—PF Diffuser at Ontario Power Station,

Background

In September 2006, 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 quadrifurcation. The nominal bore of the primary pipe is 711mm (approximately 27") and the secondary pipes at 396mm (approximately 16").

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 current distribution as measured at +/- 50% RMS

GAIM Ltd. provided CFD analysis to identify which VARB solution would be appropriate. It was decided that an aggressive 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 device would be utilized along with a control gate device.

The station decided to use its PfMaster sensor system on this configuration to verify the results and allow online fuel powder balancing.

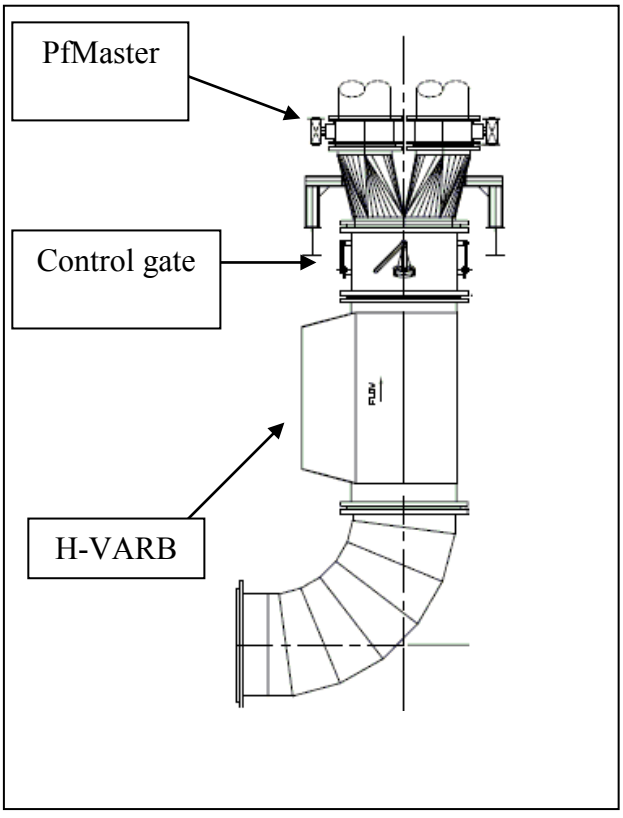

Figure 2: Installation layout showing all compo-

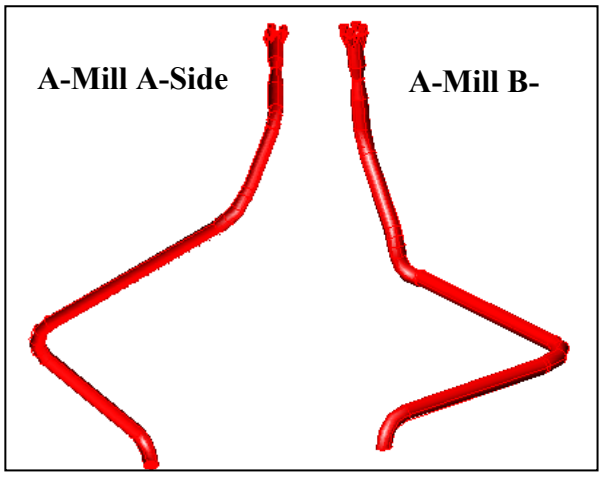

Figure 1: A-Mill A side and A-Mill B

H-VARB PF Diffuser

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 outlet in a quadrifurcation got the majority of the pulverised fuel.

The investigation indicated the orientation of the H-VARB device and possible initial positions for the control gate plates to be positioned.

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 Nanti-

Results and Fuel Balance Splits

Both quadrifurcations were successfully balanced to within +/- 10% 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.

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%

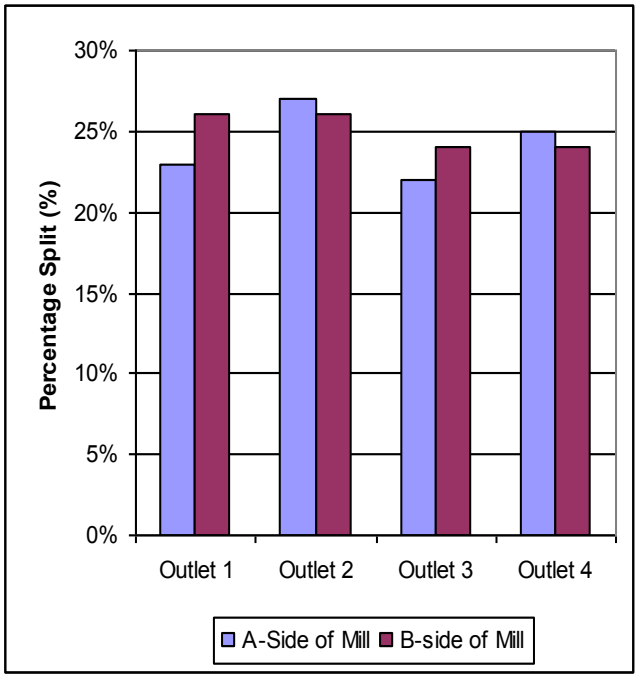

Figure 4: Graphs showing comparison be-tween A-Side and B-Side