Measuring Dusty Air Streams
in Cement Manufacturing

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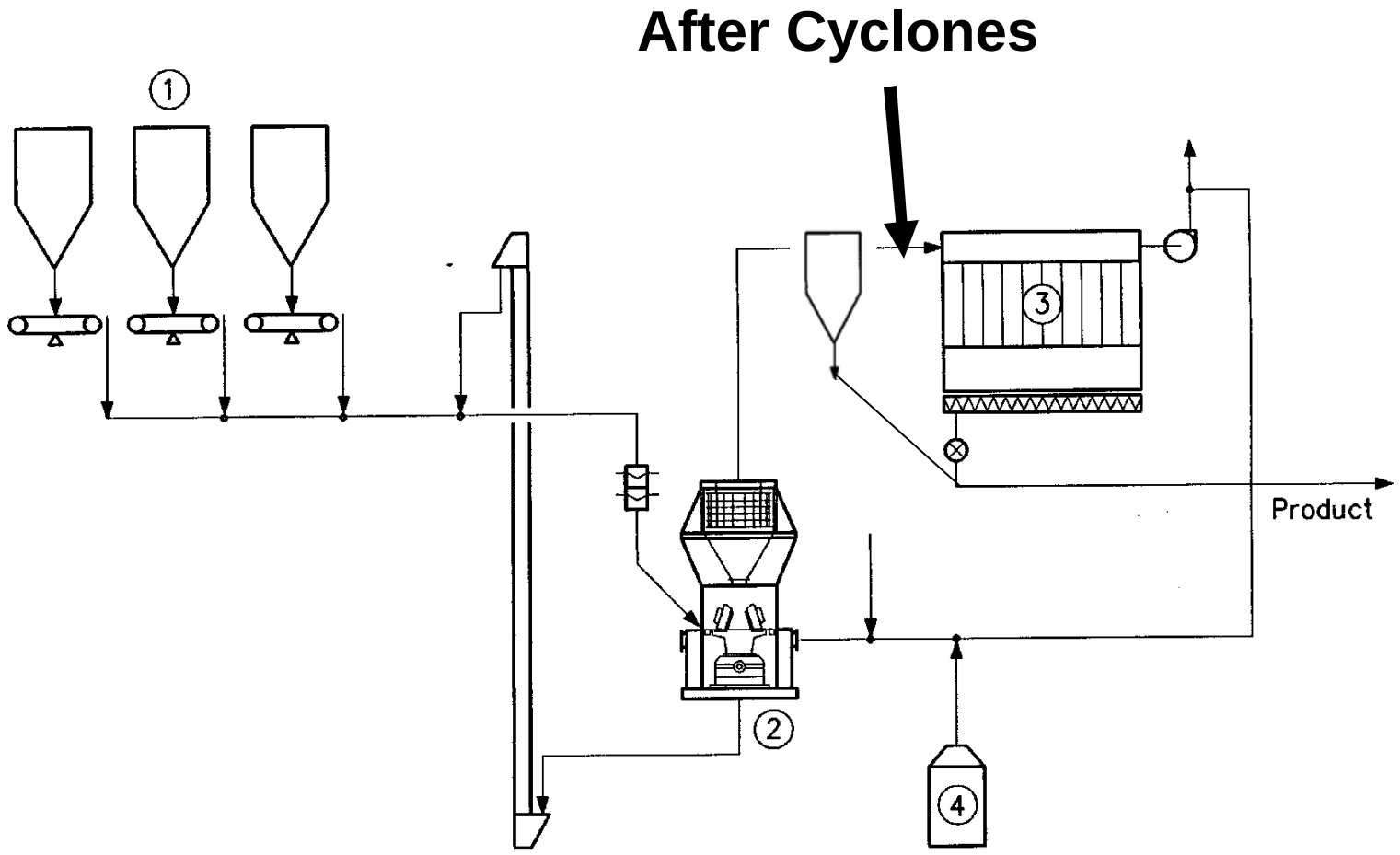
Challenges to Measure Dusty Gas Streams

- List of challenges
  - Location of the duct (accessibility & safety)
  - Temperature, Pressure and Moisture
  - Fluctuation in flow rate
  - Dust concentration of the stream
  - **Availability of appropriate equipment**

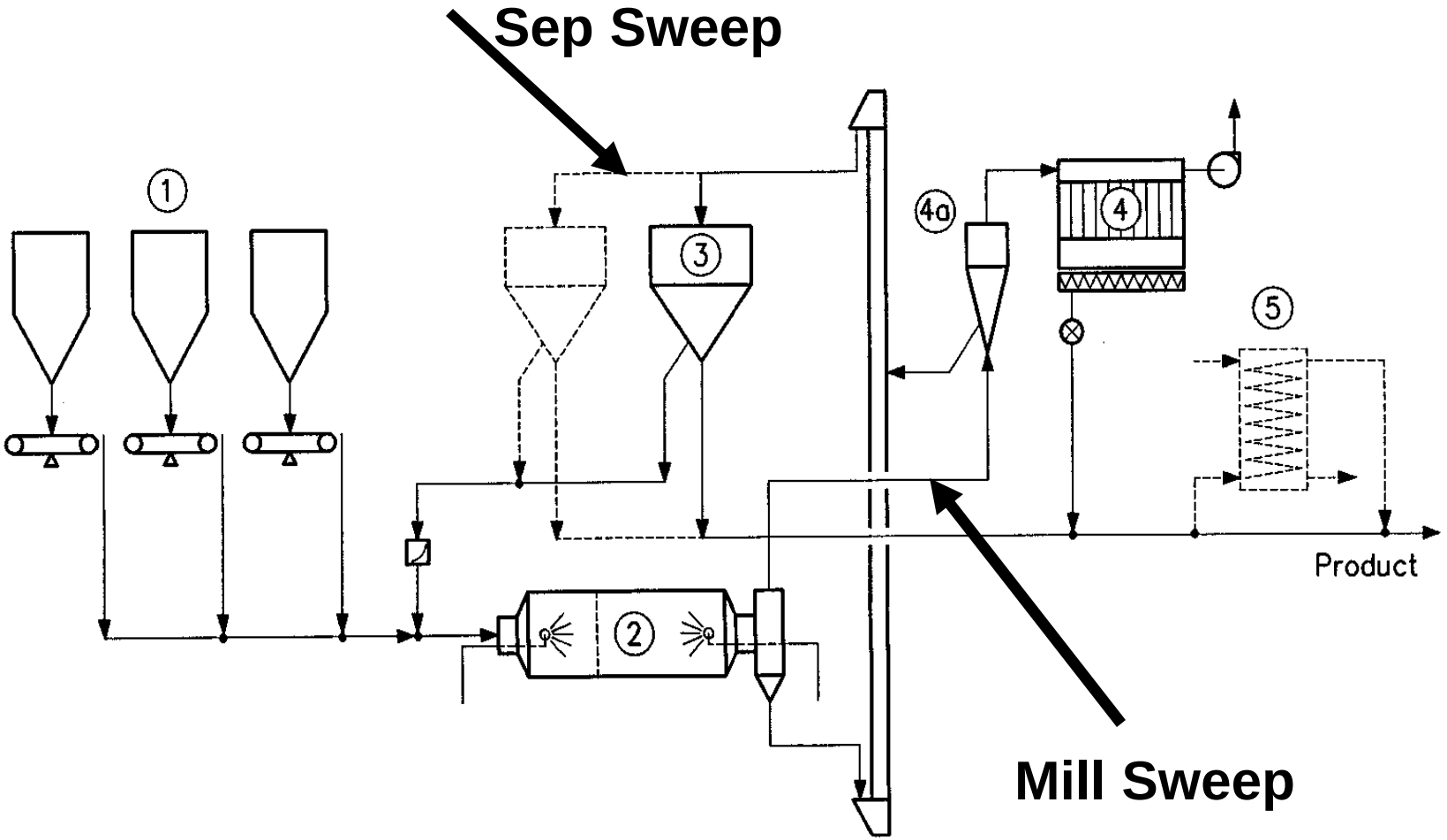
Where in Cement Manufacturing

- Areas of interest
  - Vertical roller mill
  - Tube mill
  - Preheater / Precalciner kiln
  - Long Wet/ Dry kilns
  - Direct fired burning system
  - Kiln gas bypass system

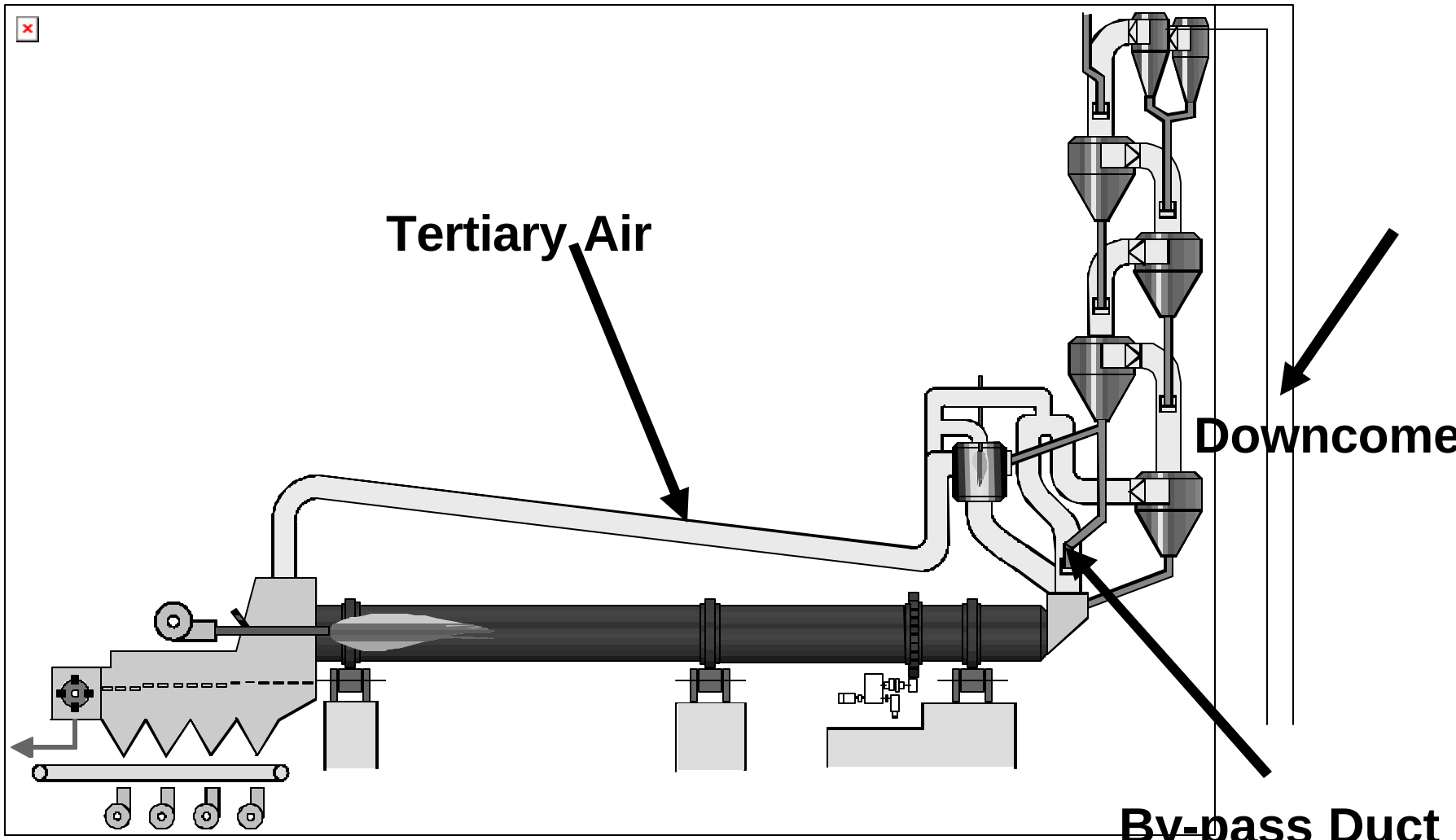
Where in Cement Manufacturing - VRM



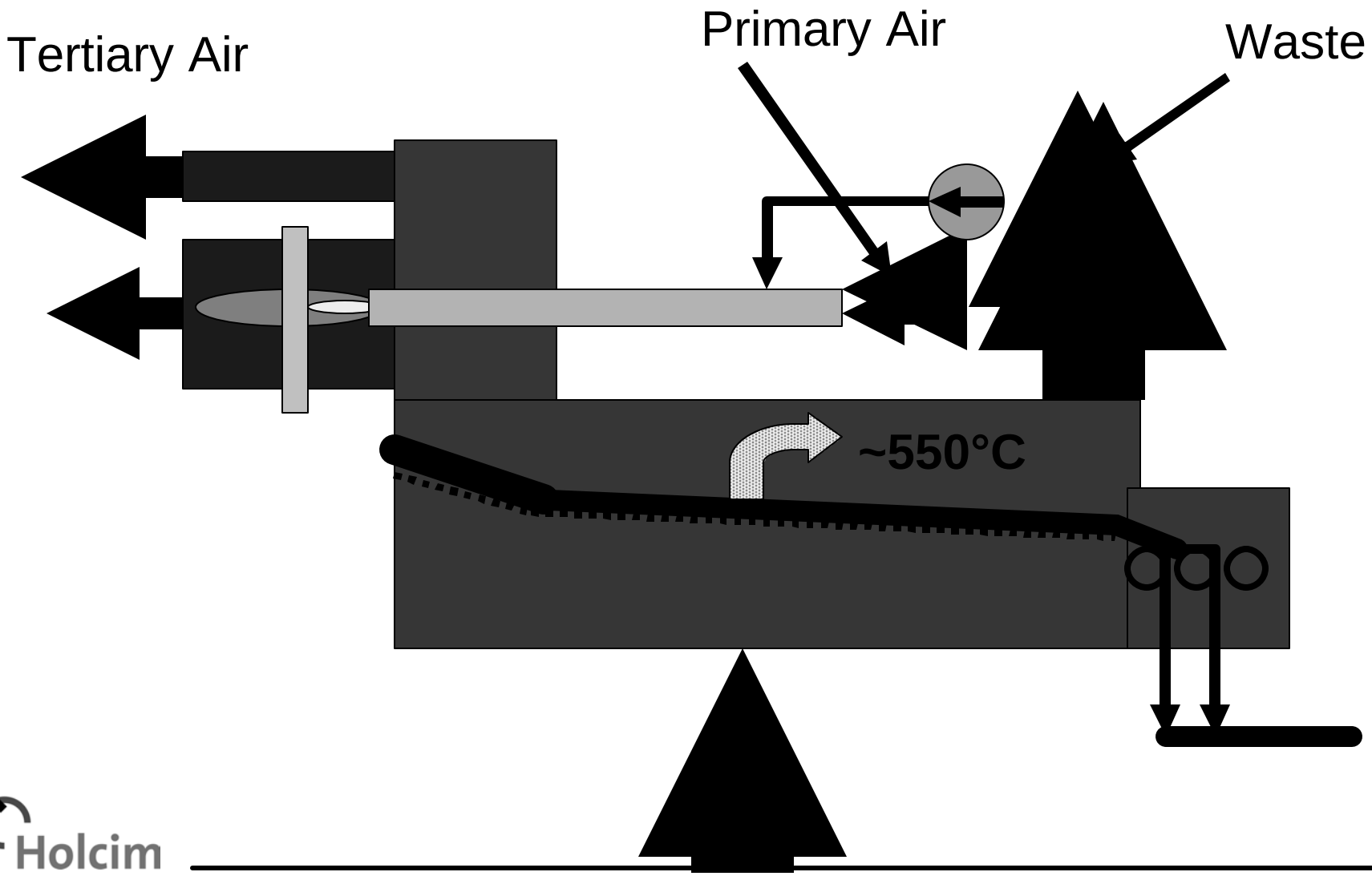
Where in Cement Manufacturing – Ball Mills



Where in Cement Manufacturing - Preclaciner



Where in Cement Manufacturing - Cooler



Use at Midlothian Plant

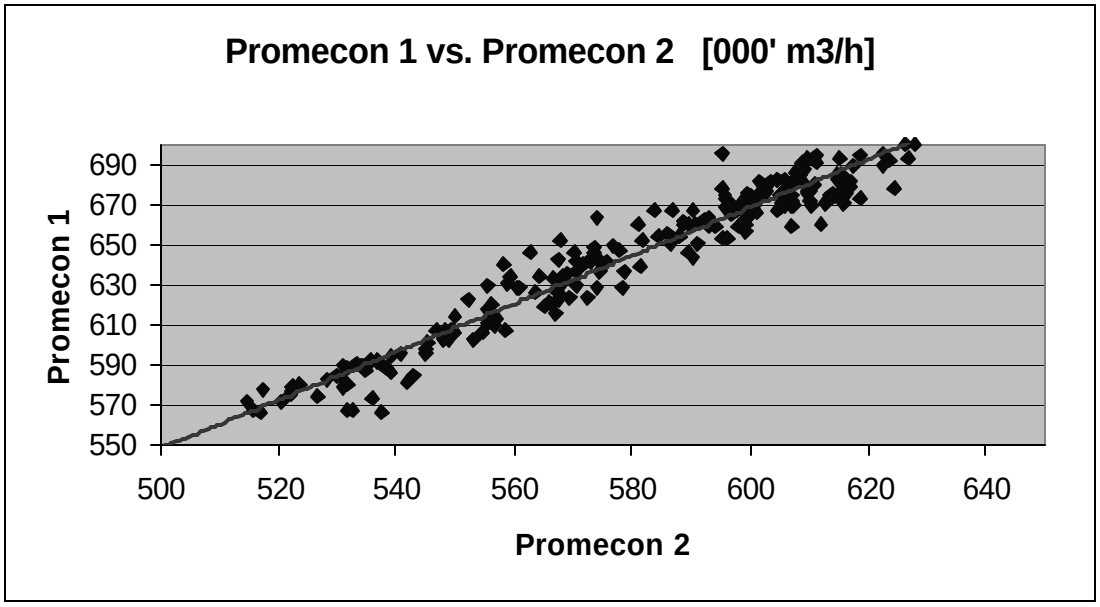
- Installation Background
  - Two vertical roller (raw) mills (Loesche, Pfeiffer)
  - The high moisture of the raw material (13%) require more than normal gas flow quantities to be moved through the mill for drying → power consumption of the mill ID fan is about 60% of the total power consumption of the grinding system.
  - Operators used to control the mill draft manually and tended to overdraft the mill to maintain a more stable operation without loading up the internal recirculation.

Use at Midlothian Plant

- A potential for savings by automatically controlling the fan speed was realized, based on a relative indication of the gas flow through the system.
  - The following indicators were used:
    - Differential pressure across the raw mill cyclones: poor and inconsistent correlation with actual air flow
    - Calculated airflow by using fan power and differential pressure across fan: a little better than cyclone dp but no satisfactory results were achieved.
    - Mill inlet pressure: Works quite well because our mills have no recirculation duct
    - December 2004, commissioned the Promecon instrument (2 sensor pairs per raw mill). Works very well.

Results at Midlothian Plant

- Excellent correlation between the two sensor pairs validate location



Conclusions

- On vertical roller mills power savings of 0.5-1 kWh/t raw meal can be achieved by minimizing and controlling the airflow through the mill
- This can only be done successfully with an accurate indication of the actual airflow
- The Promecon system (installed in December 04) has proven itself as reliable and accurate measurement