

Spectra-cular Flow Metering Performance

The competitive nature of the energy market means that it is vital for British Coal to guarantee the quality and consistency of its products. In order to help achieve this, projects to help control and improve the operation of coal washing plants have been undertaken as part of British Coal's Research programme.

Previous experience has shown that the design of the water circuit in a coal preparation plant has a profound influence on how effectively the process is operated in order to maintain product quality and minimise coal losses. This is particularly relevant on the froth flotation plant where the loss of coal to the tailings (which is subsequently discarded) can represent a huge reduction in revenue over the period of a year.

As part of the overall strategy to control water flow around the plant, it was proposed to mathematically model the fines water circuit, incorporating the flotation plant, using a commercially available chemical engineering software package. The model would take into account residence times and transfer functions, enabling prediction of the response of the circuit to a disturbance.

Although the development of the model itself would be based on mathematical techniques, it would be necessary to confirm the predictions of the model by actual on-site flow measurements at strategic points around the plant. In order to achieve this, an electronic flowmeter which met the following criteria would be required. The instrument had to be:

- **Suitable for a wide range of pipe sizes and materials of construction.**
- **Battery operated and easily transportable.**
- **Of reasonable cost.**
- **Robust in use.**
- **Able to operate in areas of high vibration.**

Since the use of an intrusive type of flowmeter was impractical, the options still available were either a Doppler or an ultrasonic Transit-time flowmeter. After conducting comparative tests on equipment from a number of potential suppliers, the Controlotron Spectra supplied by ABLE Instruments & Controls was chosen. Not only did it meet the required criteria, it also offered comprehensive data logging and recall facilities, the



capability of storing details of up to ten locations with the touch-on transducers making operation under difficult conditions very easy.

Although not claimed to be a feature, it was found that the Spectra would operate effectively on clarified water pipes where there would be little or no solid matter present. An example of the meter's sensitivity was shown when it could not produce a reading from a pipe which hitherto had always given a good flow. It was only after a few minutes of investigation that it was found that due to high water demand around the plant, this particular location was temporarily starved and there was indeed no flow present.

The data logging facility was used extensively, and in several cases quantified fluctuations in flow which had, until then, only been estimated. Jeff Williams of TSRE who was responsible for carrying out the tests, comments "Not only did the Spectra meet the stringent British Coal criteria, its enhanced features provided additional information which would otherwise have been impossible to obtain".

For more information, please contact ABLE Instruments on +44 (0)118 9311188 or by email: info@able.co.uk

Reading Office

Cutbush Park, Danehill, Lower Earley,
Reading, Berkshire. RG6 4UT. UK.
Tel: +44 (0)118 9311188
Email: info@able.co.uk

Aberdeen Office

Unit 6 Airside Business Park, Kirkhill Industrial Estate,
Dyce, Aberdeen. AB21 0GT. UK.
Tel: +44 (0)1224 725999
Email: ab@able.co.uk

Internet: www.able.co.uk
e-procurement: www.247able.com
Registered in England No: 01851002
VAT No: GB 417 2481 61

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