An Example of a NGCQM Monthly Performance Summary Report

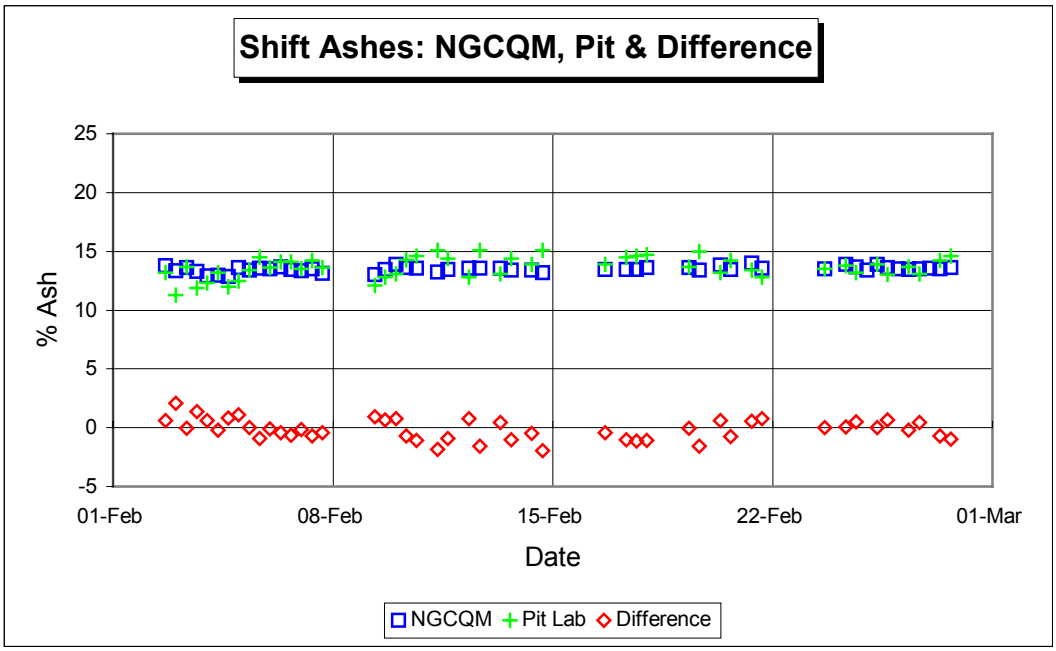
The following provides an example of a summary report on the recent monthly performance of the NGCQM at a UK colliery. This NGCQM is used to control the blending of washed smalls with dry fines to produce a uniform blended product at 13.5% ash for sale to a nearby power station.

Table 1 below gives a weekly summary of the NGCQM performance against both the in-house pit laboratory ashes and the commercial laboratory ashes.

Week	NGCQM		Pit		CQM-Pit			Commercial		NGCQM-Comm		
End	Ash%	σ	Ash%	σ	Ash%		σ	Ash%	σ	Ash%		σ
08-Feb	13.4	0.3	13.2	0.9	0.2	±	0.2	13.6	0.8	-0.2	±	0.2
15-Feb	13.4	0.2	13.9	1.0	-0.5	±	0.3	14.3	0.8	-0.9	±	0.3
22-Feb	13.6	0.2	14.0	0.7	-0.4	±	0.3	14.2	0.6	-0.6	±	0.2
01-Mar	13.6	0.2	13.7	0.5	0.0	±	0.2	14.1	0.4	-0.5	±	0.1

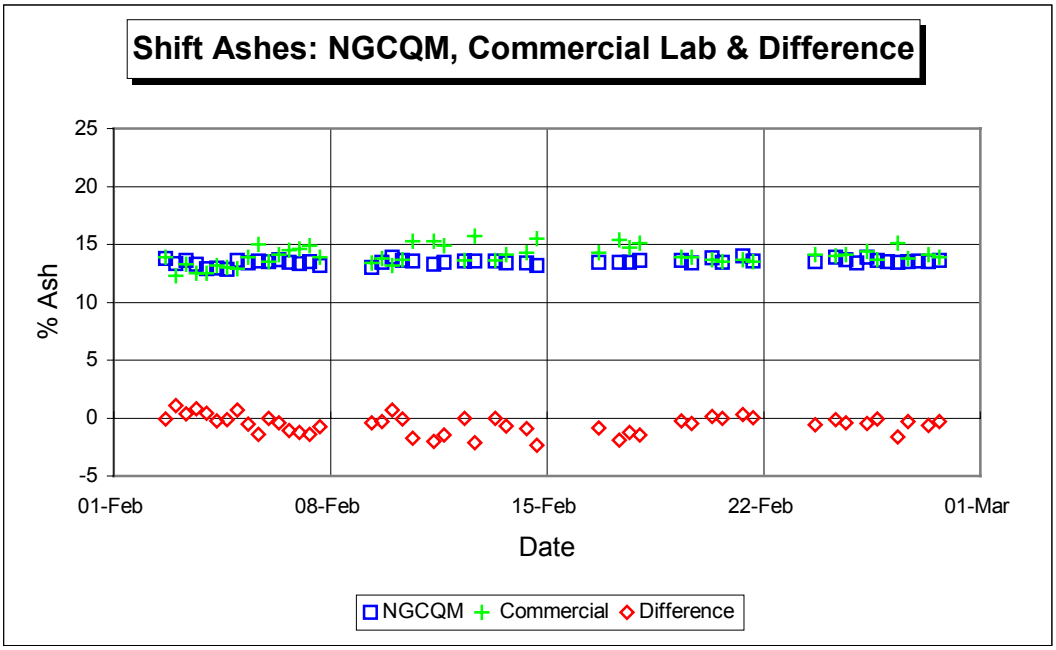
Table 1

Graph 1 below shows the individual shift ashes for the NGCQM, the pit laboratory and their differences for February 2003.



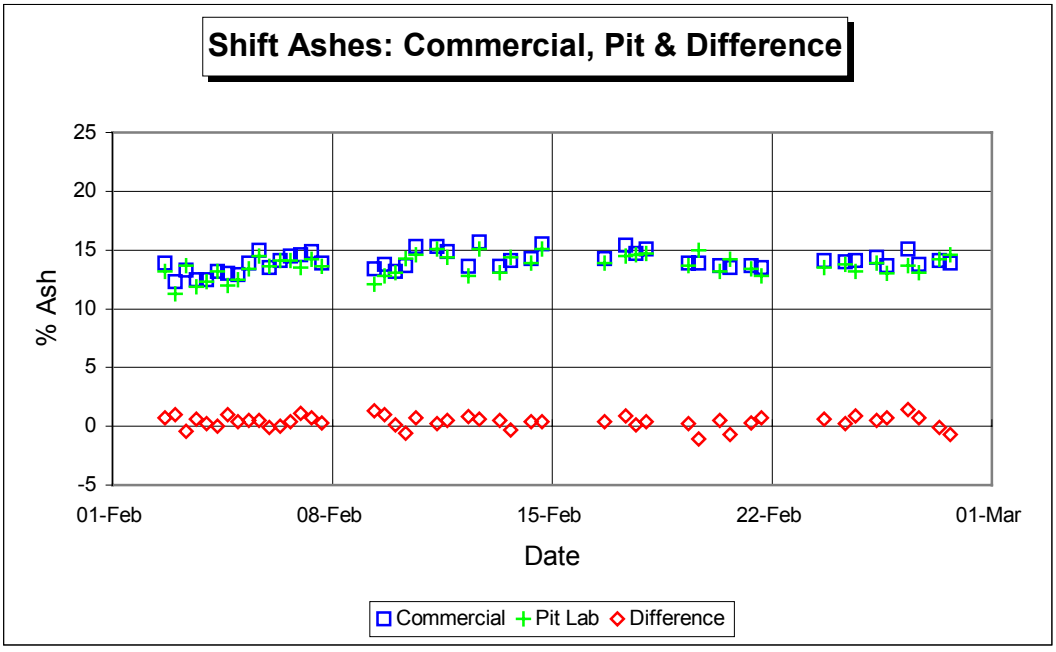
Graph 1

Graph 2 below shows the individual shift ashes for the NGCQM, the commercial laboratory and their differences for February 2003.



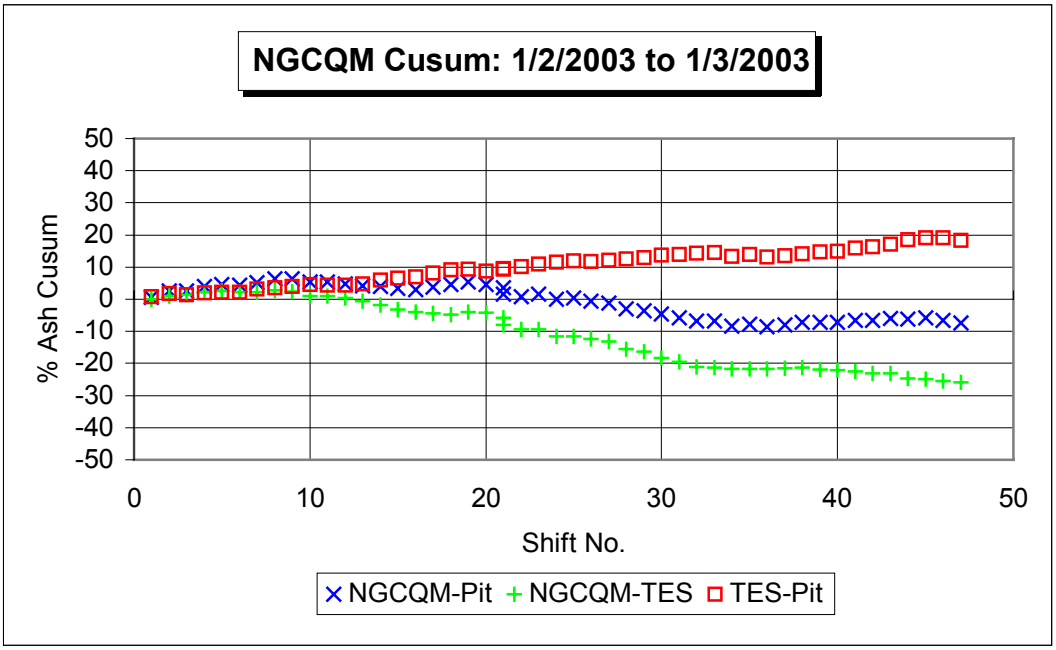
Graph 2

Graph 3 below shows the individual shift ashes for the pit laboratory, the commercial laboratory and their differences for February 2003.



Graph 3

Graph 4 below shows the cumulative sum (CUSUM) of the differences between the individual shift ashes for a) the NGCQM and pit laboratory, b), the NGCQM and the commercial laboratory and c) the commercial laboratory and the pit laboratory for February 2003 all plotted against an arbitrary shift number. The slopes of the graphs provide the respective biases.



Graph 4

It can be seen from Graph 1 and Graph 2 that the NGCQM shift ashes have been held virtually constant at 13.5% ash throughout the month. This shows that the NGCQM has been successfully able to control the blend to the target ash. The pit laboratory ashes in Graph 1 and the commercial ashes in Graph 2 are tightly clustered around this target ash.

The commercial laboratory ashes were on average 0.38±0.08% higher than the pit laboratory ashes during February. The NGCQM under-read the commercial laboratory ashes by 0.54±0.12% ash and the NGCQM under-read the pit laboratory samples by an average 0.16±0.13%. In other words the NGCQM was substantially unbiased against the pit laboratory, against which it was calibrated but there was a 0.4% bias between the two laboratories.

The RMS errors were 0.89% ash for the NGCQM against the pit laboratory, 0.97% ash for the NGCQM against the commercial laboratory ashes, with 0.65% ash between the two laboratories.

The precision of the three measurement systems using the Grubbs Estimator (as recommended in ISO15239) were: 0.76% ash for the NGCQM, 0.27% ash for the commercial laboratory and 0.45% ash for the pit laboratory. These results are typical. Generally the NGCQM precision can be expected to be in the range 0.5% to 1.0% ash.

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