

COAL CONCEPTS PROFICIENCY TESTING

GENERAL ANALYSIS SAMPLE

REPORT – ONE HUNDRED AND THIRTEEN

Revision 00

Final report

DATE ISSUED: 31 MARCH 2021

PARTICIPANT

LABORATORY CODE:



R BABOOLAL (SCHEME MANAGER)

*Disclaimer: Opinions and interpretations expressed herein are outside the scope of SANAS accreditation
*Moisture in the analysis sample is not included in the SANAS schedule of accreditation as robust statistics cannot be applied.
Chlorine, Fluorine, Quick ash, ASTM ash and ASTM Volatiles is not included in the scope of accreditation.*

THINKING QUALITY, QUALITY THINKING

REGISTRATION NUMBER: 2006/149731/23 (RMB INDUSTRIAL STATIONERS cc t/a)

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EXECUTIVE SUMMARY

1. One hundred eight samples were sent to participants with 107 timeous result submissions
2. The total number of outliers found were as follows (dry base):
 - ISO volatile matter x 2
 - Quick Ash x 2
 - ISO Ash x 2
 - Calorific value x 4
 - Sulphur x 5
 - Phosphorous x 2
 - Carbon x 1
 - Nitrogen x1
3. Fluorine, ASTM Ash, ASTM Volatile Matter participants were insufficient to warrant robust statistical calculations.
4. Trending for your laboratory is as follows:

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Dear Participant

RE: PROFICIENCY TESTING RESULTS FOR THE MONTH OF MARCH 2021

Thank you for your participation in the Coal Concepts proficiency testing scheme.

Your laboratory code is as per the cover page.

All results are totally confidential. Any results in ***Bold, Italics and Underlined*** are outliers. Where applicable, the most extreme outliers have been eliminated from calculations using the Grubbs estimate for outliers. Robust statistics has been applied where possible. Analysis results have been reported on air dry and dry base. The dry base results have been used to calculate the z-scores.

Please take note of the following:

1. Z-scores between -1 and +1 is deemed acceptable
2. Z-scores between -2 and -3 should serve as a warning that the analysis result could get worse
3. Z-scores between +2 and +3 should also serve as a warning that analysis results could get worse.
4. Z- scores lower than -3 and exceeding +3 should warrant an investigation
5. Compare your result to the robust average which will be the assigned value. The measurement of uncertainty (UoM) of the results is also stated.
6. Z-Score calculations can be made available upon request

The Coal Concepts scheme adheres to the requirements of ISO/IEC 17043:2010 – Conformity assessment – General requirements for proficiency testing.

Statistical analysis has been carried out using ISO/IEC 13528:2015-Statistical methods for use in proficiency testing by interlaboratory comparisons

Please find results attached together with Z-score trends.

Best Regards

R Baboolal

LIST OF PARTICIPANTS IN ALPHABETICAL ORDER

Arcelor Mittal - Vanderbijl Park	Arcelor Mittal - Newcastle
Anglo SOC - Goedehoop Colliery South Plant	Anglo SOC - Goedehoop Colliery North Plant
	Anglo SOC - Greenside Colliery
Afrisam - Dudfield	Alfred H Knight -Richards Bay Laboratory
Afrisam - Ulco	AquaSpecto
Botswana Power Corporation - Morupule B Power Station	Botswana Power Corporation - Morupule A Power Station
Bureau Veritas Inspectorate Laboratories - Belfast	Bureau Veritas Inspectorate Laboratories - Middelburg
Bureau Veritas – Moatize, Vale	Bureau Veritas - Nacala
Bureau Veritas Inspectorate Laboratories - Tendele	Bureau Veritas Inspectorate Laboratories - Beira
Bureau Veritas Inspectorate Laboratories - Alton	Bureau Veritas Testing & Inspection SA - Pretoria
Castle Peak – Hong Kong	
Cotecna South Africa – Richards Bay	Cotecna South Africa - Nasonti
Cotecna South Africa - Lurco	Cotecna South Africa - Phola
Cotecna South Africa – Tselentis	Cotecna South Africa - Kangala
Cotecna South Africa - Middelburg	Cotecna Ubumbene(Pty)Ltd - Umlabu
Cotecna South Africa - Mimosa	Cotecna South Africa - AMR
Cotecna South Africa - Droogvallei	
Eyethu Coal Wilge	Eskom Holdings SOC Ltd - Matimba Power Station
Eskom Holdings SOC Ltd – Kendal Power station	Eskom Holdings SOC Ltd - Duvha Power Station
Eskom Holdings SOC Ltd – Lethabo Power Station	Eskom Holdings SOC Ltd - Komati Power Station
Eskom Holdings SOC Ltd - Tutuka Power Station	Eskom Holdings SOC Ltd - Grootvlei Power Station
Eskom Holdings SOC Ltd - ERID	Eskom Holdings SOC Ltd - Kriel Power Station
Eskom Holdings SOC Ltd - Hendrina Power Station	Eskom Holdings SOC Ltd – Majuba Power Station
Eskom Holdings SOC Ltd - Arnot Power Station	Exxaro Resources - Grootegeluk Mine
Eskom Holdings SOC Ltd - Matla Power Station	Eskom Holdings SOC Ltd – Medupi Power Station
Exxaro Resources - Matla Mine	G&W Base & Industrial Minerals
Glencore Wonderkop	Glencore -Rustenburg Smelter
Glencore Boshhoek Smelter	Glencore Lion Smelter
HighVeld Laboratories	Hwange Colliery – Zimbabwe
Idwala Lime	Jindal Mining SA Pty Ltd – Kiepersol Colliery
Kangra Coal (Pty) Ltd	Khwezela Colliery - Landau
Lafarge Industries SA (Pty) Ltd - Lichtenburg	Leon Inspection and Testing - Pakistan
Mpumamanzi Group CC	Mafube Colliery Mine PTY (Ltd)
Morupule Coal Mine - Botswana	Mitra SK South Africa (PTY) Ltd
Msobo Coal PTY Ltd	M L Coal PTY Ltd
Nelson Mandela University - Innoventon	Noko Analytical Services CC - Twistdraai
Noko Analytical Services CC - Witbank	Noko Analytical Services CC - Welgemeend
Noko Analytical Services CC - NCC	
Quality Ensure Eastside Laboratory	Richards Bay Minerals
Ronewa Lab Middelburg	Ronewa Lab Ubuntu
RSA Labs - Phalandwa	RSA Labs - Khanye
RSA Labs - ZAC	
SB Mining Solutions	Seriti - Kriel Colliery
Seriti - New Vaal Colliery	Siza Coal Services - Kinross
Siza Coal Services - Vlakfontein	Siza Coal Services - Umlalazi
Siza Coal Services - Wescoal	Siza Coal Services - Mooiplaats
Siza Coal Services – Botswana Palapye	Siza Coal Services – Botswana, Gaborone – Minerals Lab
Siza Coal Services - Middelburg	Siza Coal Services - NBC
Siza Coal Services - Carolina	Siza Coal Services - Sasolburg
Siza Coal Services - Leeuwpan	Siza Coal Services - Wildfontein
South 32 – Khutala Colliery	Sibonisiwe Coal Laboratory Services CC – Clewer
Sibonisiwe Coal Laboratory Services CC Rietvlei Mining	Sibonisiwe Coal Laboratory Services CC Middelburg
Sibonisiwe Coal Laboratory Services CC - West Coal	Sibonisiwe Coal Laboratory Services CC – Mzimkhulu
SABS Commercial SOC Ltd Richards bay	SABS Commercial SOC Ltd NewCastle
SABS Commercial SOC Ltd CSIR	SABS Commercial SOC Ltd Secunda
SABS Commercial SOC Ltd Uitkomst	SPTe Lab - Middelburg
Tata Steel – Wales Lab, Europe	Universal Geominerals Sdn Bhd - Malaysia
Umzamo Analytical Services - Overlooked Colliery	Umzamo Analytical Services - Witbank
Umzamo Analytical Services - Sudor	Umzamo Analytical Services - VDD
Vitrovian Analytical Services DELMAS	Yıldız Lab. Test An. Ar. ve Dan. Hiz. Tic. Ltd. Şti. - Turkey

1. TYPE OF SAMPLE USED

The coal used in this proficiency testing round was bituminous coal.

2. PREPARATION OF SAMPLE

Approximately 1000kg's of coal with an approximate top size of 50mm was sourced. This was crushed to -4mm using a jaw crusher. The -4mm material was reduced to -212um using a cross beat pulveriser. The 212 material was sieved using a 212um screen. Any +212um material was pulverised and sieved until all material passed through the 212 um sieve.

All the -212um material was then mixed in a mixing drum for 4 hours.

3. HOMOGENEITY CHECK

There were 108 participants in this round, 10 portions of sample were randomly extracted. These were packaged in their final form i.e. in 200ml sample bottles. The bottles were labelled 1 to 10. The results were as follows:

SAMPLE NO.	TEST PORTION 1	TEST PORTION 2	sample av (Xt)	range (Wt)	range sqd
1	16,30	16,44	16,37	0,14	0,0196
2	16,32	16,37	16,35	0,05	0,0025
3	16,33	16,48	16,41	0,15	0,0225
4	16,32	15,52	15,92	0,80	0,6400
5	16,55	16,47	16,51	0,08	0,0064
6	16,36	16,50	16,43	0,14	0,0196
7	16,40	16,52	16,46	0,12	0,0144
8	16,26	16,63	16,45	0,37	0,1369
9	16,36	16,58	16,47	0,22	0,0484
10	16,46	16,23	16,35	0,23	0,0529
GENERAL AVERAGE			16,37		
STANDARD DEVIATION			0,167		
WITHIN SAMPLE STANDARD DEVIATION			0,219		
BETWEEN SAMPLE STANDARD DEVIATION			0,063		

The between sample standard deviation must be $\leq 0.3 \times \sigma$

(σ = std deviation for the proficiency assessment)

σ = 2% of the mean was used, which is the repeatability for ISO ash (Ash % > 10%)

Hence $0.3 \times 0.33 = 0.099$

Since 0.063 < 0.099, the samples are homogenous

4. STABILITY CHECK

Samples were retained for sales as reference material. Ten of them were randomly chosen for stability testing. In order for the proficiency testing samples to be declared stable the general average from the homogeneity check and that of the stability check the difference in the general average should not differ by more than 0.3 X precision.

This test has been carried out about a month after the samples were received by the participating laboratories

SAMPLE NO.	TEST PORTION 1	TEST PORTION 2	sample av (Xt)	range (Wt)	range sqd
1	16,28	16,33	16,31	0,05	0,0025
2	16,21	16,32	16,27	0,11	0,0121
3	16,44	16,26	16,35	0,18	0,0324
4	16,13	16,37	16,25	0,24	0,0576
5	16,30	16,42	16,36	0,12	0,0144
6	16,32	16,40	16,36	0,08	0,0064
7	16,25	16,40	16,33	0,15	0,0225
8	16,53	16,38	16,46	0,15	0,0225
9	16,35	16,44	16,40	0,09	0,0081
10	16,53	16,42	16,48	0,11	0,0121
GENERAL AVERAGE			16,35		
STANDARD DEVIATION			0,073		
WITHIN SAMPLE STANDARD DEVIATION			0,098		
BETWEEN SAMPLE STANDARD DEVIATION			0,025		

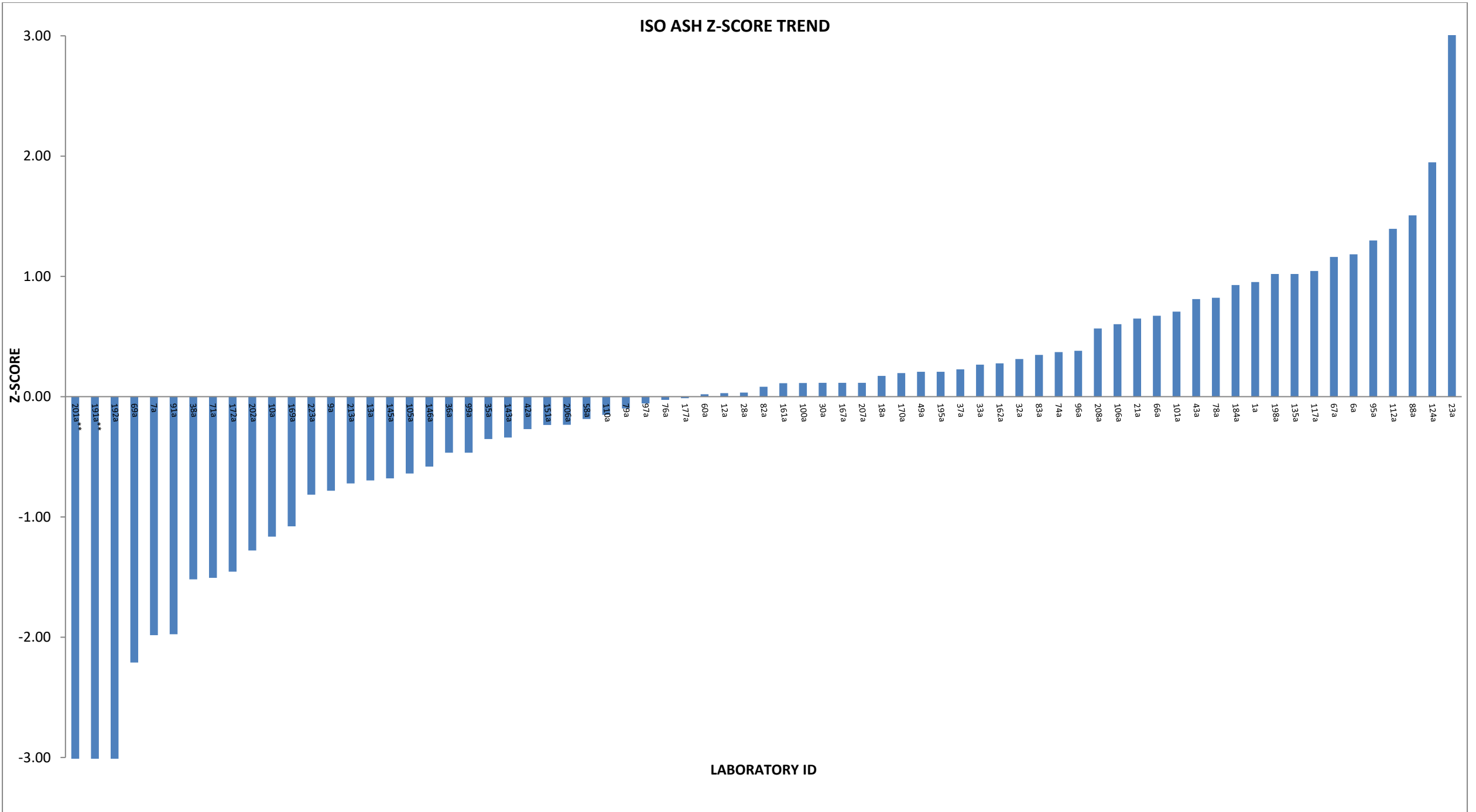
($\sigma = 0.33$ was used)

For this report $0.3 \times 0.033 = 0.099$

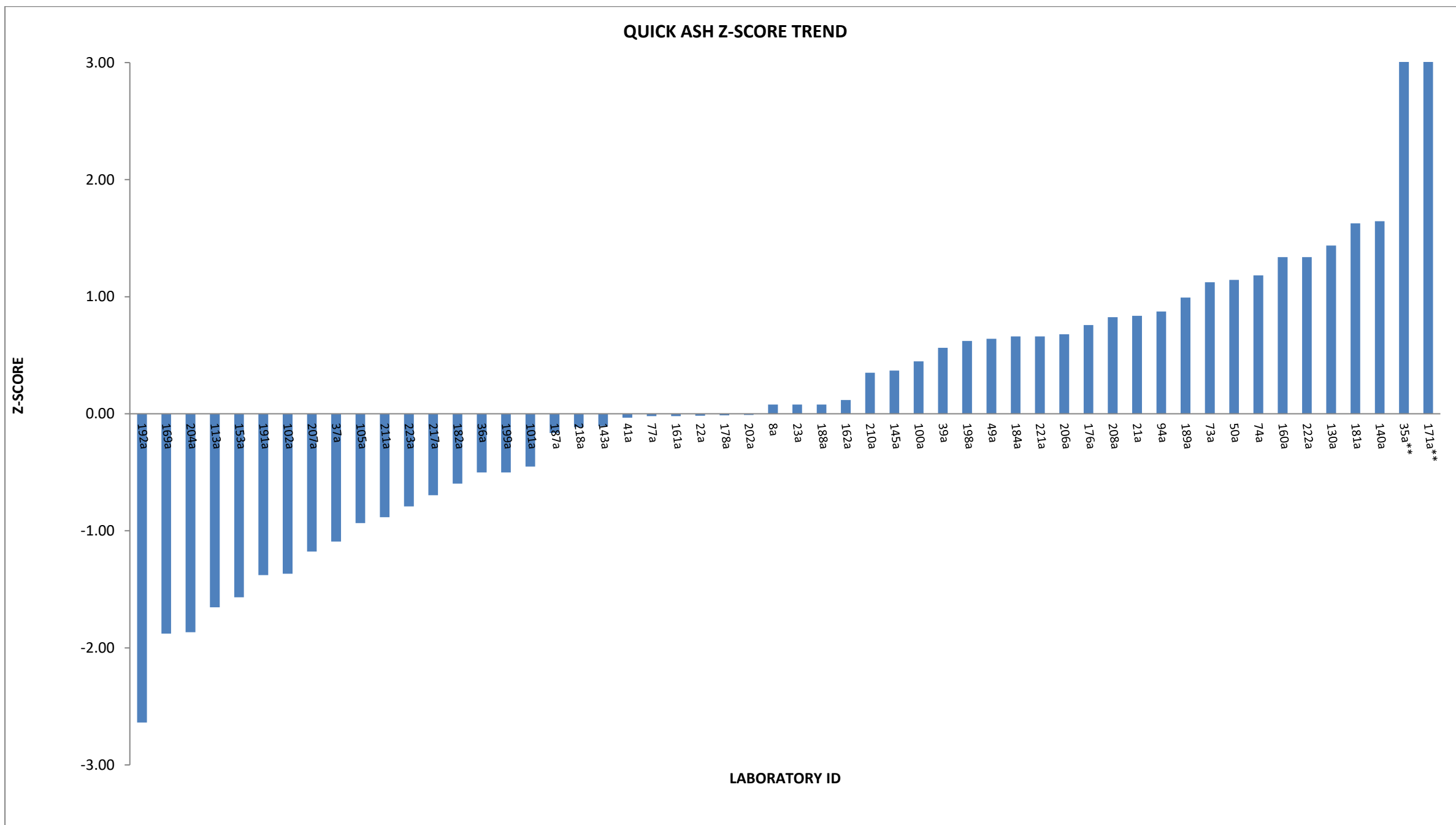
Absolute value of $(16.37 - 16.35) = 0.020$

Since $0.020 < 0.099$ the proficiency testing samples were stable

COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021					
ANALYTICAL PARAMETER : ISO ASH (%)					
LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)	
1a	2,42	16,30	16,70	0,95	
6a	1,90	16,42	16,74	1,18	
7a	1,57	16,02	16,28	-1,98	
9a	1,95	16,13	16,45	-0,78	
10a	1,80	16,10	16,40	-1,16	
12a	2,23	16,20	16,57	0,03	
13a	1,60	16,20	16,46	-0,7	
18a	1,63	16,32	16,59	0,17	
21a	2,28	16,28	16,66	0,65	
23a	1,80	16,70	17,01	3,02	
28a	1,63	16,30	16,57	0,03	
30a	1,70	16,30	16,58	0,11	
32a	1,51	16,36	16,61	0,31	
33a	1,83	16,30	16,60	0,27	
35a	1,90	16,20	16,51	-0,35	
36a	1,80	16,20	16,50	-0,47	
37a	2,40	16,20	16,60	0,23	
38a	2,10	16,00	16,34	-1,52	
42a	1,85	16,22	16,53	-0,27	
43a	1,64	16,41	16,68	0,81	
49a	1,90	16,28	16,60	0,21	
58a	1,50	16,29	16,54	-0,19	
60a	1,92	16,25	16,57	0,02	
66a	2,00	16,33	16,66	0,67	
67a	2,00	16,40	16,73	1,16	
69a	1,80	15,95	16,24	-2,21	
71a	1,50	16,10	16,35	-1,51	
74a	1,74	16,33	16,62	0,37	
76a	2,00	16,23	16,56	-0,03	
78a	0,81	16,55	16,69	0,82	
79a	2,30	16,17	16,55	-0,10	
82a	1,43	16,34	16,58	0,08	
83a	1,90	16,30	16,62	0,35	
88a	1,70	16,50	16,79	1,51	
91a	1,70	16,00	16,28	-1,97	
95a	1,52	16,50	16,75	1,30	
96a	1,75	16,33	16,62	0,38	
97a	1,43	16,32	16,56	-0,06	
99a	1,80	16,20	16,50	-0,47	
100a	1,88	16,27	16,58	0,11	
101a	1,55	16,41	16,67	0,71	
105a	1,59	16,21	16,47	-0,64	
106a	1,52	16,40	16,65	0,60	
110a	1,53	16,29	16,54	-0,15	
112a	2,20	16,40	16,77	1,40	
117a	1,90	16,40	16,72	1,04	
124a	1,60	16,58	16,85	1,95	
135a	1,76	16,42	16,71	1,02	
143a	1,91	16,20	16,52	-0,34	
145a	2,10	16,12	16,47	-0,68	
146a	1,70	16,20	16,48	-0,58	
151a	2,00	16,20	16,53	-0,24	
161a	2,30	16,20	16,58	0,11	
162a	1,84	16,30	16,61	0,28	
167a	1,70	16,30	16,58	0,11	
169a	1,51	16,16	16,41	-1,08	
170a	1,83	16,29	16,59	0,20	
172a	1,85	16,05	16,35	-1,46	
177a	1,59	16,30	16,56	-0,01	
184a	1,80	16,40	16,70	0,93	
191a**	2,10	15,60	15,93	-4,32	
192a	2,00	15,80	16,12	-3,03	
195a	1,78	16,30	16,60	0,21	
198a	1,70	16,43	16,71	1,02	
201a**	3,49	14,98	15,52	-7,14	
202a	2,31	16,00	16,38	-1,28	
206a	1,70	16,25	16,53	-0,23	
207a	1,70	16,30	16,58	0,11	
208a	1,91	16,33	16,65	0,57	
213a	1,76	16,17	16,46	-0,72	
223a	1,80	16,15	16,45	-0,82	
Number of results	-	71	71	71	-
OUTLIERS	-	-	2	2	-
AVERAGE	-	1,83	16,27	16,57	-
STD DEVIATION	-	-	0,15	0,15	-
MEDIAN	-	-	16,29	16,57	-
ROBUST AVERAGE	-	-	16,27	16,57	-
ROBUST STD DEVIATION	-	-	0,15	0,15	-
UoM	-	-	0,02	0,02	-



March 2021					
ANALYTICAL PARAMETER : QUICK ASH (%)					
LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)	
8a	1,8	16,3	16,60	0,08	
21a	2,28	16,35	16,73	0,84	
22a	1,76	16,29	16,58	-0,02	
23a	1,80	16,30	16,60	0,08	
35a**	1,90	16,90	17,23	3,66	
36a	1,80	16,20	16,50	-0,50	
37a	2,40	16,00	16,39	-1,09	
39a	1,70	16,40	16,68	0,56	
41a	1,32	16,36	16,58	-0,03	
49a	1,90	16,38	16,70	0,64	
50a	1,70	16,50	16,79	1,14	
73a	3,05	16,27	16,78	1,12	
74a	1,74	16,50	16,79	1,18	
77a	2,30	16,20	16,58	-0,02	
94a	1,84	16,43	16,74	0,87	
100a	1,88	16,35	16,66	0,45	
101a	1,55	16,25	16,51	-0,45	
102a	1,50	16,10	16,35	-1,37	
105a	1,59	16,16	16,42	-0,93	
113a	1,81	16,00	16,29	-1,65	
130a	2,00	16,50	16,84	1,44	
140a	2,33	16,48	16,87	1,64	
143a	1,91	16,25	16,57	-0,11	
145a	2,10	16,30	16,65	0,37	
153a	1,90	16,00	16,31	-1,57	
160a	1,90	16,50	16,82	1,34	
161a	2,30	16,20	16,58	-0,02	
162a	1,84	16,30	16,61	0,12	
169a	1,51	16,01	16,26	-1,88	
171a**	2,48	17,08	17,51	5,30	
176a	1,90	16,40	16,72	0,76	
178a	1,10	16,40	16,58	-0,01	
181a	1,60	16,60	16,87	1,63	
182a	1,70	16,20	16,48	-0,60	
184a	1,80	16,40	16,70	0,66	
187a	2,15	16,20	16,56	-0,16	
188a	1,80	16,30	16,60	0,08	
189a	2,44	16,35	16,76	0,99	
191a	2,10	16,00	16,34	-1,38	
192a	2,00	15,80	16,12	-2,64	
198a	1,70	16,41	16,69	0,62	
199a	1,80	16,20	16,50	-0,50	
202a	2,31	16,20	16,58	-0,01	
204a	2,20	15,90	16,26	-1,87	
206a	1,70	16,42	16,70	0,68	
207a	1,70	16,10	16,38	-1,18	
208a	1,91	16,41	16,73	0,83	
210a	1,90	16,33	16,65	0,35	
211a	1,40	16,20	16,43	-0,88	
217a	1,90	16,15	16,46	-0,70	
218a	1,90	16,25	16,56	-0,11	
221a	1,80	16,40	16,70	0,66	
222a	1,90	16,50	16,82	1,34	
223a	1,80	16,15	16,45	-0,79	
Number of results	-	54	54	-	
OUTLIERS	-	2	2	-	
AVERAGE	-	1,90	16,27	16,58	-
STD DEVIATION	-	-	0,17	0,18	-
MEDIAN			16,30	16,59	
ROBUST AVERAGE	-	-	16,28	16,59	
ROBUST STD DEVIATION	-	-	0,18	0,20	
UoM			0,03	0,03	

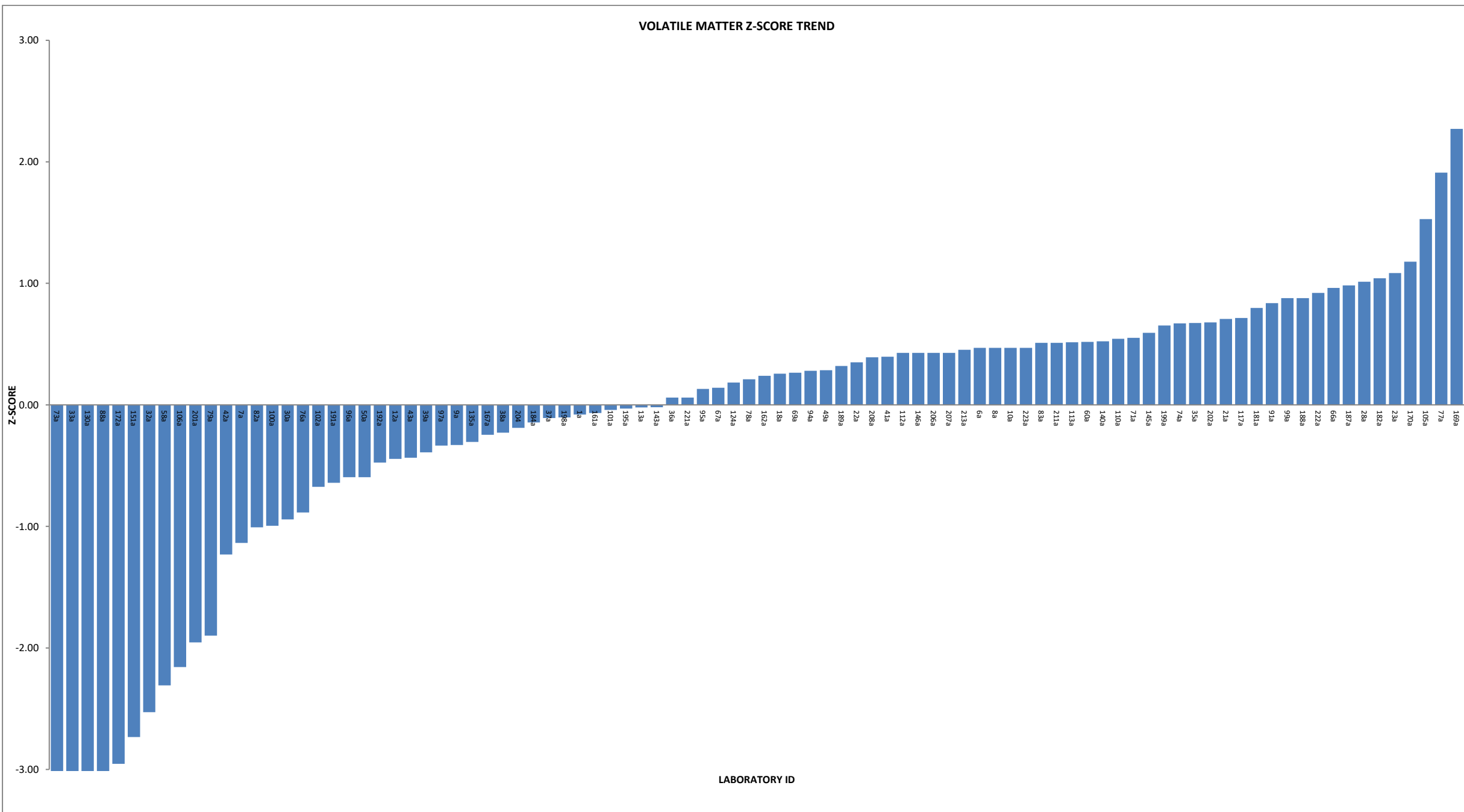


COAL CONCEPTS - PROFICIENCY TESTING - MARCH 2021
ANALYTICAL PARAMETER : ISO VOLATILE MATTER(%)

LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
1a	2,42	19,21	19,69	-0,08
6a	1,90	19,58	19,96	0,47
7a	1,57	18,86	19,16	-1,14
8a	1,80	19,60	19,96	0,47
9a	1,95	19,18	19,56	-0,33
10a	1,80	19,60	19,96	0,47
12a	2,23	19,07	19,50	-0,44
13a	1,60	19,40	19,72	-0,02
18a	1,63	19,53	19,85	0,26
21a	2,28	19,62	20,08	0,71
22a	1,76	19,55	19,90	0,35
23a	1,80	19,90	20,26	1,08
28a	1,63	19,90	20,23	1,01
30a	1,70	18,93	19,26	-0,94
32a	1,51	18,19	18,47	-2,53
33a	1,83	16,97	17,29	-4,91
35a	1,90	19,68	20,06	0,67
36a	1,80	19,40	19,76	0,06
37a	2,40	19,20	19,67	-0,11
38a	2,10	19,20	19,61	-0,23
39a	1,70	19,20	19,53	-0,39
41a	1,32	19,66	19,92	0,40
42a	1,85	18,76	19,11	-1,23
43a	1,64	19,19	19,51	-0,43
49a	1,90	19,49	19,87	0,28
50a	1,70	19,10	19,43	-0,59
58a	1,50	18,30	18,58	-2,31
60a	1,92	19,60	19,98	0,52
66a	2,00	19,80	20,20	0,96
67a	2,00	19,40	19,80	0,14
69a	1,80	19,50	19,86	0,26
71a	1,50	19,70	20,00	0,55
73a	3,05	15,12	15,60	-8,31
74a	1,74	19,71	20,06	0,67
76a	2,00	18,90	19,29	-0,89
77a	2,30	20,20	20,68	1,91
78a	0,81	19,67	19,83	0,21
79a	2,30	18,35	18,78	-1,90
82a	1,43	18,95	19,22	-1,01
83a	1,90	19,60	19,98	0,51
88a	1,70	17,90	18,21	-3,05
91a	1,70	19,80	20,14	0,84
94a	1,84	19,50	19,87	0,28
95a	1,52	19,49	19,79	0,13
96a	1,75	19,09	19,43	-0,60
97a	1,43	19,28	19,56	-0,33
99a	1,80	19,80	20,16	0,88
100a	1,88	18,87	19,23	-0,99
101a	1,55	19,40	19,71	-0,04
102a	1,50	19,10	19,39	-0,67
105a	1,59	20,16	20,49	1,53
106a	1,52	18,37	18,65	-2,16
110a	1,53	19,69	20,00	0,54
112a	2,20	19,50	19,94	0,43
113a	1,81	19,62	19,98	0,51
117a	1,90	19,70	20,08	0,72
124a	1,60	19,50	19,82	0,18
130a	2,00	17,30	17,65	-4,17
135a	1,76	19,23	19,57	-0,30
140a	2,33	19,52	19,99	0,52
143a	1,91	19,34	19,72	-0,02
145a	2,10	19,60	20,02	0,59
146a	1,70	19,60	19,94	0,43
151a	2,00	18,00	18,37	-2,73
161a	2,30	19,24	19,69	-0,07
162a	1,84	19,48	19,85	0,24
167a	1,70	19,27	19,60	-0,25
169a	1,51	20,54	20,85	2,27
170a	1,83	19,94	20,31	1,18
172a	1,85	17,92	18,26	-2,95
181a	1,60	19,80	20,12	0,80
182a	1,70	19,90	20,24	1,04
184a	1,80	19,30	19,65	-0,14
187a	2,15	19,78	20,21	0,98
188a	1,80	19,80	20,16	0,88
189a	2,44	19,40	19,89	0,32
191a	2,10	19,00	19,41	-0,64
192a	2,00	19,10	19,49	-0,47
195a	1,78	19,36	19,71	-0,03
198a	1,70	19,34	19,67	-0,10
199a	1,80	19,69	20,05	0,65
201a	3,49	18,10	18,75	-1,95
202a	2,31	19,60	20,06	0,68
204	2,20	19,20	19,63	-0,19
206a	1,70	19,60	19,94	0,43
207a	1,70	19,60	19,94	0,43
208a	1,91	19,54	19,92	0,39
211a	1,40	19,70	19,98	0,51
213a	1,76	19,60	19,95	0,45
221a	1,80	19,40	19,76	0,06
222a	1,90	19,80	20,18	0,92
223a	1,80	19,60	19,96	0,47

NUMBER OF RESULTS	-	91	91	91	-
OUTLIERS	-	-	3	3	-
AVERAGE	-	1,85	19,36	19,73	-
STD DEVIATION	-	-	0,50	0,50	-
MEDIAN	-	-	19,50	19,85	-
ROBUST AVERAGE	-	-	19,37	19,73	-
ROBUST STD DEVIATION	-	-	0,52	0,53	-
UoM	-	-	0,07	0,07	-

VOLATILE MATTER Z-SCORE TREND



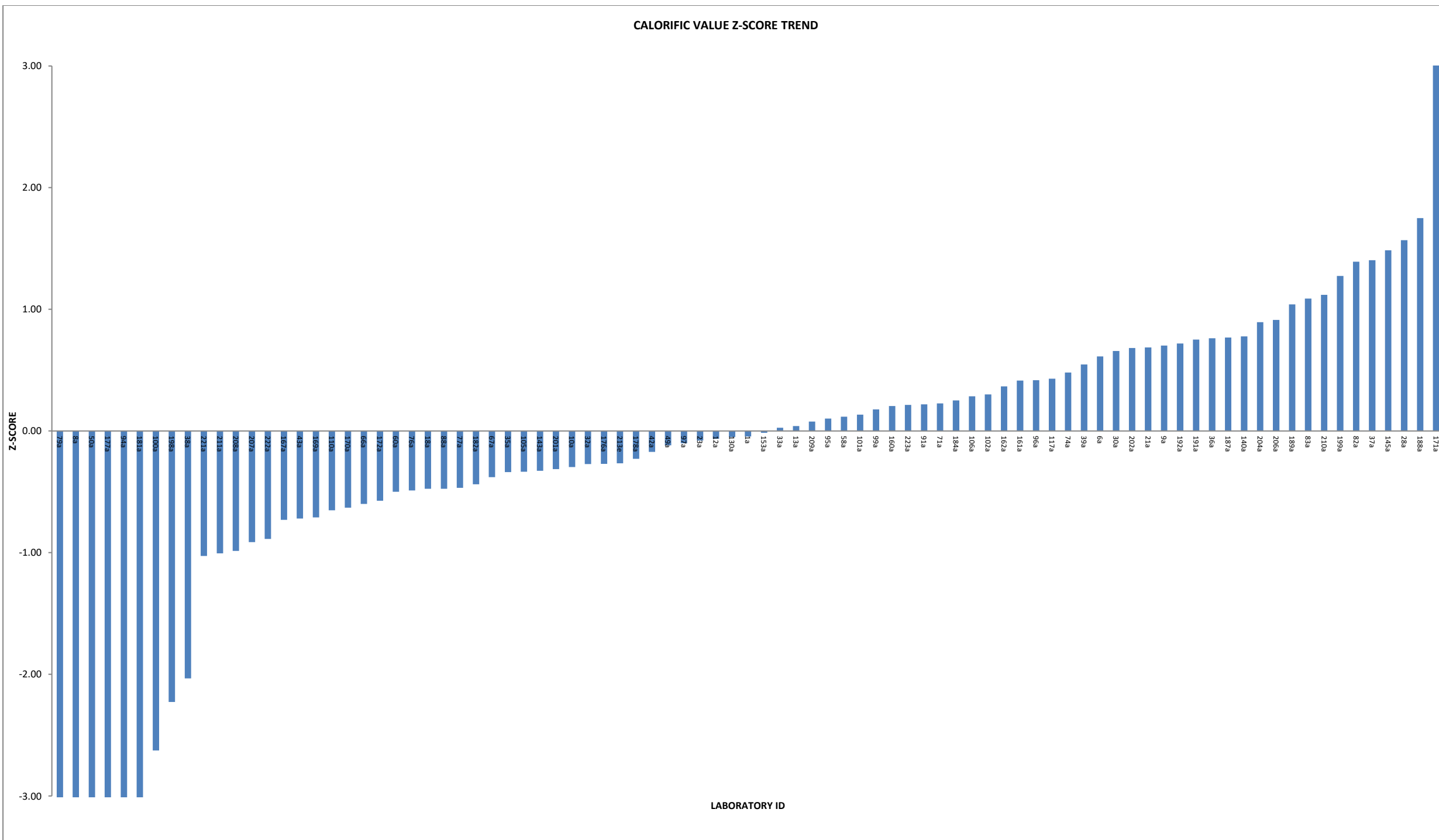
LABORATORY ID

COAL CONCEPTS - PROFICIENCY TESTING - MARCH 2021

ANALYTICAL PARAMETER : CALORIFIC VALUE (MJ/kg)

LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (MJ/kg)	DRY BASE (MJ/kg)	Z-SCORE (DRY BASE)
1a	2,42	28,10	28,80	-0,05
6a	1,90	28,43	28,98	0,61
8a	1,80	26,21	26,69	-7,60
9a	1,95	28,44	29,01	0,70
10a	1,80	28,21	28,73	-0,30
12a	2,23	28,15	28,79	-0,06
13a	1,60	28,36	28,82	0,04
18a	1,63	28,21	28,68	-0,48
21a	2,28	28,34	29,00	0,69
23a	1,80	28,27	28,79	-0,08
28a	1,63	28,77	29,25	1,57
30a	1,70	28,50	28,99	0,66
32a	1,51	28,30	28,73	-0,27
33a	1,83	28,29	28,82	0,03
35a	1,90	28,17	28,72	-0,3
36a	1,80	28,50	29,02	0,76
37a	2,40	28,50	29,20	1,40
38a	2,10	27,65	28,24	-2,03
39a	1,70	28,47	28,96	0,55
42a	1,85	28,23	28,76	-0,17
43a	1,64	28,14	28,61	-0,72
49a	1,90	28,23	28,78	-0,12
50a	1,70	26,81	27,27	-5,51
58a	1,50	28,41	28,84	0,12
60a	1,92	28,12	28,67	-0,50
66a	2,00	28,07	28,64	-0,60
67a	2,00	28,13	28,70	-0,38
71a	1,50	28,44	28,87	0,23
74a	1,74	28,44	28,94	0,48
76a	2,00	28,10	28,67	-0,49
77a	2,30	28,02	28,68	-0,47
79a	2,30	24,90	25,49	-11,93
82a	1,43	28,78	29,20	1,39
83a	1,90	28,56	29,11	1,09
88a	1,70	28,19	28,68	-0,47
91a	1,70	28,38	28,87	0,22
94a	1,84	27,40	27,91	-3,22
95a	1,52	28,40	28,84	0,10
96a	1,75	28,42	28,93	0,4
97a	1,43	28,37	28,78	-0,10
99a	1,80	28,34	28,86	0,18
100a	1,88	27,55	28,08	-2,63
101a	1,55	28,40	28,85	0,13
102a	1,50	28,46	28,89	0,30
105a	1,59	28,26	28,72	-0,33
106a	1,52	28,45	28,89	0,28
110a	1,53	28,19	28,63	-0,65
117a	1,90	28,38	28,93	0,43
130a	2,00	28,22	28,80	-0,05
140a	2,33	28,35	29,03	0,78
143a	1,91	28,17	28,72	-0,33
145a	2,10	28,61	29,22	1,48
153a	1,86	28,27	28,81	-0,01
160a	1,86	28,33	28,87	0,20
161a	2,30	28,26	28,93	0,41
162a	1,84	28,38	28,91	0,37
167a	1,70	28,12	28,61	-0,73
169a	1,51	28,18	28,61	-0,71
170a	1,83	28,11	28,63	-0,63
171a	2,48	28,96	29,70	3,18
172a	1,85	28,12	28,65	-0,57
176a	1,86	28,20	28,73	-0,27
177a	1,59	26,91	27,34	-5,26
178a	1,10	28,43	28,75	-0,23
181a	1,60	27,47	27,92	-3,20
182a	1,70	28,20	28,69	-0,44
184a	1,80	28,36	28,88	0,25
187a	2,15	28,40	29,02	0,77
188a	1,80	28,77	29,30	1,75
189a	2,44	28,39	29,10	1,04
191a	2,10	28,41	29,02	0,75
192a	2,00	28,43	29,01	0,72
198a	1,70	27,71	28,19	-2,23
199a	1,80	28,64	29,16	1,27
201a	3,49	27,72	28,72	-0,31
202a	2,31	28,33	29,00	0,68
204a	2,20	28,42	29,06	0,90
206a	1,70	28,57	29,06	0,91
207a	1,70	28,07	28,56	-0,91
208a	1,91	27,99	28,54	-0,99
209a	2,19	28,20	28,83	0,08
210a	1,86	28,58	29,12	1,12
211a	1,40	28,13	28,53	-1,01
213e	1,76	28,23	28,74	-0,27
221a	1,80	28,01	28,52	-1,03
222a	1,90	28,02	28,56	-0,89
223a	1,80	28,35	28,87	0,21
NUMBER OF RESULTS	-	87	87	-
OUTLIERS	-	-	4	-
AVERAGE	-	1,86	28,27	28,81
STD DEVIATION	-	-	0,27	0,28
MEDIAN	-	-	28,30	28,82
ROBUST AVERAGE	-	-	28,27	28,81
ROBUST STD DEVIATION	-	-	0,28	0,28
UoM	-	-	0,04	0,04

CALORIFIC VALUE Z-SCORE TREND

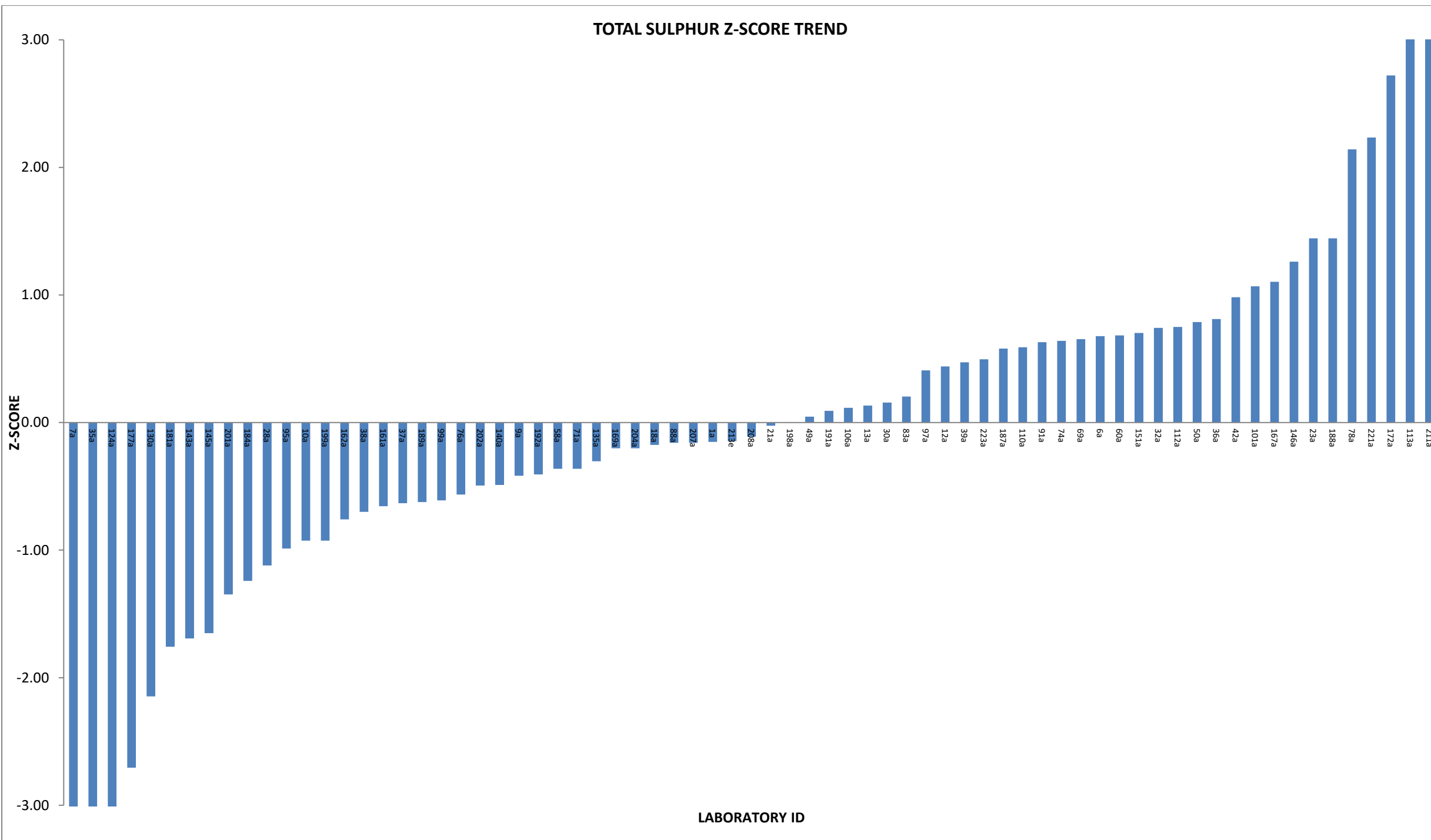


COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021

ANALYTICAL PARAMETER : TOTAL SULPHUR (%)

LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
1a	2,42	1,42	1,46	-0,15
6a	1,90	1,48	1,51	0,68
7a	1,57	0,88	0,89	-8,86
9a	1,95	1,41	1,44	-0,42
10a	1,80	1,38	1,41	-0,93
12a	2,23	1,46	1,49	0,44
13a	1,60	1,45	1,47	0,13
18a	1,63	1,43	1,45	-0,17
21a	2,28	1,43	1,46	-0,02
23a	1,80	1,53	1,56	1,44
28a	1,63	1,37	1,39	-1,12
30a	1,70	1,45	1,48	0,16
32a	1,51	1,49	1,51	0,74
35a	1,90	1,00	1,02	-6,91
36a	1,80	1,49	1,52	0,81
37a	2,40	1,39	1,42	-0,63
38a	2,10	1,39	1,42	-0,70
39a	1,70	1,47	1,50	0,47
42a	1,85	1,50	1,53	0,98
49a	1,90	1,44	1,47	0,05
50a	1,70	1,49	1,52	0,79
58a	1,50	1,42	1,44	-0,36
60a	1,92	1,48	1,51	0,68
69a	1,80	1,48	1,51	0,65
71a	1,50	1,42	1,44	-0,36
74a	1,74	1,48	1,51	0,64
76a	2,00	1,40	1,43	-0,56
78a	0,81	1,59	1,60	2,14
83a	1,90	1,45	1,48	0,20
88a	1,70	1,43	1,45	-0,16
91a	1,70	1,48	1,51	0,63
95a	1,52	1,38	1,40	-0,99
97a	1,43	1,47	1,49	0,41
99a	1,80	1,40	1,43	-0,61
101a	1,55	1,51	1,53	1,07
106a	1,52	1,45	1,47	0,12
110a	1,53	1,48	1,50	0,59
112a	2,20	1,48	1,51	0,75
113a	1,81	1,68	1,71	3,82
124a	1,60	1,15	1,17	-4,60
130a	2,00	1,30	1,33	-2,15
135a	1,76	1,42	1,45	-0,30
140a	2,33	1,40	1,43	-0,49
143a	1,91	1,33	1,36	-1,69
145a	2,10	1,33	1,36	-1,65
146a	1,70	1,52	1,55	1,26
151a	2,00	1,48	1,51	0,70
161a	2,30	1,39	1,42	-0,66
162a	1,84	1,39	1,42	-0,76
167a	1,70	1,51	1,54	1,10
169a	1,51	1,43	1,45	-0,20
172a	1,85	1,61	1,64	2,72
177a	1,59	1,27	1,29	-2,71
181a	1,60	1,33	1,35	-1,76
184a	1,80	1,36	1,38	-1,24
187a	2,15	1,47	1,50	0,58
188a	1,80	1,53	1,56	1,44
189a	2,44	1,39	1,42	-0,62
191a	2,10	1,44	1,47	0,09
192a	2,00	1,41	1,44	-0,41
198a	1,70	1,44	1,46	0,00
199a	1,80	1,38	1,41	-0,93
201a	3,49	1,33	1,38	-1,35
202a	2,31	1,40	1,43	-0,49
204a	2,20	1,42	1,45	-0,20
207a	1,70	1,43	1,45	-0,16
208a	1,91	1,43	1,46	-0,11
211a	1,40	1,73	1,75	4,49
213e	1,76	1,43	1,46	-0,14
221a	1,80	1,58	1,61	2,23
223a	1,80	1,47	1,50	0,50
NUMBER OF RESULTS	71	71	71	-
OUTLIERS	-	5	5	-
AVERAGE	1,85	1,44	1,46	-
MEDIAN	-	1,43	1,46	-
STD DEVIATION	-	0,06	0,06	-
ROBUST AVERAGE	-	1,44	1,46	-
ROBUST STD DEVIATION	-	0,07	0,07	-
UoM	-	0,01	0,01	-

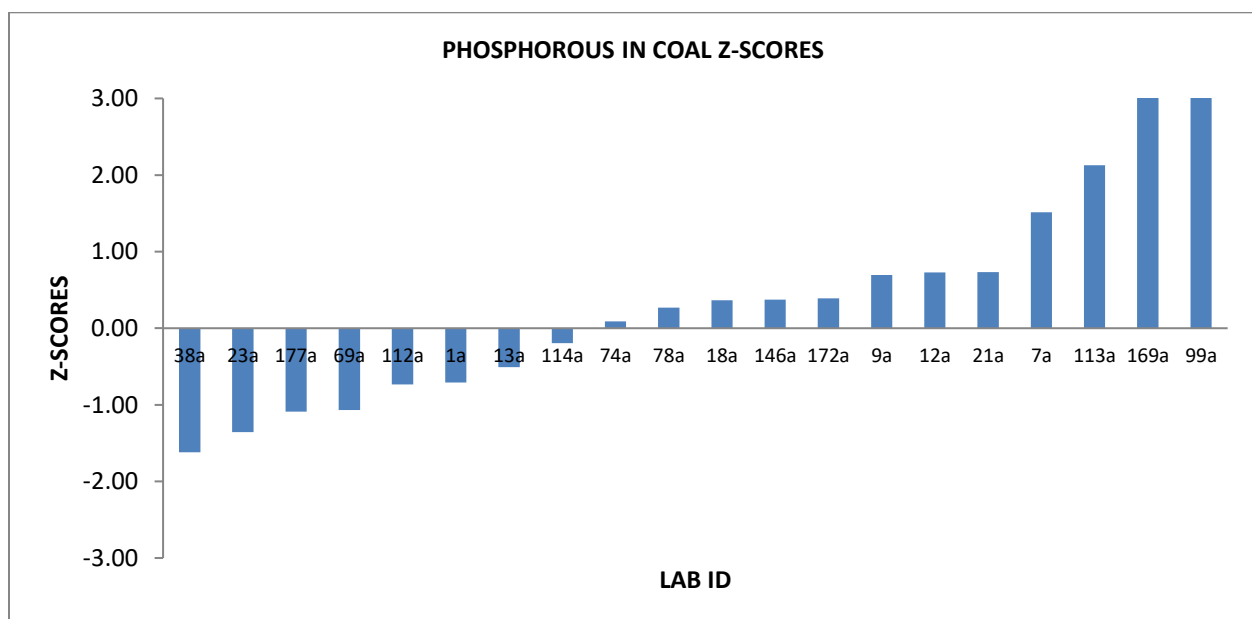
TOTAL SULPHUR Z-SCORE TREND



COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021

ANALYTICAL PARAMETER : PHOSPHOROUS IN COAL (%)

	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	2,42	0,036	0,037	-0,71
	7a	1,57	0,044	0,045	1,52
	9a	1,95	0,041	0,042	0,69
	12a	2,23	0,041	0,042	0,73
	13a	1,60	0,037	0,038	-0,51
	18a	1,63	0,040	0,041	0,36
	21a	2,28	0,041	0,042	0,73
	23a	1,80	0,034	0,035	-1,36
	38a	2,10	0,033	0,034	-1,62
	69a	1,80	0,035	0,036	-1,07
	74a	1,74	0,039	0,040	0,09
	78a	0,81	0,040	0,040	0,27
	99a	1,80	0,210	0,214	49,74
	112a	2,20	0,036	0,037	-0,73
	113a	1,81	0,046	0,047	2,13
	114a	1,81	0,038	0,039	-0,20
	146a	1,70	0,040	0,041	0,37
	169a	1,51	0,077	0,078	11,06
	172a	1,85	0,040	0,041	0,39
	177a	1,59	0,035	0,036	-1,09
Number of results	-	20	20	20	-
OUTLIERS	-	-	2	2	-
AVERAGE	-	1,81	0,039	0,039	-
STD DEVIATION	-	-	0,003	0,004	-
MEDIAN	-	-	0,040	0,040	-
ROBUST AVERAGE	-	-	0,039	0,039	-
ROBUST STD DEVIATION	-	-	0,004	0,004	-
UoM	-	-	0,001	0,001	-



COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021					
ANALYTICAL PARAMETER : TOTAL CARBON (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	2,42	69,68	71,41	-1,20
	9a	1,95	71,77	73,20	1,44
	12a	2,23	70,37	71,98	-0,36
	18a	1,63	70,60	71,77	-0,66
	21a	2,28	71,33	72,99	1,14
	42a	1,85	71,02	72,36	0,21
	43a	1,64	70,94	72,12	-0,14
	49a	1,90	69,73	71,08	-1,68
	74a	1,74	73,87	75,18	4,37
	99a	1,80	70,70	72,00	-0,33
	177a	1,59	71,30	72,45	0,34
	202a	2,31	71,36	73,05	1,22
Number of results	-	12	12	12	-
OUTLIERS	-	-	1	1	-
AVERAGE	-	1,95	70,80	72,22	-
MEDIAN	-	-	70,94	72,12	-
STD DEVIATION	-	-	0,67	0,68	-
ROBUST AVERAGE	-	-	70,82	72,24	-
ROBUST STD DEVIATION	-	-	0,83	0,84	-
UoM	-	-	0,31	0,32	-

COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021					
ANALYTICAL PARAMETER : HYDROGEN (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	2,42	3,59	3,68	-0,08
	9a	1,95	3,65	3,72	0,26
	12a	2,23	3,77	3,86	1,29
	18a	1,63	3,52	3,58	-0,86
	21a	2,28	3,50	3,58	-0,83
	42a	1,85	3,51	3,58	-0,88
	43a	1,64	3,79	3,85	1,27
	99a	1,80	3,57	3,64	-0,42
	177a	1,59	3,81	3,87	1,41
	202a	2,31	3,46	3,54	-1,14
Number of results	-	10	10	10	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	1,97	3,62	3,69	-
MEDIAN	-	-	3,58	3,66	-
STD DEVIATION	-	-	0,13	0,13	-
ROBUST AVERAGE	-	-	3,61	3,69	-
ROBUST STD DEVIATION	-	-	0,19	0,19	-
UoM	-	-	0,07	0,08	-

COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021					
ANALYTICAL PARAMETER : NITROGEN(%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	2,42	1,82	1,87	-0,65
	9a	1,95	2,01	2,05	2,22
	12a	2,23	1,84	1,88	-0,39
	18a	1,63	1,82	1,85	-0,9
	42a	1,85	1,91	1,95	0,6
	43a	1,64	1,92	1,95	0,7
	99a	1,80	1,83	1,86	-0,7
	177a	1,59	1,85	1,88	-0,4
	192a**	2,00	2,92	2,98	16,6
	202a	2,31	1,83	1,87	-0,5
Number of results	-	10	10	10	-
OUTLIERS	-	-	1	1	-
AVERAGE	-	1,94	1,87	1,91	-
MEDIAN	-	-	1,84	1,88	-
STD DEVIATION	-	-	0,06	0,06	-
ROBUST AVERAGE	-	-	1,86	1,89	-
ROBUST STD DEVIATION	-	-	0,07	0,07	-
UoM	-	-	0,03	0,03	-

COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021				
ANALYTICAL PARAMETER : ASH FUSION TEMPERATURES (oC)				
LAB ID	DEFORMATION	SOFTENING	HEMISPHERE	FLOW
1a	1300	1330	1350	1390
9a	1440	1445	1460	1475
10a	1320	1340	1370	1390
18a	1310	1330	1350	1380
21a	1390	1420	1460	1490
23a	1380	1410	1460	1500
28a	1300	1410	1450	1460
38a	1385	1415	1445	1455
42a	1420	1440	1460	1480
49a	1290	1340	1400	1460
60a	1273	1327	1405	1476
83a	1300	1340	1440	1450
95a	1400	1420	1460	1480
99a	1378	1407	1442	1497
145a	1420	1450	1470	1480
151a	1260	1340	1400	1450
167a	1340	1370	1400	1430
Number of results	17	17	17	17
Outliers	0	0	0	0
AVERAGE	1347	1384	1425	1455
MEDIAN	1340	1407	1442	1460
STDEV	57	46	40	38
REPRODUCIBILITY				
UPPER LIMIT	1427	1444	1485	1500
LOWER LIMIT	1267	1324	1365	1375

Z-SCORES				
LAB ID	DEFORMATION	SOFTENING	HEMISPHERE	FLOW
1a	-0,83	-1,18	-1,85	-1,74
9a	1,62	1,32	0,87	0,52
10a	-0,48	-0,97	-1,35	-1,74
18a	-0,65	-1,18	-1,85	-2,01
21a	0,74	0,78	0,87	0,92
23a	0,57	0,56	0,87	1,19
28a	-0,83	0,56	0,62	0,12
38a	0,66	0,67	0,50	-0,01
42a	1,27	1,21	0,87	0,65
49a	-1,00	-0,97	-0,61	0,12
60a	-1,30	-1,25	-0,49	0,55
83a	-0,83	-0,97	0,37	-0,15
95a	0,92	0,78	0,87	0,65
99a	0,53	0,49	0,42	1,11
145a	1,27	1,43	1,12	0,65
151a	-1,53	-0,97	-0,61	-0,15
167a	-0,13	-0,31	-0,61	-0,68

COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021					
ANALYTICAL PARAMETER : ASTM ASH (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)
	1a	2,42	16,31	16,71	0,72
	12a	1,81	16,28	16,58	-0,14
	202a	2,31	16,01	16,39	-1,36
	209a	2,19	16,36	16,72	0,78
Number of results	-	4	4	4	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	2,12	16,24	16,60	-
STD DEVIATION	-	-	0,16	0,16	-
MEDIAN	-	-	16,30	16,65	-

COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021					
ANALYTICAL PARAMETER : ASTM VOLS (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)
	1a	2,42	20,26	20,76	0,70
	12a	1,81	20,52	20,90	1,01
	202a	2,31	19,59	20,05	-0,92
	209a	2,19	19,67	20,11	-0,79
Number of results	-	4	4	4	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	2,12	20,01	20,46	-
STD DEVIATION	-	-	0,45	0,44	-
MEDIAN	-	-	19,97	20,44	-

COAL CONCEPTS - PROFICIENCY TESTING -MARCH 2021					
ANALYTICAL PARAMETER : FLUORINE (ppm)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	12a	2.23	128	131	na
	169a	1.51	160	163	na
Number of results	-	2	2	2	-
OUTLIERS	-	-	-	-	-
AVERAGE	-	1.51	144	147	-
STD DEVIATION	-	-	na	na	-
MEDIAN	-	-	na	na	-

CONCLUSIONS

1. The ISO Ash z-score trend is evenly distributed. The Robust average, Median and Average are the same at 16.57%.
2. The overall ISO volatile trend is positively biased. Three outliers were detected. These seemed to be due to calculation and analytical errors.
3. Calorific value trend is evenly distributed. Four outliers were detected. These were due to analytical errors.
4. The sulphur z-score trend is evenly distributed. The average and robust average are the same. Five extreme outliers were detected. These were due to analytical errors.
5. Phosphorous analysis: The z-score trend is positively biased. Two outliers were detected.
6. Carbon, Hydrogen and Nitrogen: Generally acceptable results were obtained on Carbon and Hydrogen. One outlier was detected on Carbon and one on Nitrogen
7. No outliers were detected on Ash fusion. Generally, well done

COAL CONCEPTS: Terms and ConditionsReturn of results:

Laboratories participate in proficiency testing programs on the understanding that they will be sharing their results and information **anonymously** with other laboratories performing the same analysis. No return of results compromises the spirit of the programs, and reports will not be sent to laboratories unless they return results. Payment in full is required from all laboratories enrolling whether they return results or not.

Errors in Participant Proficiency Testing Results:

Proficiency testing reports should reflect the level of accuracy that a regular testing client would receive.

If a participant finds an error in their proficiency testing results, they may notify us in writing and change their submission **PRIOR** to the due date for return. Changes after this time will not be accepted.

Coal Concepts' reports results *as submitted* by participants.

On occasion, it seems as though participants have mixed up the samples or not processed the samples according to the instructions. Coal Concepts cannot make assumptions of this nature and change results 'to suit'. We also cannot compromise the integrity of the programs by suggesting to some participants that they should review their results prior to the due date. (This is unfair to other participants) It is the responsibility of the participants to check all aspects of the program, including sample identification, preparation, testing instructions, calculations and reporting of the results prior to results submission.

If samples are not in good condition on arrival to the participant laboratory, Coal Concepts must be notified in writing IMMEDIATELY, as often samples can be replaced in good time. Claims about samples received in bad condition will not be accepted after the report has been issued.

Late Enrolments and Late Results:

Late enrolment requests cannot always be accommodated, as sample manufacture must be scheduled well in advance to the shipping date of the program to allow all necessary quality assurance activities to be carried out.

Shipping of PT materials and evaluating test results from PTPs out of cycle with the mainstream programs is considerably time consuming and therefore costly.

In order not to disadvantage participants able to comply with time frames, Coal Concepts may charge a late fee in the following circumstances:

Requests that Coal concepts staff enters results on behalf of participants

Requests to record results after the due date

Requests for PTP participation that is out of cycle with the scheduled dates

Shipping fees and Customs clearance:

Costs incurred for shipping samples and clearance of same through customs are the responsibility of the participating laboratory unless otherwise indicated

Non-payment of fees:

Coal Concepts retains the right to withhold reports and/or test materials and services when invoices are outstanding.

Confidentiality of results:

All data and information received by Coal Concepts from its clients are considered confidential unless the client has given express permission to pass on information.

Definitions:

The dictionary definitions of "collusion" and "falsification" are as follows.

· *Collusion*: A secret agreement or cooperation for a fraudulent or deceitful purpose.

· *Falsification*: Deliberately changing something to be false. In proficiency testing terms, collusion is comparing data (and perhaps changing data) to fit in with a believed "correct" result. This is contrary to the spirit of proficiency testing programs, which are issued with the intention of providing an objective comparison of a laboratory's performance with others. Coal Concepts tries to minimise the occurrence of collusion by being aware that laboratories should be objective when they report their results, and should therefore not know the intended results at the time they are reporting to us.

Answers are not provided to clients until results have been submitted.

To prevent collusion and falsification our advice to clients is:

DON'T confer with others about PT samples or results.

DO accept the fact that everyone makes errors.

DON'T average the results or opinions of every person in the laboratory before selecting the answer to be submitted. Instead, use one of the answers AS SUBMITTED to you and take advantage of the Coal Concepts internal QA services and submit all answers generated by the technicians.

DO have confidence in your own results.

Proficiency Testing (PT) is a compulsory part of laboratory accreditation, but it is also an important tool for giving you confidence in your results. "Enhancing" your PT results with assistance from another participant cannot increase confidence in your laboratory's performance.

Coal concepts' testing staff are not told what the expected results are, nor what we are expecting.

We subject ALL results to analysis, even if they are different.

The staff have the right to check that the results we enter on their behalf are correctly transcribed.

Clients are always welcome to contact Coal Concepts to seek advice or information about collusion or falsification of data.

Policy for Participant Appeal of PT Performance Assessment:

If participants disagree with their performance assessment in a proficiency report, they should inform Coal Concepts in writing.

The response will include Coal Concepts interpretation of the outcome of the reassessment and an explanation of that outcome. (For example, explanation of a calculation, or the rationale for the outcome of the evaluation.)

If a mistake has been made by Coal Concepts, it will be dealt with via Coal Concepts' non-conformance system.

Liability

In no event shall a party's liability to the other party for direct damages exceed an amount equal to the value of the amount for the PT Programme, under that specific month

End of report