PROBABILISTIC APPROACH TO MINERAL RESOURCE DEFINITION

The Venmyn Variance Tower

by Iaan Myburgh

In recent years, Venmyn has been working closely with our associate geostatistician to define statistical boundaries between Inferred, Indicated and Measured Resource categories. This Probabilistic approach is similar to methods used in the Oil and Gas industry.

Venmyn has worked closely with Carina Lemmer on this process and established a practice which is becoming more popular with all our clients.

Venmyn has now generated its own propriety variance analysis software. This software assesses the variance of the samples about the true mean and is used to give an initial classification of the Mineral Resource based on this variance. The software also gives an indication as to the number of boreholes needed to upgrade the Mineral Resource classification from an Inferred Mineral Resource to an Indicated Mineral Resource, and from an Indicated Mineral Resource to a Measured Mineral Resource.

The classification of a Mineral Resource is based on the confidence one has that the mean grade obtained from a sample is representative of the mean grade of the entire ore body. A variance about the mean of <10% is classified as a Measured Mineral Resource, 10-20% as an Indicated Mineral Resource and >20% as an Inferred Mineral Resource.

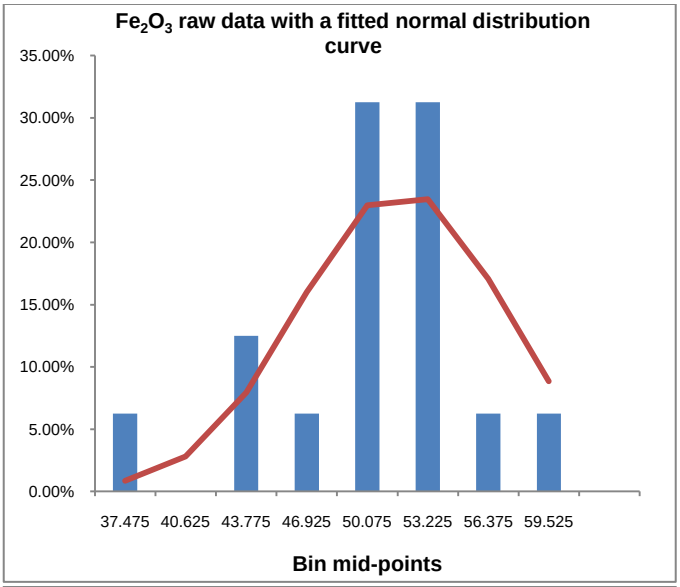
The software can handle both normally distributed as well as lognormally distributed data, and the appropriate statistics for small and large sample sizes are used. Output is represented graphically and easily interpreted, with the Venmyn Variance Tower giving the percentage the true mean could be above or below the sampled mean with a 95% confidence level, and the number of boreholes required to reach a required variance.

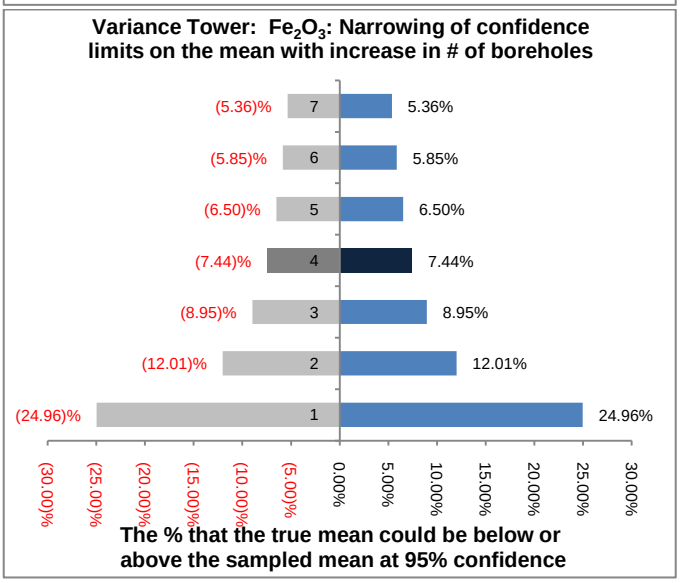
The following example uses data from a block with four (4) boreholes, samples taken in 3m intervals, from a tailings dam where we test the Fe_2O_3 percentage. The borehole data is given in the table below:-

BHID	FROM	TO	Fe2O3
WMS16 2001_02_03	0.00	3.00	54.43
WMS16 2004_05_06.	3.00	6.00	54.30
WMS16 2007_08_09	6.00	9.00	50.13
WMS16 2010_11_12	9.00	12.00	54.50
WMS 15 2014_15_16	0.00	3.00	51.10
WMS 15 2017_18_19	3.00	6.00	49.30
WMS 15 2020_21_22	6.00	9.00	42.60
WMS 15 2023_24	9.00	11.00	51.10
WMS 01 2103_4_5	0.00	3.00	52.90
WMS 01 2106_7_8	3.00	6.00	52.20
WMS 01 2109_10_11	6.00	9.00	35.90
WMS 01 2112_13_14_15	9.00	12.00	43.80
WMS 13 2038_39_40	0.00	3.00	46.80
WMS 13 2041_42_43	3.00	6.00	49.70
WMS 13 2044_45_46	6.00	9.00	56.90
WMS 13 2047_48_49	9.00	12.00	61.10

Variance Analysis on Fe_2O_3

STATISTICS	
Mean %	50.42
Variance	36.32
Standard Deviation	6.03
Skewness	-0.76
Kurtosis	1.27
Upper confidence limit	53.38
Lower confidence limit	47.47





In the Variance Tower the highlighted line indicates the actual number of boreholes present with its associated percentage. It is interesting to note that confidence increases at a rapid rate with an increasing number of boreholes when starting out, but then reaches a point that can be clearly indicated whereby there is only a small increase in confidence with additional boreholes.

From this we can conclude that, on face value, the block has a Measured Fe_2O_3 Resource, and no additional drilling is required. A comprehensive Mineral Resource estimation can now be undertaken using modeling software.

The statistical and mathematical methods behind the Variance Tower calculation are freely available to support the processes, so that this cannot be described as a “Black Box”.

For more information about the Venmyn Variance Tower you can contact Iaan Myburgh at iaan@venmyn.com