

001478

INTER-OFFICE MEMO

TO: LEO HWORDYK

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SUBJECT: DENSITY CALCULATION FROM DRILL CORE SAMPLES

A mean value ~~and~~ regression calculation was conducted in April of this year to determine if the densities obtained from laboratory results compared to values ~~obtained~~ provided by the open pit geological staff (SEE APPENDIX 1).

The ^{density values of} graphitic quartzite units compared to within 1.2% whereas the massive sulphide units compared differed by 13 to 16%.

The regression calculation correlated Pb, Zn, Fe and specific gravities (S.G.) of underground diamond drill core samples.

Samples were analyzed for Au, Ag, Pb, Zn and S.G. by Northern

Analytical Labs of Whitehorse Y.T. The results were
 (SEE APPENDIX 2.1 and 2.2)
 separated by lithological units and the following regression
 formula and statistical mean values were calculated:

ZAO (graphitic quartzite) (SEE APPENDIX 3.1.)

$$S.G. = 2.75 + 0.01 * Pb\% + 0.02 * Zn\% + 0.017300 * Fe\%$$

mean S.G. = 2.958 unbiased deviation = 0.179

Z.E.F.H (massive sulphides) (SEE APPENDIX 3.2.)

$$S.G. = 4.47 - 0.01 * Pb\% - 0.05 * Zn\% + 0.011536 * Fe\%$$

mean S.G. = 4.371 unbiased deviation = 0.274

NOTE: mean and standard deviation calculations are related to
 regression formula only by the data used to calculate each.

S.G.'s are converted to densities using the following
 calculation:

1 cuft water = 62.4 lbs.
 porosity of rock = ~ 2%
 2204.6 lbs = 1 tonne

$$\text{density} = \text{S.G.} * 62.4 * 0.98 / 2204.6 \quad \text{tonnes / banked cubic foot}^{\wedge} \quad (\text{t/bcf})$$

The comparison of the open pit geological values with the statistically determined values are as follows:

LITHOLOGICAL UNITS	ORIGINAL DENSITIES (t/bcf)	STATISTICALLY DETERMINED DENSITIES (t/bcf)	DIFFERENCE (%)
ZH	0.104	0.121	16.3%
ZE/F	0.107	0.121	13.1%
ZAO	0.083	0.082	1.2%
* ZAO (sulphide rich)	0.090	-	-
* 1H, 1D, 1O, 1Q, 1A	0.076	-	-

* NOTE: Inadequate sample population doesn't justify statistical analysis for these lithological units. Densities are assumed to be consistent with original pit densities. These units are not very common in the underground and should not significantly affect the tonnages.

BACK CALCULATION PROCEDURE

Back calculation involves re-calculation of all tonnages and grades for the months of January to June using the new density of $0.121 \frac{t}{bcf}$ for massive sulphides. The density of $0.090 \frac{t}{bcf}$ for sulphide rich graphitic quartzite was first introduced in April and was included in the recalculation of tonnages before April.

Back calculations were conducted by round for each heading advanced with the results for each heading totalled for each month. These results were compared with the original month-end totals. A correction factor was calculated to adjust the ~~old~~ original month-end totals to coincide with the new month-end totals. These adjustments were entered in an active month as either part of a daily advance (usually at period end) or as a separate entry in the "DAILY UPDATE" spreadsheet.

We ~~only~~ used only the statistical mean values instead of the regression formula to simplify calculations. ^{The statistical mean values} ~~and these values~~ also correlate well with values calculated by Dave Tenney, Chief Geologist in his memo, "Specific Gravity from Multiple Regression,"

dated March 23, 1990, figure 1.

Corrections in ~~SG~~ density have been made for the months up to June and I expect the correction for June to be determined and entered this month.

Jan Bilquist.

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