

002858

M E M O R A N D U M

TO: J. C. Devitt

FROM: D. J. Hanson

SUBJECT: RESULTS OF CORE RE-ASSAY PROGRAMME

DATE: November 6, 1974

Introduction:

Based upon historical information available for 1972 and 1973, our current tonnage and grade model (Progress Report, Tonnage and Grade Estimates, Faro Deposits, December 1973) underestimates available Pb metal and overestimates available Zn metal. This report investigates the possibility of errors in the original assays.

An extensive re-assaying programme of drill core rejects and pulps was conducted by the Cyprus Anvil Analytical Laboratory during 1973. Holes for re-assaying were chosen along one longitudinal section and two cross-sections to cover any mineralogical zoning.

Conclusions:

1) Lead

Errors in individual Pb assays should tend to compensate each other. There should be no error in estimating available Pb metal tons that can be attributed to assaying errors alone. Individual tonnage block grades based on the average of eight assays may be in error by a factor of two.

2) Zinc

The Zn re-assays are significantly lower than the original assays. This difference could explain the overestimation of available Zn metal in our tonnage and grade model. The mean difference of -0.38 is within the range of -0.3 to -0.4 now used to adjust predicted Zn grades for short term planning. The source of the assay errors is unknown.

CYPRUS

Results:

	Mean (\bar{x})	Standard Deviation (s)	Number Of Samples (n)
1) Lead			
Original Assays	3.55	2.06	556
Re-Assays	3.36	2.10	556
Paired Differences	-0.19	0.66	556
2) Zinc			
Original Assays	5.44	3.08	562
Re-Assays	5.06	3.21	562
Paired Differences	-0.38	0.37	562

Discussion of Results:

1) Lead

a) Using a standard comparison t test,

$$t_{n-1} = \frac{\bar{x}_1 - \bar{x}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad \begin{aligned} s &= \frac{n_1 s_1 + n_2 s_2}{n_1 + n_2} \\ n &= n_1 + n_2 - 2 \end{aligned}$$

the hypothesis can be accepted that there is no significant difference in means at the 95% confidence level.

$$t_{1110} = \frac{3.55 - 3.36}{2.08 \sqrt{\frac{1}{556} + \frac{1}{556}}} = 1.52$$

$$t_{1110; 0.05} \approx t_{\infty; 0.05} = \pm 1.96$$

b) Using a paired comparison t test,

$$t_{n-1} = \frac{\bar{d}}{s_d / \sqrt{n}} \quad \begin{aligned} n &= n_1 = n_2 \\ \bar{d} &= \text{mean of differences} \\ s_d &= \text{standard deviation} \\ &\quad \text{of differences} \end{aligned}$$

the hypothesis that the two assays give identical individual Pb values is rejected at the 95% confidence level.

$$t_{555} = \frac{-0.19}{0.66 \sqrt{556}} = -6.7$$

$$t_{555;.05} \approx t_{\infty;.05} = \pm 1.96$$

2) Zinc

a) Using a t test comparison for the means,

$$t_{1122} = \frac{5.44 - 5.06}{3.15 \sqrt{\frac{1}{562} + \frac{1}{562}}} = 2.02$$

$$t_{1122;.05} \approx t_{\infty;.05} = \pm 1.96$$

the hypothesis of equal means is rejected with 95% confidence.

b) Using a paired comparison t test,

$$t_{561} = \frac{-0.38}{0.37 / \sqrt{562}} = -24.35$$

$$t_{561;.05} \approx t_{\infty;.05} = \pm 1.96$$

the hypothesis of identical individual Zn assays is rejected with 95% confidence.