

TR 11-182-187

**R. 533 PART 1****32. PLACER PROSPECTING PTY LTD: RAZORBACK MINE,  
DUNDAS: SAMPLING****Introduction**

As part of its investigation of the above mine the company conducted a bulk sampling campaign. Parcels of approximately 12 tons of ore, as mined, were successively crushed to pass  $1\frac{1}{2}$  and  $\frac{3}{8}$  inch screens. Between reduction stages automatic samplers took one-tenth part as sample. The final sample from the automatic sampler was riffled down to nominally 150 pounds for dispatch to the Department's Launceston Laboratory.

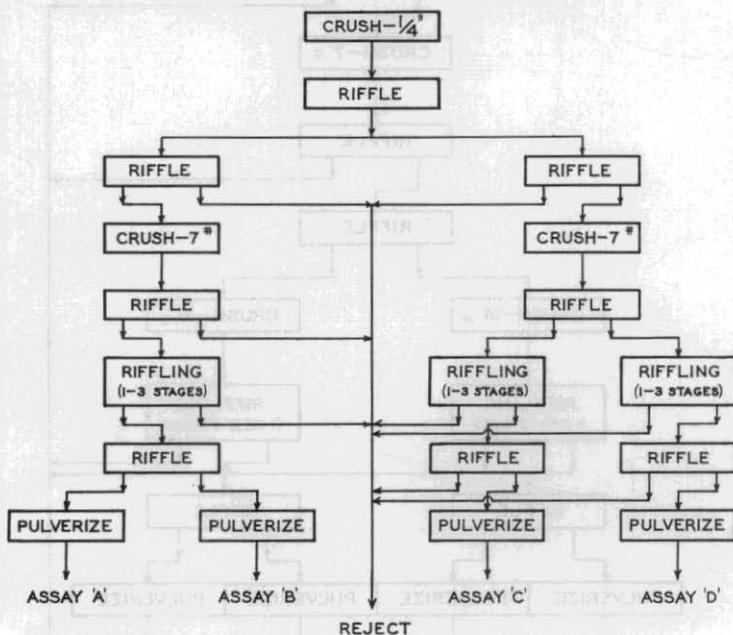
As discussion had taken place between the Department and the company on sampling procedure, it was decided to investigate the matter further. From the samples received three, namely 663590, 663591 and 663592, were selected for detailed study.

**Method**

The samples, as received, were minus  $\frac{3}{8}$  inch in size. The sampling procedure used is shown in Flowsheet 1 (fig. 45). The objects of this procedure were:—

- (a) to examine riffing at minus  $\frac{1}{4}$  inch in which case average of assays A and B should be the same as the average of assays C and D;
- (b) to examine the riffing of 4 lb of sample into equal parts in which case assays A and B should agree; and
- (c) to examine riffing after reduction to pass 7 mesh, although results from this will be affected by (b) above.

PLACER PROSPECTING PTY. LTD., ZEEHAN  
RAZORBACK MINE SAMPLING



NOTES:— 1. ASSAY SAMPLES WEIGH 2 LBS.  
2. RIFFLING STAGES DEPEND ON INITIAL SAMPLE SIZE

R533  
FLOWSHEET FOR PRODUCTION OF ASSAY SAMPLES  
FROM LARGE BULK SAMPLES

FLOWSHEET 1

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FIGURE 45

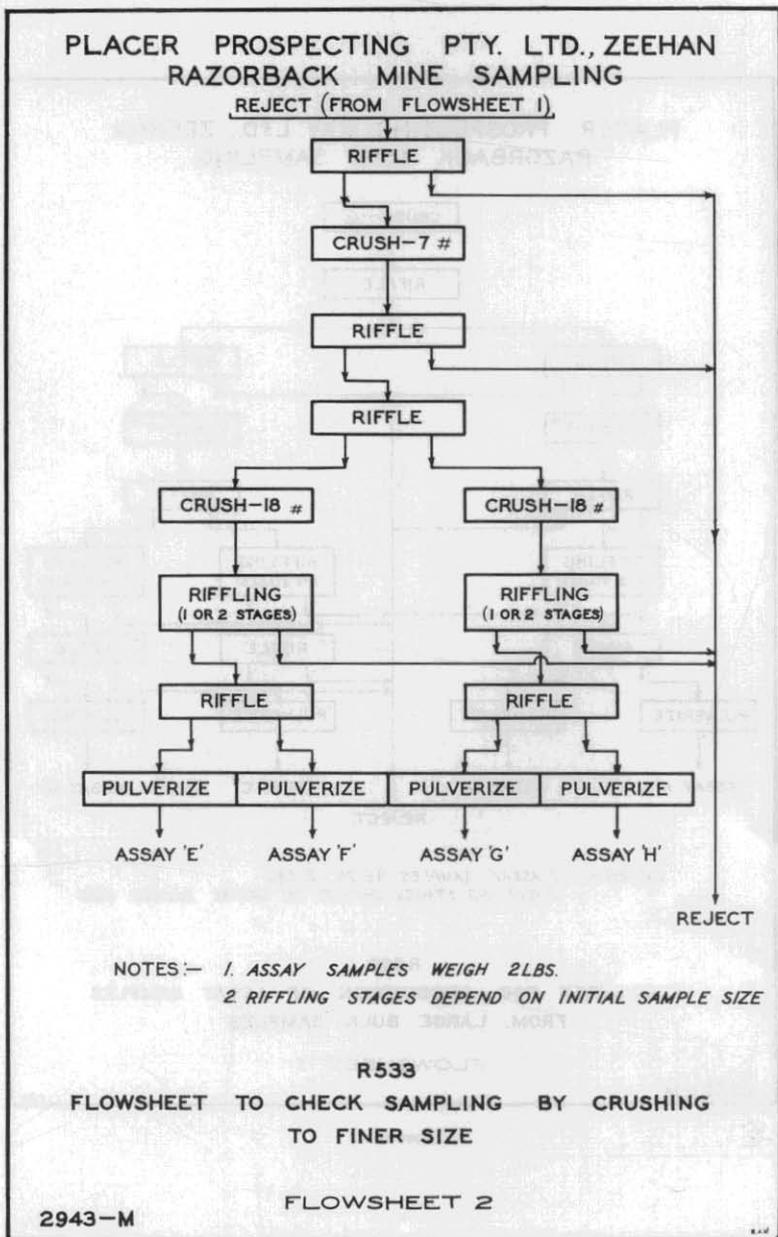


FIGURE 46

Following appraisal of the results the project was extended by resampling the initial rejects as shown in Flowsheet 2 (fig. 46).

The objects of this procedure were:—

- (a) to check two stages of riffing at minus 7 mesh; and
- (b) to examine riffing after a further reduction stage, namely, to pass 18 mesh.

Final samples were assayed for tin, copper, lead and zinc.

Tin determinations were made chemically using acid treatment to remove sulphides, sodium peroxide fusion, nickel reduction, and titration with iodine. Copper, lead and zinc were done on the Atomic Absorption Spectrophotometer.

## Results

Sample	Assays (Per Cent)				
	*Sn(1)	*Sn(2)	Cu	Pb	Zn
663590 A	2.38	2.32	0.13	0.12	0.20
B	2.40	2.42	0.13	0.14	0.20
C	2.44	2.43	0.13	0.14	0.20
D	2.35	2.33	0.13	0.13	0.20
663591 A	3.27	3.29	0.27	0.17	0.12
B	3.05	3.05	0.27	0.15	0.13
C	3.29	3.31	0.27	0.15	0.12
D	3.05	3.15	0.27	0.16	0.13
663592 A	3.75	3.75	0.29	0.12	0.16
B	3.95	3.95	0.29	0.12	0.15
C	3.84	3.85	0.29	0.12	0.16
D	3.92	3.90	0.29	0.11	0.17
663590 E	2.29	2.28	0.11	0.12	0.20
F	2.33	2.31	0.11	0.12	0.20
G	2.25	2.26	0.11	0.12	0.19
H	2.27	2.29	0.11	0.12	0.19
663591 E	3.11	3.09	0.26	0.14	0.13
F	3.13	3.11	0.26	0.14	0.13
G	3.04	3.05	0.26	0.16	0.13
H	3.12	3.13	0.26	0.15	0.13
663592 E	3.84	3.85	0.29	0.12	0.16
F	3.78	3.81	0.29	0.12	0.16
G	3.78	3.77	0.29	0.12	0.15
H	3.75	3.75	0.29	0.12	0.16

\* Duplicate Sn assays (1) and (2)

## Analysis of Results

The determinations of copper, lead and zinc show so little variation that they cannot be used for an assessment of the sampling errors. These results do indicate uniformity between all samples, with an absence of gross errors.

Apart from 663590A and 663591D duplication of tin assays has been good, indicating that differences revealed have occurred in sampling.

Riffling at  $\frac{1}{4}$  inch (two stages) gave the following:—

Sample	Mean Sn Assay (Per Cent)	
	A and B.	C and D
663590 .....	2.38	2.39
663591 .....	3.15	3.20
663592 .....	3.85	3.88

These mean figures all lie within 0.05 per cent, hence the riffling at  $\frac{1}{4}$  inch is considered satisfactory.

Riffling at 7 mesh for assay samples gave the following:—

Sample	Mean Sn Assay (Per Cent)	
	A	B
663590 .....	2.35	2.41
663591 .....	3.28	3.05
663592 .....	3.75	3.95

These mean figures vary by up to 0.23 per cent which is considered too great, hence reduction of samples at 7 mesh should not be taken as far as this for assay purposes.

Riffling at 7 mesh gave the following:—

Sample	Mean Sn Assay (Per Cent)	
	C	D
663590 .....	2.435	2.34
663591 .....	3.30	3.10
663592 .....	3.845	3.91

These mean figures vary to a similar extent to those above, hence variations could be due to this cause.

Riffling at 7 mesh a second time showed the following:—

Sample	Mean Sn Assay (Per Cent)	
	E and F	G and H
663590 .....	2.30	2.27
663591 .....	3.11	3.08
663592 .....	3.82	3.76

These mean figures lie within 0.06 per cent, hence the riffling at 7 mesh is considered satisfactory.

Riffling at 18 mesh for assay samples gave the following:—

Sample	Mean Sn Assay (Per Cent)			
	E	F	G	H
663590 .....	2.285	2.32	2.255	2.28
663591 .....	3.10	3.12	3.045	3.125
663592 .....	3.845	3.795	3.775	3.75

The maximum difference is 0.08 per cent between 663591 G and H, while in all the others the difference is not greater than 0.05 per cent. This is much improved on the results of this riffling done at 7 mesh.

In assigning an assay value to each sample, the Samples A to D in each case have been used as the rejects could be affected by the shortcomings of Flowsheet 1 (fig. 45).

Sample	Sn Assay (Per Cent)			Remarks
	Mean	Max.	Min.	
663590	2.38	2.44	2.32	
663591	3.18	3.31	3.05	
663592	3.86	3.95	3.75	
663590 R	2.29	2.33	2.25	'R' = reject portions of the original sample
663591 R	3.10	3.13	3.04	
663592 R	3.79	3.85	3.75	

**Recommendation**

In sampling ore such as these samples contain from the foregoing work the procedure should be as follows from about 150 lbs of minus  $\frac{3}{8}$  inch material—

- (a) crush to minus  $\frac{1}{4}$  inch;
- (b) riffle out a quarter as sample;
- (c) crush to minus 8 mesh;
- (d) riffle out a quarter as sample;
- (e) crush to minus 22 mesh; and
- (f) riffle down to an assay sample for pulverizing.

Using this method the sample should be within 0.10 per cent, and in most cases within 0.05 per cent Sn.

In crushing the mesh sizes have been reduced one sieve in the series in each case for better sampling.

For metallurgical work where the coarseness of the sample is governed by other factors, the likely difference in head assay between tests is shown by this work.