QUEST EXPLORATION PTY. LTD.

HAWKES ALLUVIAL TIN PROSPECT

KING ISLAND

SUPPLEMENTARY REPORT

OF

ESTIMATION OF RESERVES

by

James K. Couper

3rd January, 1967.

Report No. RHA, S/67/25

Copy No: 1.

Department of Mines, Tasmania

Hobart, 14th February, 1967

Director of Mines,
HOBART

R.H.A. Report on Hawkes Alluvials

I agree with Mr. Turner's remark that it is not logical to reduce Beamish's values to such a great extent on the basis of a much smaller number of samples and in general smaller samples.

I think however, that Mr. Turner's arbitrary figure of 50 cents per yard for working cost is excessive.

In my own calculations I included double the yardage and obtained an average grade of 0.74 lbs/cy. The reduction factor on Beamish's values was 82% and was obtained by reducing very high valued bores to a maximum figure of 2 lbs./c.y.

My calculations gave 1,000,000 c.yds. and a tin content of 350 tons. Much of the drift overlying the wash is barren and I consider that if the ground is going to be moved with bull dozers or similar equipment selective mining will reduce the capital cost of the treatment plant and average handling costs so that the overall cost of 50 cents per yard could be bettered.

(J.B. Braithwaite)
SENIOR MINING ENGINEER.

COMPANY		DATE 12.1.67.
		FILE
MEMORANDUM TO: QUEST EXPLORATION PTY. LTD.		COPIES TO:
FROM MR. H. K. TURNER		
SUBJECT HAWKE'S ALLUVIALS		

Reviewing R. Hare and Associates recent report (3.1.67) on the above property - the major facts as seen by them are stated - (N.B. The exercise was designed to check Beamish's work).

1.   VOLUMES

Correction factor against Beamish's testing is 83.6% to 95.5% (figure unchanged from their report of 8.11.66). This is equal to 471,200 - 538,200 cubic yards in respect of the six selected sections A,B,C,D,E and F.   (Plan of these areas in R. Campi's hands).

2.   GRADE

Correction factor (because of assay figures in Report 8.11.66) is now at 47.1 to 62.6% against Beamish's determinations in the same areas as stated above.

3.   VOLUME & GRADE THEN

(a)   471,200 - 538,200 c/yds.
       122 - 185 tons of contained concentrates -
                                      70% Su

Comparing with Beamish's total figures (Refer R. Hare's Report 7/4/66) as well as testing by Storey's Creek.
(b)   563,500 yards

(a) is equal to .68 lbs./c/yd. (taking mean in both cases)
(b) is equal to 1.2 lbs./c/yd.

COMMENTS

The volume position is quite acceptable - although depths of Beamish's drilling appear to be greater.

The grade position is downgraded on a comparative basis, by a number of factors -
(a)   No. of samples taken by R. Hare and Associates.
(b)   Accuracy of sampling
(c)   Standard of sample clean up
(d)   Volume of sample used in each

Beamish's results are based over the same areas on a much closer and more orderly pattern of drilling and shaft sinking. The number of samples from Beamish is probably several times that of Hare's in the same areas. Argument can be sustained that the more samples taken in this field the more correct the final figure.

On the factors (b) and (c) - it is contended that Beamish's experience would be broader and keener than Hares.

Hares used in their first sampling exercise, miniature samples (a cross section of a few square inches in each face providing no more than one prospecting dish from a 5' sample cut).

In the last exercise (3.1.67) Appendix $\overline{V}$, sample volumes

../2.

00.2

are stated at .4 cub. ft.

<u>Beamish & S.C.</u>

Beamish used 5" casing and volumes cut from shafts. (5" casing provides $5 \times 5 \times \frac{11}{14}$ sq. inches = 20 sq. inches = 1 cub. ft. for each $7\frac{1}{2}$ feet of sample).

S.C. used 12" x 12" c/sections in bulldozer cuts, 5" proline and 16" diameter casing on the Conrad Rig.

Overall, it is reasonable that Beamish's results are a better bet than those of RHA —which means that the correction for grade factor is too low.

<u>REFERENCE</u> — <u>R. HARE'S REPORT OF 3.1.67</u> — <u>HAWKE'S RE-ASSESSMENT.</u>

Indicated and inferred reserves average at say :

      500,000 yds.
         200 tons/tin concentrate
      448,000 lbs. Sn concentrate

assume   90% recovery
         = 403,2000 lbs./72%Sn.

Value £1,200 sterling = 92 cents =

$$
\begin{array}{r}
403200 \\
92 \\
\hline
806400 \\
36288000 \\
\hline
37094400 \\
\hline
\end{array}
$$

Say 371,000 Dollars

<u>All In Costs</u> — Say 50 cents/yd.
                for 500,000 yds. = 250,000

Gross Profit = $121,000

<u>All In Capital</u> (including Working Capital) 82,000

                                    39,000 before Tax

                  Net =   26,000 After $\frac{1}{3}$ for Tax

                     =   6,500 p.a. over 4 year

<u>Equity Capital</u> = 82,000 less 15,000
              =   67,000

then 10% nett is probable return.

CONTENTS

Appended:

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SUMMARY.

This report supercedes Report No. RHA. S/66/18 dated
8th November, 1966, and amends the estimation of reserves due
to check assays having revealed serious errors in the original
assays determined by Geochemical & Mineralogical Laboratories
Pty. Ltd.

The correction factor applied to reserves calculated from the
original W. A. Beamish testing is therefore amended.

The correction factor varies from 83.6% to 95.5% for volumes and
from 47.1% to 62.6% for grade, depending on whether survey or
assay grades are used to control the comparison.

Amended estimates now indicate reserves in Block A of between
184,300 and 210,500 cubic yards containing between 53 and 80 tons of 70%
tin concentrate and infer reserves in Blocks B, C, D, E and F to
total between 289,000 and 327,700 cubic yards containing between
69 and 105 tons of 70% tin concentrate.

Total indicated and inferred reserves at Hawkes are now estimated
to be between 471,200 cubic yards and 538,200 cubic yards containing
between 122 and 185 tons of 70% tin concentrate.

INTRODUCTION

Check assays received after R. Hare & Associates Report No. RHA. S/66/18 - "Hawkes Alluvial Tin Prospect Estimation of Reserves" was submitted have revealed errors in the values used for the tin metal content of the field concentrates.

This present report shows how these errors occurred and presents an amended estimate of reserves based on the corrected value for the tin metal content of the field concentrate.

Please refer to previous reports:

RHA. S/66/4   Report on Evaluation of Reserves by D. Campi.

RHA. S/66/8   Report on Reliability of Sampling and Surveying by
               Storey's Creek Tin Mining Co. N. L. and
               W. A. Beamish by K. Fletcher.

RHA. S/66/18   Estimation of Reserves by J. Couper.

ASSAYING

The results of the work carried out by this firm to determine the degree of inaccuracy in the Beamish surveying and sampling at Hawkes were required urgently by Quest Exploration Pty. Ltd. An effort was made therefore to reduce the two or three week delay normally experienced in assaying for the tin content of the field concentrate by employing a new firm, Geochemical & Mineralogical Laboratories Pty. Ltd., who offered the service in one week. Although the firm is held in good repute by the industry in Sydney, six samples were split and duplicates of the samples sent to Geochemical & Mineralogical Laboratories Pty. Ltd. were also sent to Australian Mineral Development Laboratories in Adelaide for check assay. Prior to this, six samples of concentrate obtained early in the survey were assayed by General Superintendence Co. (Aust.) Pty. Ltd. and the results were to hand.

Fifteen samples were assayed by Geochemical & Mineralogical Laboratories Pty. Ltd. (see Assay Certificate 11th November, 1966, in Report RHA. S/66/18 - also attached as Certificate #2 with this report). In comparison with the field estimates of tin content these results were low, however seeing they were of a similar order to the General Superintendence Co. (Aust.) Pty. Ltd. results (see Assay Certificates 1st November, 1966, in Report RHA. S/66/18) the assays were assumed correct. The values were then used in the calculations leading to the estimates of Report RHA. S/66/18 which was then submitted.

Several weeks later assay certificates dated 28th November, 1966, from Australian Mineral Development Laboratories (see copy this report #4) were received. The serious discrepancy in the duplicate sample assays caused concern and after notifying Quest Exploration Pty. Ltd. of the discrepancy the following steps were taken to ascertain the true tin content of the concentrate.

1. Both Australian Mineral Development Laboratories and Geochemical & Mineralogical Laboratories Pty. Ltd. were notified and asked to check their results.

2. A composite sample of concentrate was prepared and split, half sent to Geochemical & Mineralogical Laboratories Pty. Ltd. and half to the Geology Department of the University of Sydney. Samples used in preparation of the composite were 102/89, 91, 95, 97A, 97B, 103/92A, 96A; 104/89, 91, 97; 105/88; 106/89. These samples were not from the suite chemically assayed.

We requested microscopic analysis be made of these samples to determine the other minerals in the concentrate, in particular components which could have influenced the erroneous assays.

1. <u>Assay Checks.</u>

Australian Mineral Development Laboratories expressed confidence in the accuracy of their work performed using X-ray Fluorescence – however at our request repeated the assay using a Wet Way Chemical Method. These results for the same six samples are reported as Certificate #5 dated 30th December, 1966, in this report. Close agreement can be seen between the results.

Meanwhile Geochemical & Mineralogical Laboratories Pty. Ltd. repeated assays on the 15 samples and reported higher results. (See Certificate #3 this report). The new results are generally in accord with the Australian Mineral Development Laboratories results. See Table No. 1.

COMPARATIVE TABLE OF ASSAY RESULTS
TABLE NO. 1

Sample No.	Geomin.		Amdel.	
	Wet #2	Wet #3	XRF #4	Wet #5
S11	37.0	61.5		
S12	47.3	74.7		
S25	27.9	50.1		
S30A	37.7	54.3		
102/93	41.5	68.8		
103/90	41.7	65.2		
103/96B	13.1	30.1		
104/93	* 43.6	* 73.9	* 68.6	* 68.7
104/95	* 34.0	* 77.6	* 72.4	* 73.8
105/90A	* 30.0	* 69.8	* 68.3	* 70.3
105/92	* 37.2	* 67.9	* 71.9	* 71.4
106/91	* 40.8	* 64.7	* 67.2	* 68.1
107/90	* 38.0	* 70.6	* 71.0	* 69.9
108/91A	29.1	33.5		
108/91B	38.4	59.3		
Average *	37.3	70.8	69.9	70.3
Average total	35.8	61.5		

number refers to assay certificate.

In a letter dated 22nd December, 1966, Geochemical & Mineralogical Laboratories Pty, Ltd. "most sincerely regret the inconvenience caused by the erroneous results reported on 11th and 17th November which were caused in part by faulty reagents." See Certificate #3A.

2. Mineralogical Grain Count Checks.

See Reports as Certificates #6 and #7.

It can be seen that no minerals were determined in the concentrate that could possibly affect either wet way chemical or X-Ray fluorescence assays for tin.

The low percentage of cassiterite recognised reflects the low grade of the sample but could also be due to difficulty in recognising the unusual cassiterite types.

The close agreement between the two Australian Mineral Development Laboratories' sets of results and the amended Geochemical & Mineralogical Laboratories Pty. Ltd.'s results plus the apparent absence of interfering minerals suggests that these results can be accepted.

In the following correction to our reserves estimates we have used the average of the two Australian Mineral Development Laboratories sets for samples Nos. 104/93, 95; 105/90A, 92, 106/91; 107/90. The amended Geochemical & Mineralogical Laboratories Pty. Ltd.'s results were used for samples S11, S12, S25, S30A, 102/93; 103/90, 96B; 108/91A, 91B.

A proportionate correction to the original field estimate has been used for samples not assayed.

CORRECTED RESULTS.

Comparative Study in Block A

The calculations based on the Beamish work remain unchanged (Appendices I and III). The calculations based on the R. Hare & Associates sampling and surveying are corrected in Appendices II and IV.

A corrected summary of results follows:-

PART OF BLOCK A.

Alternative	Area	Av. Depth Ft.	Volume cu. yds.	Av.Grade lbs/cu. yd. 70% Sn.	Contained SnO$_2$ Tons
I. Beamish	49,397 sq. yds. (10.21 Ac.)	6.6	108,685	1.40	67.9
I. R. H. A.	49,556 sq. yds. (10.24 Ac.)	5.5	90,948	0.66	26.9
II. Beamish	33,789 sq. yds. (6.98 Ac.)	5.8	65,782	1.31	38.6
II. R. H. A.	33,288 sq. yds. (6.87 Ac.)	5.8	62,959	0.82	23.2

In Alternative I the R. H. A. grade is 47.1% of Beamish. In Alternative II the R. H. A. grade is 62.6% of Beamish.

ORE RESERVES.

The amended ore reserves are tabulated below. These have been calculated by applying the amended correction factors for grade to the previous calculation of Report RHA, S/66/18.

Correction factors for volume remain unchanged.

ORE RESERVES TABLE

BLOCK NO.	AREA	VOLUME (Beamish)	CORRECTED VOLUME				GRADE lbs SnO$_2$/ p.c.y. (Beamish)	CORRECTED GRADE				CONTAINED SnO$_2$ (70% Sn) lbs.	
			Alternative I		Alternative II			Alternative I		Alternative II			
			Corr'n Factor	Corrected Vol. Say	Corr'n Factor	Corrected Vol. Say		Corr'n Factor	Corrected Gr.	Corr'n Factor	Corrected Gr.	Alternative I	Alternative II
INDICATED A	94,900 s.y.	220,400 cy.	83.6%	184,300	95.5%	210,500	1.35	47.1%	0.64	62.6	0.85	117,900	178,900
TOTAL INDICATED				184,300		210,500						117,900	178,900
INFERRED B	53,400 s.y.	224,000 cy.	83.6%	187,300	95.5%	213,900	1.21	47.1%	0.57	62.6	0.76	106,800	162,600
C	10,000 s.y.	19,800 cy.	83.6%	16,500	95.5%	18,900	1.0	47.1%	0.47	62.6	0.63	7,800	11,900
D	13,100 s.y.	26,300 cy.	83.6%	22,000	95.5%	25,100	1.6	47.1%	0.75	62.6	1.00	16,500	25,100
E	9,800 s.y.	45,300 cy.	83.6%	37,900	95.5%	43,300	0.8	47.1%	0.38	62.6	0.50	14,400	21,700
F	4,800 s.y.	27,700 cy.	83.6%	23,200	95.5%	26,500	0.9	47.1%	0.42	62.6	0.56	9,700	14,800
TOTAL INFERRED				286,900		327,700						155,200	236,100
TOTAL INDICATED AND INFERRED				471,200		538,200						273,100 122 tons	415,000 185 tons

CONCLUSION.

The amended results establish a correction factor of between 83.6% and 95.5% for volumes and 47.1% to 62.6% for grades. These figures are applied to the ore reserves calculated from Beamish's testing.

Total indicated and inferred reserves are now estimated at between 471,200 and 538,200 cubic yards containing between 122 and 185 tons of 70% tin concentrate.

James K. Couper.

PART OF BLOCK A - ALTERNATIVE I - BEAMISH RESULTS.

Area No.	Hole No.	Area of Influence (sq. ft.)	Depth (ft.)	Volume of Influence (cu. yds.)	Grade lbs/SnO_2 per cu. yd	Contained SnO_2 (lbs)
5	119	9,900	4	1,465	0.80	1,172
6	10	7,800	4	1,154	0.40	461
9		6,750	5	1,249	0.78	974
10		2,700	7.5	749	1.09	816
11		3,750	6	832	0.67	557
12	378	10,200	5	1,887	1.22	2,302
13	7	19,500	5.7	4,113	2.58	10,611
14	377	6,900	5	1,276	0.31	395
15	6	16,800	7	4,351	0.88	3,829
16	376	12,000	5	2,220	2.45	5,439
17	9	10,950	6.2	2,512	0.60	1,507
18		11,250	3	1,249	2.55	3,185
19		8,550	4	1,265	1.97	2,492
20		6,750	6	1,499	4.10	6,146
21	65	12,450	4	1,843	0.70	1,290
22	6*	10,500	6	2,331	2.60	6,061
23	66	5,400	4	799	0.32	256
24	344	7,500	6	1,665	0.17	283
25	67	4,200	3	466	0.97	452
26	345	12,900	7	3,341	0.41	1,370
27	346	14,700	6	3,263	2.34	7,635
28	63	10,500	5	1,943	1.80	3,497
29	347	15,000	9	4,995	4.70	23,477
30	348	7,800	8	2,309	1.60	3,694
31	62	13,050	5	2,414	1.22	2,945
32	349	11,000	15	6,111	0.75	4,583
33	61	3,200	8	1,080	0.71	767
40	375	16,500	9	5,500	0.40	2,200
49	78	6,525	7	1,690	1.09	1,842
50	79	13,950	6	3,097	0.30	929
51	80	15,000	5	2,775	0.26	722
52	81	14,400	6	3,197	2.13	6,810
53	82	5,250	4	777	0.57	443
54	342	6,900	4	1,021	0.20	204
55	341	18,750	7	4,856	0.89	4,322
56	340	14,100	4	2,087	5.40	11,270
57	339	6,750	8	1,998	2.10	4,181
70	53	2,500	8	742	1.32	980
71	322	16,050	7	4,157	1.12	4,656
72	321	11,400	11	4,640	0.70	3,437
73	85	10,500	8	3,111	1.79	5,569
74	11*	9,600	12	4,262	0.66	2,813
76	54	14,400	12	6,394	0.86	5,499
Totals		444,575		108,685		152,073

Area   =   444,575 sq.ft.

         =   49,397 sq. yd.

         =   10.21 acres

Volume   =   108,685 cubic yards

Average
Depth   = $\dfrac{108,685}{49,397} \times 3$

         =   6.6 ft.

Contained
SnO_2 =   152,073 lbs

         =   67.9 tons

Average
Grade   = $\dfrac{152,073}{108,685}$

         =   1.40 lbs/cubic yard.

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PART OF BLOCK A - ALTERNATIVE I - R. H. A. RESULTS.

Area No.	Hole No.	Area of Influence (sq. ft.)	Depth (ft.)	Volume of Influence (cu. yds.)	Grade lbs/SnO$_2$ per cu. yd.	Contained SnO$_2$ (lbs.)
S16	S16	3,150	3.9*	455	0.48*	218
S25	S25	8,750	3.7*	1,199	0.31*	372
1	-	6,250	5.7	1,319	0.77	1,015
2	-	14,000	6.8	3,526	0.20	705
3	-	18,300	6.1	4,134	1.06	4,382
4	-	19,150	6.1	4,326	0.92	3,980
5	-	19,000	5.3	3,729	0.64	2,387
105/88	105/88	5,150	6.4	1,220	0.39	476
106/89	106/89	13,000	2.8	1,348	0.48	647
107/90	107/90	18,800	6.6	4,596	0	0
			2.6	1,810	2.97	5,376
108/91	108/91	22,850	5.8	4,908	0.18	883
			5.2	4,408	0.45	1,984
106/91	106/91	22,000	5.7	4,644	0.82	3,808
105/90	105/90	20,000	2.4	1,778	1.04	1,849
104/89	104/89	10,000	3.2	1,185	0.65	770
103/90	103/90	15,000	3.3	1,833	0.59	1,082
104/91	104/91	20,000	2.9	2,148	0.61	1,310
105/92	105/92	20,000	3.4	2,519	2.85	7,179
S13	S13	9,000	3.3*	1,100	0.13*	143
104/93	104/93	13,800	3.7	1,891	2.22	4,198
103/92	103/92	20,000	2.0	1,481	0.46	681
102/91	102/91	17,850	5.3	3,504	0.10	350
S28	S28	9,000	3.3	1,100	Tr	0
102/93	102/93	16,500	3.9	2,383	0.50	1,192
S12	S12	11,500	4.5*	1,917	0.47	901
7	-	14,300	3.9	1,921	0.45	864
104/95	104/95	21,100	9.0	7,033	1.33	9,354
104/97	104/97	8,300	4.1	1,260	Tr	0
			4.4	1,353	0.49	663
103/96	103/96	17,000	5.9	3,714	0.03	111
			4.6	2,896	0.22	637
102/95	102/95	17,500	8.8	5,704	0.28	1,597
6	-	9,300	5.0	1,722	0.28	482
S11	S11	6,450	3.7*	884	0.68*	601
Totals		446,000		90,948		60,197

* Weighted mean of two samples.

Area	=	446,000 sq. ft.
	=	49,556 sq. yds.
	=	10.24 acres
Volume	=	90,948 cubic yards
Average Depth	=	$\dfrac{90,948}{49,556} \times 3$
	=	5.5 ft.
Contained SnO$_2$	=	60,197 lbs
	=	26.9 tons
Average Grade	=	$\dfrac{60,197}{90,948}$
	=	0.66 lbs/cubic yard.

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PART OF BLOCK A - ALTERNATIVE II - BEAMISH RESULTS.

Area No.	Hole No.	Area of Influence (sq. ft.)	Depth (ft.)	Volume of Influence (cu. yds.)	Grade lbs/SnO_2 per cu. yd.	Contained SnO_2 (lbs)
5	H9	11,500	4	1,704	0.80	1,363
6	10	7,800	4	1,154	0.40	461
9		6,750	5	1,249	0.78	974
10		2,700	7.5	749	1.09	816
11		3,750	6	832	0.67	557
12	378	10,200	5	1,887	1.22	2,302
13	7	14,500	5.7	3,061	2.58	7,897
14	377	4,500	5	833	0.31	258
15	6	5,500	7	1,425	0.88	1,254
17	9	10,950	6.2	2,512	0.60	1,507
18		10,250	3	1,249	2.55	3,185
19		8,550	4	1,265	1.97	2,492
20		6,750	6	1,499	4.10	6,146
21	65	10,300	4	1,526	0.70	1,068
22	6*	11,300	6	2,511	2.60	6,529
23	66	5,400	4	799	0.32	256
24	344	7,500	6	1,665	0.17	283
25	67	9,000	3	1,000	0.97	970
25 A	68	2,800	4	415	0.09	37
26	345	12,900	7	3,341	0.41	1,370
27	346	11,950	6	2,656	2.43	6,454
28	63	8,500	5	1,574	1.80	2,833
29	347	6,200	9	2,066	4.70	9,710
30	348	5,000	8	1,481	1.60	2,370
31	62	9,000	5	1,666	1.22	2,032
32	349	700	15	388	0.75	291
50	79	3,150	6	700	0.30	210
51	80	13,250	5	2,453	0.26	638
52	81	14,400	6	3,197	2.13	6,810
53	82	14,500	4	2,148	0.57	1,224
54	342	2,950	4	437	0.20	87
55	341	18,750	7	4,856	0.89	4,322
56	340	2,550	4	378	5.40	2,040
72	321	6,150	11	2,505	0.70	1,753
73	85	2,800	8	829	1.79	1,485
74	11*	8,450	12	3,755	0.66	2,478
73	85	2,000	8	595	1.79	1,065
75		9,600	8	2,844	0.14	398
76	54	1,300	12	578	0.86	497
Totals		304,100		65,782		86,422

Area   =   304,100 sq. ft.

            =   33,789 sq. yds.

            =   6.98 acres

Volume   =   65,782 cubic yards

Average
Depth   = $\frac{65,782}{33,789} \times 3$

            =   5.8 feet

Contained
SnO$_2$ =   86,422 lbs.

            =   38.6 tons

Average
Grade   = $\frac{86,422}{65,782}$

            =   1.31 lbs/cubic yard.

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PART OF BLOCK A - ALTERNATIVE II - R.H.A. RESULTS.

Area No.	Hole No.	Area of Influence (sq. ft.)	Depth (ft.)	Volume of Influence (cu. yds.)	Grade lbs/SnO_2 per cu. yd.	Contained SnO_2 (lbs)
S25	S25	3,500	3.7*	479	0.31*	148
1		7,250	5.7	1,530	0.77	1,178
2		13,200	6.8	3,324	0.20	665
3		19,000	6.1	4,292	1.06	4,549
4		15,500	6.1	3,502	0.92	3,222
5		10,000	5.3	1,963	0.64	1,256
106/89		9,000	2.8	933	0.48	448
107/90		19,000	6.6	4,644	0	0
			2.6	1,829	2.97	5,432
108/91		22,450	5.8	4,822	0.18	868
			5.2	4,322	0.45	1,945
105/90		18,050	2.4	1,604	1.04	1,668
106/91		22,000	5.7	4,644	0.82	3,808
104/91		20,000	2.9	2,148	0.61	1,310
105/92		20,000	3.4	2,519	2.85	7,179
103/92		20,000	5.3	3,925	0.46	1,806
102/93		15,200	3.9	2,196	0.50	1,098
7		14,300	3.9	2,066	0.45	930
S13		9,000	3.3*	1,100	0.13*	143
104/95		21,100	9.0	7,033	1.33	9,354
104/97		6,750	4.1	1,025	Tr	0
			4.4	1,100	0.49	539
104/93		14,300	3.7	1,959	2.22	4,349
Totals		**299,600**		**62,959**		**51,895**

* Weighted
mean of
two
samples.

Area	=	299,600 sq. ft.
	=	33,288 sq. yds.
	=	6.87 acres
Volume	=	62,959 cubic yards

Average
Depth $= \dfrac{62,959}{33,288} \times 3$

$= 5.8$ feet

Contained
SnO_2 $= 51,895$ lbs

$= 23.2$ tons

Average
Grade $= \dfrac{51,895}{62,959}$

$= 0.82$ lbs/cubic yard.

018

SAMPLE DETAILS

No.	Wt. Conc. Gms.	Est. Assay	Assay G. Super #1	Assay Geomin #2	#3	Corr. Assay	Conc. Wt. Corrected 70% Sn Gms.	Value lbs/Cu. Yd. 70% Sn.
2	2.0	55				58	1.7	0.25
3	2.3	50	28.6			50	1.6	0.24
4	NS							
5A	0.7	45				43	0.4	0.10
5B	0.1	30				22	0.3	0.07
11	4.0	65		37.0	61.5	61.5	3.5	0.52
12	3.3	70		47.3	74.7	72	3.4	0.51
13	0.9	60				65	0.8	0.12
15-1	1.4	70				72	1.4	0.21
16	6.5	70	22.1			72	6.7	1.00
16A	0.4	30				22	0.1	0.02
17	NS							
18	1.0	60				65	0.9	0.13
21A	0.3	30	8.9			22	0.09	0.01
21B	3.8	70	8.6			72	3.9	0.58
22	1.1	60				65	1.0	0.15
23A	0.5	65				72	0.5	0.07
23B	3.2	65	8.4			72	3.3	0.49
24	0.8	55				58	0.7	0.10
25	0.9	55		27.9	50.1	50	0.6	0.09
26	1.2	65				72	1.2	0.18
27A	0.4	45				43	0.2	0.03
28	0.3	65				72	0.3	0.05
29	0.6	45				43	0.4	0.06
30A	3.2	65		37.7	54.3	54	2.5	0.37
30B	1.3	55	17.0			58	1.1	0.16

Numbers refer
to Assay Certificates.

Sample Volumes 0.4 cu. ft.
except   5A which is 0.25
          5B which is 0.275

Sample Details Cont'd:

No.	Wt. Conc. Gms.	Assay Est.	Assay Geomin #2	Assay Geomin #3	Assay AMDL #4	Assay AMDL #5	Assay Corrected	Conc. Wt. Corrected 70% Sn Gms.	Value lbs/cu.yd 70% Sn.
102/89	0.9	30					22	0.3	0.05
91	1.0	50					50	0.7	0.10
93	3.4	60	41.5	68.8			68.8	3.3	0.50
95	2.0	60					65	1.9	0.28
97A	0.6	30					22	0.2	0.03
97B	1.9	50					50	1.4	0.21
103/88	0.2	-							
90	4.3	60	41.7	65.2			65.2	4.0	0.59
92A	3.3	60					65	3.1	0.46
96A	0.6	30					22	0.2	0.03
96B	1.8	55	13.1	30.1			58	1.5	0.22
104/89	4.7	60					65	4.4	0.65
91	4.4	60					65	4.1	0.61
93	15.2	65	43.6	73.9	68.6	68.7	68.7	14.9	2.22
95	8.5	65	34.0	77.6	72.4	73.8	73.1	8.9	1.33
97	4.7	50					50	3.3	0.49
105/88	2.8	60					65	2.6	0.39
90A	7.1	60	30.0	69.8	68.3	70.3	69.3	7.0	1.04
90B	Tr.	-							
92	18.7	65	37.2	67.9	71.9	71.4	71.6	19.1	2.85
106/89	3.1	65					72	3.2	0.48
91	5.7	60	40.8	64.7	67.2	68.1	67.7	5.5	0.82
107/90B	19.9	65	38.0	70.6	71.0	69.9	70.4	19.9	2.97
108/91A	2.4	50	29.1	33.5			33.5	1.2	0.18
91B	3.5	50	38.4	59.3			59.3	3.0	0.45

\# Numbers refer to Assay Certificates.

Sample Volumes 0.4 cu.ft.

#6

CERTIFICATE/REPORT

No.   S. 3070

OF

ASSAY

CABLES & TELEGRAMS:
"ESIVREPUS"

SYDNEY: 188 GEORGE STREET
MELBOURNE: 9 QUEEN STREET
BRISBANE: ALBERT STREET

PHONE 27.728

GENERAL SUPERINTENDENCE COMPANY

(AUSTRALIA) PTY. LTD.

(Société Générale de Surveillance S.A.)

In all ports of Australasia

QUEST EXPLORATION

c/- R. HARE & ASSOCIATES. SYDNEY

VESSEL: —	FROM —	
CARGO: —	TO —	

COMMODITY: 6 SAMPLE TIN CONCENTRATES

THIS IS TO CERTIFY that we have received from your Sydney Office the abovementioned sample for assaying purposes.

We append below the result:

SAMPLE:	TIN (SN)
S16 ✓	22.1%
S 21A ✓	8.9%
S 21B ✓	8.6%
S 22B ? 23B	8.4%
S 30B ✓	17.0%
S 43 ? 3	28.6%

Signed and dated at

SYDNEY

For and on behalf of
GENERAL SUPERINTENDENCE CO. (AUST.) PTY. LTD.

1st November, 1966.

SYDNEY MANAGER

021

GEOCHEMICAL AND MINERALOGICAL LABORATORIES PTY. LTD.

TELEPHONE: 32 2483
AFTER HOURS: 36 4904
TELEGRAMS & CABLES:
GEOCHEM-SYDNEY

17 BAY STREET,
DOUBLE BAY,
N.S.W.

GP

11th November 1966.

Messrs. R. Hare & Associates,
19 - 23 Hamilton Street,
SYDNEY.

Fifteen samples of crushed rock
Each for tin assay determination.

CERTIFICATE OF ASSAY

Sample Nos.	Sn%	Sample Nos.	Sn%
S11	37.0	104/95	34.0
12	47.3	105/90A	30.0
25	27.9	92	37.2
30a	37.7	106/91	40.8
102 /93	41.5	107/90	38.0
103 /90	41.7	108/91A	29.1
104 /93	43.6	91B	38.4
103 /96B	13.1		

For
GEOCHEMICAL & MINERALOGICAL LABORATORIES PTY LTD

F C Nagy

F.C. NAGY
Chief Chemist.

GEOCHEMICAL AND MINERALOGICAL LABORATORIES PTY. LTD.

TELEPHONE: 32 2483
AFTER HOURS: 36 4904
TELEGRAMS & CABLES:
GEOCHEM-SYDNEY

17 BAY STREET,
DOUBLE BAY,
N.S.W.

FM/jm

13th December 1966

Messrs R. Hare & Associates,
19-23 Hamilton Street,
SYDNEY.

Fifteen (15) samples for tin assay.

CERTIFICATE OF ASSAY (Amended results)

Sample Nos	Sn%
S11	61.5
S12	74.7
S25	50.1
S30a	54.3
102/93	68.8
103/90	65.2
103/96B	30.1
104/93	73.9
104/95	77.6
105/90A	69.8
105/92	67.9
106/91	64.7
107/90	70.6
108/91A	33.5
108/91B	59.3

N.B. For the reanalysis the whole of the sample was prepared and analysed.

For
GEOCHEMICAL & MINERALOGICAL
LABORATORIES PTY LTD.

F.C. Nagy, Chief Chemist.

GEOCHEMICAL AND MINERALOGICAL LABORATORIES PTY. LTD.

TELEPHONE: 32 2483
AFTER HOURS: 36 4904
TELEGRAMS & CABLES:
GEOCHEM-SYDNEY

17 BAY STREET.
DOUBLE BAY,
N.S.W.

ALM/jm

22nd December 1966

Messrs R. Hare & Associates,
19-23 Hamilton Street,
SYDNEY.

Attention of Mr Cooper

Dear Sirs,

We refer to our assays for tin on the following samples:

S11, 12, 25 and 30a	200/182
102/93	200/184
103/90	206/200
104/93	B3
103/96B	2398/841
104/95	2399/831
105/90A	15-W
105/92	15-O
106/91	
107/90	Assays for above originally
108/91A	reported 17.11.66.
108/91B	Corrected assays reported 13.12.66

Assays for above originally
   reported 11.11.66
Corrected assays reported 13.12.66

We most sincerely regret the inconvenience caused by the
erroneous results reported on 11th and 17th November which were caused
in part by faulty reagents.

We have taken steps to prevent further errors of this type and
we trust that we will have your indulgence on this occasion.

Yours faithfully,

MANAGING DIRECTOR.

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

CONYNGHAM STREET · FREWVILLE · SOUTH AUSTRALIA

TELEPHONE 791662   TELEGRAMS 'AMDEL' ADELAIDE

Please quote this reference in your reply

AN 3/135/0

Your reference:

28th November, 1966

The Manager,
R. Hare & Associates,
6th Floor,
19-23 Hamilton Street,
SYDNEY,   N.S.W.

REPORT AN1190/67

YOUR REFERENCE:	Order No. 54 dated 3/11/66
IDENTIFICATION:	104/93, 104/95, 105/90A, 105/92, 106/91 and 107/90
LOCALITY:	Hawkes Allwial Tin Prospect – King Island
DATE RECEIVED:	7/11/66

ANALYSIS
%

Sample mark	Tin Sn
104/93	68.6
104/95	72.4
105/90A	68.3
105/92	71.9

AN1190/67

ANALYSIS
%

Sample mark	Tin Sn
106/91	67.2
107/90	71.0

Enquiries quoting AN1190/67 to Officer in Charge please.

Analysis by: C.N. Robinson

Officer in Charge, Analytical Section: A.B. Timms
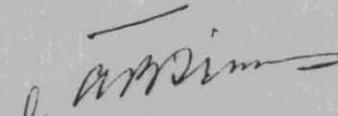
P.A. Young
Director.

hg:2

192027   #5

Received 3·1·67
Answered
Filed   Action

THE AUSTRALIAN MINERAL DEVELOPMENT LABORATORIES

CONYNGHAM STREET · FREWVILLE · SOUTH AUSTRALIA

TELEPHONE 791662 · TELEGRAMS 'AMDEL' ADELAIDE

Please quote this reference in your reply:

AN3/135/Q

Your reference:

30th December, 1966

The Manager,
R. Hare & Associates,
6th Floor, 19-23 Hamilton Street,
SYDNEY,   N.S.W.

REPORT AN1486/67

YOUR REFERENCE:	Application dated 6/12/66
IDENTIFICATION:	104/93, 104/95, 105/90A, 105/92, 106/91, 107/90
DATE RECEIVED:	6/12/66

Enquiries quoting AN1486/67 to Officer in Charge please.

Analysis by: J.A. Powell

Officer in Charge, Analytical Section: A.B. Timms

P.A. Young
Director.

ghl:2

N.B.   These results are by most accurate
volumetric method. Sorry for delay
in reporting due to my absence for
2 weeks. Barry Timms

027

AN1486/67   1.

ANALYSIS

Sample Mark	Tin Sn
104/93	68.7
104/95	73.8
105/90A	70.3
105/92	71.4
106/91	68.1
107/90	69.9

ghl:

Report on Microscopic Examination of Hawkes

Alluvial (Composite sample #CB (split)).

Due to the sample having extremely variable grainsize the analysis was carried out in two stages. Stage 1 involved sorting the original sample into size fractions each containing a limited range of sized grains. The approximate percentage of cassiterite was then determined for each fraction. Stage 2 required that the sample was recombined and thoroughly mixed so that a representative sample could be selected for testing. (Stage 2 was performed after stage 1 as the sample had separated into roughly sized portions due to its being agitated during transport).

Estimates of % cassiterite were obtained using a petrological microscope fitted with a point counter. Representative samples used for all determinations were obtained from the original sample by the standard "quartering" technique.

STAGE 1

Four size fractions were determined:

Fraction			
1	+36 mesh (0.0166 ins)	---	53% of sample (by weight)
2	+60 mesh (0.0099 ins)	---	20%
3	+100 mesh (0.0060 ins)	---	13%
4	-100 mesh	---	14%

The volume percent of cassiterite in each fraction is:

Fraction	
1	35%
2	20%
3	10%
4	less than 5%

Because of the unusual colour of the cassiterite and the subsequent difficulty in identifying crushed grains in polarized light with the petrographic microscope, one point counter run was made after the sample had been treated with dilute hydrochloric acid containing zinc metal.

STAGE 2

Approximate % cassiterite in whole sample: 10 - 20%.
Note: Three determinations were made and the results varied widely due to the large variation in grainsize. It is expected that the results of Stage 1 should be of more use than those of this stage.

Discussion

Cassiterite occurs in each size fraction of the sample that was examined. It is most noticeable, however, that it is most prevalent in the coarser fractions and almost non-existant in the very fine fraction. This state of affairs is very common in cassiterite-bearing concentrates.

Representative portions of the sample were immersed in methylene iodide and the heavy and light fractions examined.

Heavy fractions contain

Ilmenite
Magnetite and other spinel minerals. The ilmenite and magnetite are much more common in the fine fractions.
Rutile - very common in the fine fractions and rare in the coarse.
Zircon - as for rutile.
Tourmaline - at least three varities. Very common in finer fractions
Garnet- very common throughout the entire sample. It is a pink variety - may be almandine-type.
Epidote minerals. - possibly two varieties one is probably allanite. Rarely seen, only in fine fractions.
Monazite - rare, only in fine fractions.
Topaz - rare.
Staurolite - rare.
Corundum? - very rare.

Light fractions contain

Quartz - is the most common of the light minerals and is almost exclusively found in the fine fractions. Grains are markedly anhedral(a characteristic of the entire concentrate).
Fluorite - rare, only in fine fractions.
Unidentified minerals - very rare. X-ray diffraction work needed for confident identification.

Chemical analysis of the concentrate

There appears to be no mineralogical reason that standard "wet" analysis or x-ray spectrographic analysis for tin should be difficult or give rise to conflicting answers. If, however, the wet analysis is being performed by atomic absorption spectrophotometry care should be taken to remove minerals containing silicon or aluminium as these are interfering elements. The principal minerals to remove are garnet, zircon, quartz and tourmaline.

GEOCHEMICAL AND MINERALOGICAL LABORATORIES PTY. LTD.

#7

192 31

D/B No. 1444

12th December, 1966.

R.Hare and Associates.

Sample 'Hawkes Alluvial — Composite'

MINERALOGICAL REPORT

192

Weight of the sample (a heavy—mineral concentrate) as received = 17.8gm

The sample was screened at 80 mesh. Weight of +80 mesh material = 6.80gm or 38.0% of the sample. It contained approximately 95% cassiterite and 5% rutile (this being very coarse, i.e. +14 mesh, at least). Weight of -80 mesh material = 11.0gm or 62.0% of the sample. It contained approximately 60% cassiterite, 20% garnet, 15% rutile, 3% tourmaline, 2% zircon and a trace of staurolite.
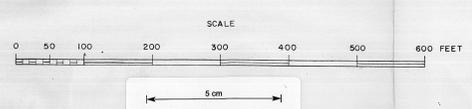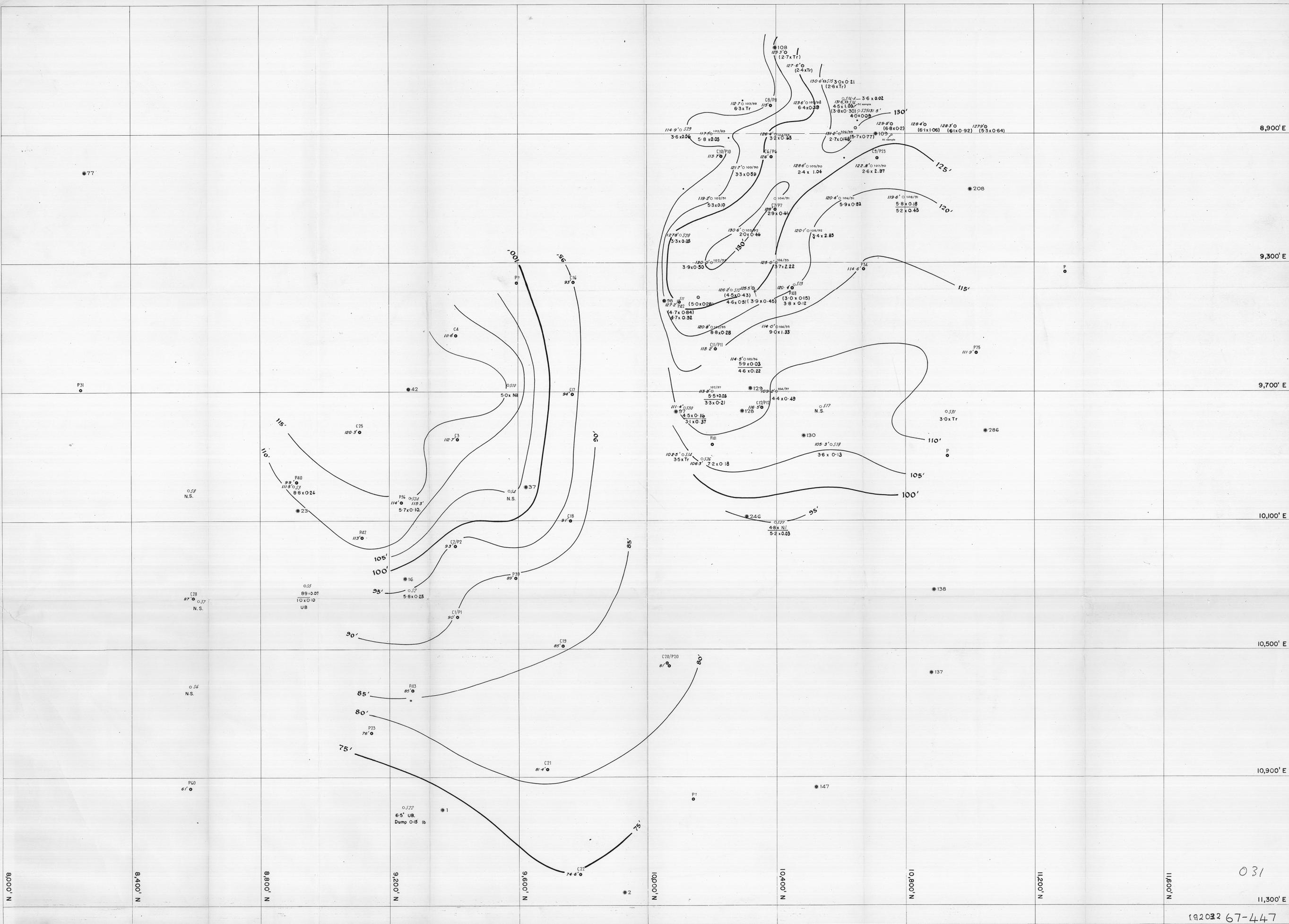
The total percentages of the sample submitted are thus :-

Cassiterite:	$95 \times 38 = 36.1 + 60 \times 62 = 37.2$	$= 73.3$ or $73\frac{1}{2}\%$
Garnet:	20×62	$= 12.4$ or $12\frac{1}{2}$
Rutile:	$5 \times 38 = 1.9 + 15 \times 62 = 9.3$	$= 11.2$ or 11
Tourmaline:	3×62	$= 1.9$ or 2
Zircon:	2×62	$= 1.2$ or 1
Staurolite:		trace
	Total:	100

This sample gave a chemical assay value of 57.8% Sn.

This is equivalent to 73.4% cassiterite.

(This report necessitated bromoforming, chemical assay for Sn and microscopic examination of two sized fractions).

Contour/grid map: *HAWKES ALLUVIAL TIN DEPOSIT, KING ISLAND — CONTOURS AT BOTTOM OF ALLUVIUM AND ASSAY VALUES*

Grid labels (right margin): 8,900' E · 9,300' E · 9,700' E · 10,100' E · 10,500' E · 10,900' E · 11,300' E

Grid labels (bottom margin): 8,000' N · 8,400' N · 8,800' N · 9,200' N · 9,600' N · 10,000' N · 10,400' N · 10,800' N · 11,200' N · 11,600' N

031

192032 67-447

REFERENCE

SCALE
0 50 100   200   300   400   500   600 FEET

5 cm

50 x 0·28 — Depth x value lbs SnO₂ — (70% Sn) per cubic yd.
Brackets — Sampled by K. Fletcher
Without Brackets — Sampled by J. Couper
93' — Reduced level at bottom of alluvium
~~~~ — Contours of bottom of alluvium

C75 ◉ — "Storey's Ck. Tin" bore
● — "Beamish"(?) bore
● 23 — R. Hare & Associates Survey Station · Survey by Plane Table and Microptic Alidade — October 1966
○ 103/85 — R.H.A. pit sample location and number } by J. Couper
○ 530 — R.H.A. sample location and number
○ — R.H.A. sample location - by K. Fletcher