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POINT COUNTING & BULK TESTING OF 200 LEVEL OAKLEIGH CREEK MINE - TASMANIA

BY

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POINT COUNTING AND BULK TESTING OF 200 LEVEL

OAKLEIGH CREEK MINE - TASMANIA

INTRODUCTION:

Point counting was performed on the 200 level at 1m intervals both north and south of the 1805 raise position. In addition to measuring the vein, the linear amount of wolframite and the width of the drive at the roof other measurements of drive width were taken 1.4m from the floor and at floor level. The average width of the drive at each sample location was important for the calculation of dilution and more particularly the volume of each bulk sample taken along the drives development so that proper weighting could take place to obtain an average value of ore grade for the level.

In the 1805 North 26 1m sample locations gave values out of 130 m. measured or 20% of the 1m intervals; whilst in the 1805 south programme no wolframite was recorded out of 60m. Hence overall the frequency of observed wolframite was 26/189 or 14%.

In addition, bulk samples were taken to compare overall the evaluation of the 200 Level average grade by point counting. Actual head grades are available for 12 samples and recalculated head grades are available for 3 more.

The influence of dilution was also examined and 3 samples were analysed to see if the expected percentage of vein quartz fragments was reached or was significantly lower, indicating dilution.

BULK TESTING 200 LEVEL:

A Report has already been submitted on the bulk testing of the 200L, but for completeness it is appended. The main results are shown below:

1805 NORTH	DRIVE WIDTH (m)	VOL. REMOVED (m^3)	% WO_3 GRADE (1.4 m STOPE)		
Sample 3	1.91	65.1	0.184	)	)
5	2.02	53.0	0.188	)	)
6	2.66	83.3	0.446	)	)
7	2.70	80.2	0.337	)	)
8	2.53	66.3	0.361	)0.342	)
9	2.68	76.7	0.153	)	)
10	3.05	103.5	0.442	)	)
11	3.20	79.0	0.514	)	)
12	2.85	84.1	0.342	)	)
1805 SOUTH					) 0.297
Sample 1	2.07	168.5	0.247	)	)
2	1.81	60.9	0.070	)0.185	)
4	1.88	58.5	0.134	)	)

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In addition some information can be given for the relevant stope blocks:

200/102	(10m still to come)	0.37%
200/103	(all sampled)	0.32%
200/104	(17m not sampled)	0.20%
200/105	(only 11m sampled)	0.13%

Recent recalculated head grades (as opposed to actual head samples obtained above) are available for sample 13, 14, and 16.
Where possible, the grade of concentrate was used(else an average figure of 57% WO_3 for concentrate obtained) and a 66% recovery was used. These results are tabulated below. If 80% was used grades decrease of about 18%.

SAMPLE NO.	DRIVE WIDTH (m)	VOLUME (m^3)	TONNES MILLED	KG. CONC. RECOVERED	GRADE (KG/T)	CONC.GDE % WO_3	RECALC. HEAD GD 1.4m - % WO_3
Sample 13	3.22	106.6	213.2	562	2.64	61.1	.562
Sample 14	3.33	100.9	262.4	605	2.31	56.5	.470
Sample 15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sample 16	3.02	86.1	205.8	436	2.12	*	.395

ø Assumes 66% recovery. If actual recovery is higher this grade is less. Usually low grade is associated with low recovery and vice versa.

* Where concentrate grade unknown 57% has been assumed.

These figures show a slight improvement in grade northwards.

DILUTION STUDY

Three samples (240/101, 240/104 and 280/102) were checked for amount quartz present in them. The idea was to see if dilution was a noticeable factor as would be indicated by a lower than expected "% qtz" measurement. This was not found to be the case. In all cases there was slightly more quartz found than expected by a ratio calculation of the average vein width for the stope block to the average stope width.

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TABLE 1

AVERAGE VEIN AND STOPE WIDTHS - OAKLEIGH CREEK

STOPE	CO ORDS	STOPE WIDTH (m)	VEIN WIDTH (cm)
240/101	(1935-1907)	1.71	38.14 ± 3.90
240/102	(1905-1856)	1.61	42.73 ± 5.41
240/103	(1854-1804)	1.48	45.00 ± 8.18
240/104	(1802-1757)	1.27	37.97 ± 6.07
240/105	(1755-1708)	1.39	33.42 ± 5.84
280/102	(1904-1858)	1.43	51.43 ± 6.66
280/103	(1856-1808)	1.53	53.53 ± 6.12
280/104	(1806-1756)	1.60	41.25 ± 9.86

Note measurements taken at position of raises were not taken into account in determining average vein widths. The average stope widths are those as at 4/11/1980 and may not be those in effect at time ore broken which was treated in early November.

TABLE 2

STOPE	EXPECTED QUARTZ RATIO	FOUND QUARTZ RATIO
240/101	.3814/1.71 = 22.3%	24.4%
240/104	.3797/1.27 = 29.9%	30.9%
280/102	.5143/1.43 = 36.0%	38.6%

Taking tons broken and measured stope widths as at 4/11/1980 a weighted average for the 240 and 280 levels was obtained. It was 1.51m compared with original feasibility estimate of 1.2m and current planned width of 1.4m. The stope width on 240 level averaged 1.49m and 1.55m on the 280 level.

It is interesting to compare the average vein widths for the three levels as it was originally thought that the vein would widen at depth (since drill hole data suggested this). Values calculated for the levels show the opposite to be the case.

280 level 48.7 cm vein width
240 level 39.4 cm vein width
200 level 35.9 cm vein width.

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POINT COUNTING RESULTS (see Appendix II)

The Average Grade (Point counting) for the whole 129 m of drive on 200 level North of cross-cut (actually rise 1805N) was calculated, weighting being by width of vein. This value was then recalculated back to a stoping width of 1.4m. For its entire length, the average width of vein was 37.3 cm. Hence the average grade for point counting of the vein was 2.14% WO_3 or 0.57% WO_3 (1.4m STOPE) and 0.25% WO_3 (3.21m DRIVE). The actual grade from plant testing, samples to 90m mark from 200 level was 0.342% WO_3 (1.4m STOPE) or 68% of bulk sampling results. (Samples 3, 5, 6, 7, 8, 9, 10, 11, 12). If only point counting values for equivalent samples plant tested were taken (i.e. to sample 90 North) point counting grade was 2.26% WO_3 for vein, 0.60% WO_3 (1.4 m STOPE), and 0.26% WO_3 (3.21m DRIVE) showing that bulk sampling obtained 176% of bulk sampling results or grades 57% of that predicted.

In the South, point counting failed to record any grade (0% WO_3) for the 60m measured. However, bulk testing (samples 1,2,4) yielded 0.185% WO_3 (1.4m STOPE).

Over the whole 190m long section of 200m measured the point counting suggested a grade of 1.67% WO_3 (VEIN), 0.43% WO_3 (1.4m STOPE) and 0.18% WO_3 (3.29 m DRIVE). For comparison the grade obtained by bulk sampling was 0.297% WO_3 (1.4 m STOPE) i.e. point counting obtained 145% of bulk sampling values or grades 69% of that predicted.

It is instructive to note that to 15.12.80, the metallurgist calculated 40060 kg saleable concentrates (70% WO_3 usually) produced from a wet treated tonnage of 13681 tonnes i.e. a recovered grade of 0.293% WO_3 for the mine.

In the 1805 North programme the following data were measured:

Mean Drive Width 3.21 m (141 measurements)
Mean Vein Width 37.3 cm (139 measurements)
Point Counting Grade 2.14% WO_3 for Vein
Point Counting Grade 0.57% WO_3 for 1.4m Stope (whole 130 m)
* Point Counting Grade 0.60% WO_3 (initial 90 m)
* Bulk Testing Grade 0.342% WO_3 for 1.4m stope (initial 90 m)

In the 1805 South programme the following date were measured:

Mean Drive Width 3.51 m (51 measurements)
Mean Vein Width 31.4 cm (46 measurements)
* Point Counting Grade 0% WO_3 for vein
Point Counting Grade 0% WO_3 for 1.4 m Stope (whole 60 m)
* Bulk Testing Grade 0.185% WO_3 for 1.4 m Stope (whole 60 m)

Total 200L programme (190 m)

Mean Drive Width 3.29 m (192 measurements)
Mean Vein Width 35.9 cm (185 measurements)
Point Counting Grade 1.67% WO_3 for Vein
* Point Counting Grade 0.43% WO_3 for 1.4 m STOPE (whole 190m)
* Bulk Testing Grade 0.297% WO_3 for 1.4 m STOPE (whole 190 m)

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1805 NORTH

SAMPLE NO.		WIDTH WOLFRAMITE	WIDTH QUARTZ	WIDTH VEIN	% WO_3
1		25	305	330	13.92
2				365	
3				350	
4				330	
5		5	340	345	2.94
6	Average	9	381	390	4.61
7	Vein Width			420	
8	34.9 cm			300	
9	SAMPLE 3			340	
10				350	
11				360	
12				330	
12 + 710 mm				335	
13				335	
14				340	
15	Av.			350	
16	Vein Width			345	
17	34.4 cm			340	
18	SAMPLE 5	45	315	360	21.36
19		7	363	370	3.81
20				325	
20 + 890 mm				340	
21		15	325	340	8.52
22				390	
23	Av. Vein			385	
24	Width			340	
25	37.5 cm			370	
26				380	
27		50	320	370	22.76
28	SAMPLE 6	28	362	390	13.27
29				380	
30		20	380	400	9.57
31				400	
31 + 120				400	

1805 NORTH SAMPLE NO.		WIDTH WOLFRAMITE	WIDTH QUARTZ	WIDTH VEIN	% WO_3
32				390	
33				390	
34				390	
35	Ave.	95	325	420	33.77
36	Vein Width			380	
37				410	
38	39.9 cm			390	
39	SAMPLE 7			410	
40				390	
41				410	
41 + 210				410	
42				415	
43				400	
44				440	
45				390	
46	Av. Vein	11	359	370	5.88
47	Width			410	
48	39.4			380	
49	SAMPLE 8			430	
50				390	
50 + 890				300	
51				300	
52				370	
53	Average			400	
54	Vein			380	
55	Width			350	
56				370	
57	SAMPLE 9			360	
58				355	
59				345	
59 + 900				310	

1805 NORTH SAMPLE NO.		WIDTH WOLFRAMITE	WIDTH QUARTZ	WIDTH VEIN	% WO_3
60				310	
61				375	
62				345	
63	Average			340	
64	Width			345	
65	Vein			330	
66	34.8 cm			335	
67				340	
68				355	
69				360	
70				370	
71				370	
71 + 420				370	
72				355	
73				400	
74	Average			400	
75	Width	12	408	420	5.66
76	Vein			405	
77	39.10 cm	10	415	425	4.70
78		12	388	400	5.93
79		34	321	355	17.08
80				375	
81				355	
82	Average			400	
83	Width			345	
84	Vein			325	
85	37.3 cm	10	405	415	4.81
86		37	308	345	18.80
87				350	
88				420	
89		10	380	390	5.10
90				385	

SAMPLE 10
SAMPLE 11
SAMPLE 12

1805 NORTH SAMPLE NO.			WIDTH WOLFRAMITE	WIDTH QUARTZ	WIDTH VEIN	% WO_3
91					420	
92					375	
93					390	
94	Average				430	
95	Vein		15	415	430	6.84
96	Width				450	
97	42.2 cm				375	
98					395	
99		SAMPLE 13	20	520	540	7.24
100					420	
101					420	
102					405	
103			20	400	420	9.15
104	Average		5	405	410	2.48
105	Vein		70	340	410	21.62
106	Width		60	365	425	23.58
107	36.9 cm				390	
108					385	
109					375	
110		SAMPLE 14			380	
111					230	
111 + 200					230	
112					250	
113	Average				325	
114	Vein		5	440	445	2.30
115	Width				430	
116	40.9 cm				425	
117			10	325	335	5.90
118					360	
119		SAMPLE 15			375	
119 + 800					380	

1805 NORTH SAMPLE NO.		WIDTH WOLFRAMITE	WIDTH QUARTZ	WIDTH VEIN	% WO_3
120				380	
121				420	
122				340	
123	Average			385	
124	Vein			420	
125	Width			390	
126	40.9 cm			350	
127				355	
128				370	
129				350	
129 + 350				350	

SAMPLE 16

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1805 SOUTH SAMPLE NO.		WIDTH WOLFRAMITE	WIDTH QUARTZ	WIDTH VEIN	% WO_3
0				340	
1				300	
2				285	
3 Av. Vein	SAMPLE 1 (PART)			305	
4 Width				320	
5 31.8 cm				300	
6				380	
7				330	
8 - 23				Unmeasured	
24				310	
25				305	
26				300	
27				315	
28				340	
29				350	
30				340	
31				340	
32				275	
33				330	
34				365	
35				350	
36	SAMPLE 1			310	
37				250	
38				220	
39				365	
40				335	
40 + 600				340	

1805 SOUTH SAMPLE NO.		WIDTH WOLFRAMITE	WIDTH QUARTZ	WIDTH VEIN	% WO_3
41				340	
42				360	
43 Av. Vein				340	
44 Width				395	
45 34.7 cm				360	
46	SAMPLE 2			310	
47				-	
48				-	
49				-	
50				330	
50 + 600				350	
51				360	
52				345	
53 Average				290	
54 Vein				220	
55 Width				210	
56 28.1 cm				165	
57				280	
58	SAMPLE 4			265	
59				285	
60				300	
60 + 600				300	

APPENDIX I

CENTRAL TASMANIAN TUNGSTEN PTY. LTD.

200 LEVEL DEVELOPMENT

— Interim Report and Revision of Earlier Work —

Interim reporting of results from the 200 Level development drive has been updated to include sample lots 7 to 12, all of which continue on the north heading . Unfortunately, a revision of dilution factors obtained for sample lots 1 to 6 has been necessary . Originally the drive width had been maesured to the nearest 10cm ; in order to increase the accuracy these widths have been remeasured to the nearest 1cm and the dilution factors recalculated . Sample lots 1 to 6 were taken on a 1.8m drive which was subsequently stripped to 2.6m to provide easier access. Correction factors for the widths of sample lots 1 to 6 were calculated from values obtained for samples 7 to 12 . A summary of this is shown in the appendix .

Further to this the analysis of sample No.6, previously reported, has since been proven incorrect and has been ammended. Improper grinding of this sample had resulted in coarse material being presented to XRF and hence the low WO_3 values obtained .

200 DRIVE SAMPLE 1

TONNES : 366
DRIVE LENGTH : 24.6m
MEAN WIDTH : 2.07m
VOL. REMOVED : 168.5m^3.

Belt Sample : 340kg (1x 34cm section from belt every 20 min.)
Dry Weight : 325kg
% H_2O : 4.4%

Sample Preparation

The entire sample was crushed to < 9.0mm and riffled to 17.0kg. This was then pulverised to < 1.0mm and 3x 200g samples were riffled from this for final analysis. Each 200g sample was ground in a ring mill to ensure complete homogeneity before splitting for final analysis. Duplicate analyses for WO_3 were performed by A.L.S. using methods XRF-2 and 104 (A.A.S.). i.e. results were average of two samples for each method.

Results

(duplicate WO_3)	WO_3 (XRF2)	WO_3 (104)	Sn (XRF2)	As (XRF2)	S (155)
A	.16	.18	135ppm	220ppm	.33
B	.15	.16	140 "	250 "	.33
C	.17	.18	140 "	250 "	.33

Mean WO_3 = 0.167 %

Statistical Accuracy

Based on a top size of 40mm and a liberation size of 1.0mm, Gy's basic sampling equation states that error committed in sampling the millfeed was 0.085. In other words the relative error in sampling is ±8.5 % of the sample assay. Further to this, another error is committed in reducing the sample size after crushing. Thus, for a 17.0kg sample with a top size of 9.0mm, the committed error is 0.060 - or ± 6.0 % relative.

The sum sampling error committed is :

$$s = \sqrt{(0.085)^2 + (0.060)^2}$$

$$= 0.104 \text{ - or } 10.4 \text{ \% relative.}$$

Ore Dilution

With a planned stope width of 1.4m, the mean width of this section (2.07m) represents a dilution factor of 47.9%Thus, material

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recovered from this section by normal stoping methods could be expected to run at 0.247 ± 0.026 % WO_3 .

200 DRIVE SAMPLE 2

TONNES: 137.6
DRIVE LENGTH : 10.1m
MEAN WIDTH : 1.81m
VOL. REMOVED : 60.9m^3

Belt Sample : 350kg (2x 700mm cuts from belt every 20 min.)
No. Taken : 56
Dry Weight : 336kg
% H_2O : 4.0 %

Size Analysis

+30mm :	63.5kg	=	18.9 %
-30/+20mm :	76.0kg	=	22.6 %
-20mm :	196.5kg	=	58.5 %

Sample Preparation

All samples were crushed to < 9.0mm and reduced to the following weights :

+30mm	15.5kg
-30/+20mm	16.0kg
-20mm	18.5kg

These were then pulverised to < 1.0mm and riffled to duplicate samples of 200g each. Analyses were performed by A.L.S. using method XRF-2 for WO_3 , Sn & As and method 155 for S.

Results

		WO_3	WO_3	Sn	As	S
+30mm	A	.01	.01	45ppm	<.10	.15
	B	.01	.01	40 "	<.10	.19
-30/+20mm	A	.03	.03	50 "	<.10	.19
	B	.03	.03	55 "	<.10	.18
-20mm	A	.07	.08	55 "	<.10	.20
	B	.08	.08	70 "	<.10	.20

Weighted Mean WO_3 = 0.054 %

Statistical Accuracy

According to Gy's basic sampling equation, the statistical error committed in sampling the mill feed was 0.140 . In reducing the sample size after crushing, committed error was 0.095 . The sum sampling error was :

$$s = \sqrt{(0.14)^2 + (0.095)^2}$$
$$= 0.169 \quad \text{- or } 16.9 \text{ \% relative}$$

Ore Dilution

The mean width of this section (1.81m) represents a dilution factor of 29.3 % when compared to the planned stope width of 1.4m . Thus, by normal stoping methods this section could be expected to yield 0.070 $\pm$ 0.012 % WO_3 .

200 DRIVE SAMPLE 3

TONNES : 236.1
DRIVE LENGTH : 11.6m
MEAN WIDTH : 1.91m
VOL.REMOVED : 65.1m^3

Belt Sample : N/R (2x 700mm cuts from belt every 30 min.)
No. Taken : 69
Dry Weight : 447kg
% H_2O : N/R

Sample Preparation

Sample crushed to < 10mm and reduced to 14.0kg. This was then pulverised to < 1.0mm and duplicate samples of 200g riffled out for final analysis.

Results

	WO_3	WO_3	Sn	As	S
A	.15	.15	120ppm	<.10	.27
B	.12	.12	120 "	<.10	.23

Mean WO_3 = 0.135 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.075 and in reducing the crushed sample, 0.035 .

The sum sampling error was :

$$s = \sqrt{(0.075)^2 + (0.035)^2}$$

$$= 0.0828 \text{ - or } 8.28 \text{ \% relative}$$

Ore Dilution

The mean width of this section (1.91m) represents a dilution factor of 36.4 % when compared to the planned stope width of 1.4m. By normal stoping methods this section should produce 0.184 ± 0.015 % WO_3 .

200 DRIVE SAMPLE 4

TONNES : 157.5
DRIVE LENGTH : 10.0m
MEAN WIDTH : 1.88m
VOL. REMOVED : 58.5m^3

Belt Sample : 410kg (2x 700mm cuts from belt every 30 min.)
No. Taken : 75
Dry Weight : 391kg
% H_2O : 4.6 %

Sample Preparation

Sample was crushed to <10mm and reduced to 23kg . This was then pulverised to <1.0mm and duplicate samples of 200g riffled out for final analysis .

Results

	WO_3	WO_3	Sn	As	S
A	.11	.10	115ppm	<.10	.31
B	.10	.09	115 "	<.10	.29

Mean WO_3 = 0.10 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.10 and in reducing the crushed sample, 0.060 .

The sum sampling error was :

$$s = \sqrt{(0.10)^2 + (0.060)^2}$$

$$= 0.117 \text{ - or } 11.7 \text{ \% relative}$$

Ore Dilution

The mean width of this section (1.88m) represents a dilution factor of 34.3 % when compared to the planned stope width of 1.4m . By normal stoping methods the expected grade from this section would be 0.134 ± 0.016 % WO_3 .

200 DRIVE SAMPLE 5

TONNES : 122.3
DRIVE LENGTH : 8.2m
MEAN WIDTH : 2.02m
VOL REMOVED : 53.0m^3

Belt Sample : N/R (2x 700mm cuts from belt every 30 min.)
No. taken : 26
Dry Weight : 116kg
% H_2O : N/R

Sample Preparation

Sample was crushed to <10mm and reduced to 16.5kg. After pulverising to <1.0mm duplicate samples of 200g were riffled out for final analysis.

Results

	WO_3	WO_3	Sn	As	S
A	.14	.14	185ppm	<.10	.30
B	.12	.12	210 "	<.10	.33

Mean WO_3 = 0.130 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.175 and in reducing the crushed sample, 0.070 .

The sum sampling error was :

$$s = \sqrt{(0.175)^2 + (0.070)^2}$$

$$= 0.188 \text{ - or } 18.8 \text{ \% relative}$$

Ore Dilution

The mean width of this section (2.02m) represents a dilution factor of 44.3 % when compared to the planned stope width of 1.4m . By normal stoping methods this section should produce 0.188 $\pm$ 0.035 % WO_3 .

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200 DRIVE SAMPLE 6 — AMMENDED

TONNES : 256.9
DRIVE LENGTH : 10.2m
MEAN WIDTH : 2.66m
VOL. REMOVED : 83.3m^3

Belt Sample : 569.5kg (2x 700mm cuts from belt every 30 min.)
No. Taken : 84
Dry Weight : 551.25kg
% H_2O : 3.2 %

Sample Preparation

The mill feed sample was crushed to <10mm and reduced to 25.5kg . This was then pulverised to <1.0mm and reduced to two 150g samples for final analysis.

Results

	WO_3	WO_3	Sn	As	S
A	.25	.25	60ppm	<.10	.13
B	.22	.22	55 "	<.10	.14

Mean WO_3 = 0.235 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.055 and in reducing the crushed sample, 0.045 .

The sum sampling error was :

$$s = \sqrt{(0.055)^2 + (0.045)^2}$$
$$= 0.071 \text{ — or } 7.1 \text{ \% relative .}$$

Ore Dilution

The mean width of this section (2.66m) represents a dilution factor of 90.0 % when compared to the planned stope width of 1.4m . By normal stoping methods this section should produce 0.446 ± 0.032 % WO_3 .

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200 DRIVE SAMPLE 7

TONNES : 154
DRIVE LENGTH : 10.1m
MEAN WIDTH : 2.70m
VOL. REMOVED : 80.2m^3

Belt Sample : 365.25kg (2x 700mm cuts from belt every 30 min.)
No. Taken : 36
Dry Weight : 353.5kg
% H_2O : 3.2 %

Sample Preparation

Sample was crushed to <10mm and reduced to 23kg . After pulverising to <1.0mm, duplicate samples of approx. 150g were riffled out for final analysis .

Results

	WO_3	WO_3	Sn	As	S
A	.18	.18	85ppm	<.10	.17
B	.17	.17	85 "	<.10	.21

Mean WO_3 = 0.175 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.080 and in reducing the crushed sample, 0.055 .

The sum sampling error was :

$$s = \sqrt{(0.080)^2 + (0.055)^2}$$
$$= 0.097 \text{ or } 9.7\ \% \text{ relative}.$$

Ore Dilution

The mean width of this section (2.70m) represents a dilution factor of 92.9% when compared to the planned stope width of 1.4m. By normal stoping methods this section should produce 0.337 ± 0.033 % WO_3 .

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200 DRIVE SAMPLE 8

TONNES : 254.6
DRIVE LENGTH : 8.8m
MEAN WIDTH : 2.53m
VOL. REMOVED : 66.3m^3

Belt Sample : N/A (2x 700mm cuts from belt every 30 min.)
No. Taken : 76
Dry Weight : 567kg
% H_2O : N/A

Sample Preparation

The mill feed sample was crushed to <10mm and reduced to 23kg. This was then pulverised to <1.0mm and reduced to two 150g samples for final analysis.

Results

	WO_3	WO_3	Sn	As	S
A	.21	.21	165ppm	<.10	.18
B	.19	.19	155 "	<.10	.16

Mean WO_3 = 0.20 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.060 and in reducing the crushed sample, 0.050 .

The sum sampling error was :

$$s = \sqrt{(0.060)^2 + (0.050)^2}$$

$$= 0.078 \text{ — or } 7.8 \text{ \% relative .}$$

Ore Dilution

The mean width of this section (2.53m) represents a dilution factor of 80.7 % when compared to the planned stope width of 1.4m . By normal stoping methods this section should produce 0.361 ± 0.028 % WO_3 .

200 DRIVE SAMPLE 9

TONNES : 301.7
DRIVE LENGTH : 9.9m
MEAN WIDTH : 2.68m
VOL. REMOVED : 76.7m^3

Belt Sample : N/A (2x 700mm cuts from belt every 30 min.)
No. Taken : 72
Dry weight : 556
% H_2O : N/A

Sample Preparation

The mill feed sample was crushed to <10mm and reduced to 21kg . This was then pulverised to <1.0mm and reduced to two 150g samples for final analysis .

Results

	WO_3	WO_3	Sn	As	S
A	.08	.08	175ppm	<.10	.17
B	.08	.08	130 "	<.10	.15

Mean WO_3 = 0.080 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.090 and in reducing the crushed sample 0.080 .

The sum sampling error was :

$$s = \sqrt{(0.090)^2 + (0.080)^2}$$

= 0.120 - or 12.0 % relative .

Ore Dilution

The mean width of this section (2.68m) represents a dilution factor of 91.4 % when compared to the planned stope width of 1.4m . By normal stoping methods this section should produce 0.153 ± 0.018 % WO_3 .

200 DRIVE SAMPLE 10

TONNES : 165.8
DRIVE LENGTH : 11.5m
MEAN WIDTH : 3.05m
VOL. REMOVED : 103.5m^3

Belt Sample : N/A (2x 700mm cuts from belt every 30 min.)
No. Taken : 48
Dry Weight : 321kg
% H_2O : N/A

Sample Preparation

The mill feed was crushed to <10mm and reduced to 26kg . This was then pulverised to <1.0mm and reduced to two 150g samples for final analysis .

Results

	WO_3	WO_3	Sn	As	S
A	.21	.20	105ppm	<.10	.19
B	.20	.20	130 "	<.10	.16

Mean WO_3 = 0.203 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.075 and in reducing the crushed sample, 0.050 .

The sum sampling error was :

$$s = \sqrt{(0.075)^2 + (0.050)^2}$$

= 0.090 – or 9.0 % relative .

Ore Dilution

The mean width of this section (3.05m) represents a dilution factor of 117.9% when compared to the planned stope width of 1.4m . By normal stoping methods this section should produce 0.442 ± 0.040 % WO_3 .

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200 DRIVE SAMPLE 11

TONNES : 198.2
DRIVE LENGTH : 8.6m
MEAN WIDTH : 3.20m
VOL. REMOVED : 79.0m^3

Belt Sample : 267kg (2x 700mm cuts from belt every 30 min)
No. Taken : 50
Dry Weight : 260kg
% H_2O : 2.7 %

Sample Preparation

The mill feed sample was crushed to <10mm and reduced to 25kg . This was then pulverised to <1.0mm and reduced to two 150g samples .

Results

	WO_3	WO_3	Sn	As	S
A	.24	.23	85ppm	<.10	.17
B	.22	.21	85 "	<.10	.18

Mean WO_3 = 0.225 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.080 and in reducing the crushed sample, 0.045 .

The sum sampling error was :

$$s = \sqrt{(0.080)^2 + (0.045)^2}$$
$$= 0.092 \text{ - or } 9.2 \text{ \% relative} .$$

Ore Dilution

The mean width of this section (3.20m) represents a dilution factor of128.6 % when compared to the planned stope width of 1.4m . By normal stoping methods this section should produce 0.514 $\pm$ 0.047 % WO_3 .

200 DRIVE SAMPLE 12

TONNES : 215.8
DRIVE LENGTH : 10.0m
MEAN WIDTH : 2.85m
VOL. REMOVED : 84.1m^3

Belt Sample : N/A (2x 700mm cuts from belt every 30 min.)
No. Taken : 78
Dry Weight : 556kg
% H_2O : N/A

Sample Preparation

The mill feed sample was crushed to <10mm and reduced to 28kg . This was then pulverised to <1.0mm and reduced to two 150g samples for final analysis .

Results

	WO_3	WO_3	Sn	As	S
A	.17	.17	120ppm	<.10	.20
B	.17	.16	120 "	<.10	.18

Mean WO_3 = 0.168 %

Statistical Accuracy

Statistical error committed in sampling the mill feed was 0.065 and in reducing the crushed sample, 0.055 .

The sum sampling error was :

$$s = \sqrt{(0.065)^2 + (0.055)^2}$$
$$= 0.085 \text{ - or } 8.5 \text{ \% relative}$$

Ore Dilution

The mean width of this section (2.85m) represents a dilution factor of 103.6%when compared to the planned stope width of 1.4m . By normal stoping methods this section should produce 0.342 $\pm$ 0.029 % WO_3 .

SUMMARY

Results for the various sample lots have been summarised and related to the proposed development blocks for the 200 Level. Calculations for this are shown in the appendix, together with diagrams of the sample lots / block positions . (1.4m mining width)

200 / 102	weighted mean WO_3 = 0.369 % (10m of this section yet to be sampled)
200 / 103	weighted mean WO_3 = 0.315 %
200 / 104	weighted mean WO_3 = 0.201 % (17m access not sampled)
200 / 105	weighted mean WO_3 = 0.130 % (only 10.6m developed due to poor grade)

A.W.Nicholls

Plant Metallurgist

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APPENDIX

CALCULATION – WIDTH CORRECTION FOR SAMPLE LOTS 1 to 6

LOT No.	200 LEVEL ORIGINAL				200 LEVEL REVISED		WIDTH VARIATION		
	H(Av.)	W(Av.)	L	VOL.	W(Av.)	VOL.	ΔW	% VAR.	UNIT VAR.
12	2.95m	3.10m	10.0m	91.4m^3	2.85m	84.1m^3	-0.25m	-8.0645	-1.6492
11	2.87	2,66	8.6	65.6	3.20	79.0	+0.54	+20.3007	+3.5703
10	2.95	2.63	11.5	89.2	3.05	103.5	+0.42	+15.9696	+3.7556
9	2.89	2.57	9.9	73.5	2.68	76.7	+0.11	+4.2802	+0.8665
8	2.98	2.64	8.8	69.2	2.52	66.1	-0.12	-4.5454	-0.8180
7	2.94	2.92	10.1	86.7	2.70	80.2	-0.22	-7.5342	-1.5561
6	3.07	2.56	10.2	80.2	2.66*	83.3		TOTAL	+4.1691
5	3.20	1.94	8.2	50.9	2.02*	53.0			
4	3.11	1.81	10.0	56.3	1.88*	58.5		– OR A POSITIVE VARIATION	
3	2.94	1.83	11.6	62.4	1.91*	65.1		OF 4.169 %	
2	3.33	1.74	10.1	58.5	1.81*	60.9			
1	3.31	1.99	24.6	162.0	2.07*	168.5			

* Calculated from mean width variation in samples 7 to 12 .

[redacted] L[redacted]L W[redacted]BL[redacted]

	LOT No.	%WO_3	W(Av.)	H(Av.)	L(In Block)	V(In Block)	V x WO_3
	12	.342	2.85	2.95	10.0	84.1	28.762
200/102	11	.514	3.20	2.87	8.6	79.0	40.606
	10	.442	3.05	2.95	11.5	103.5	45.747
	9	.153	2.68	2.89	9.9	76.7	11.735
					TOTAL	343.3	TOTAL 126.850
	8	.361	2.53	2.98	8.8	66.3	23.934
	7	.337	2.70	2.94	10.1	80.2	27.027
200/103	6	.446	2.66	3.07	10.2	83.3	37.152
	5	.188	2.02	3.20	8.2	53.0	9.964
	3	.184	1.91	2.94	11.6	65.1	11.978
	1	.247	2.07	3.31	1.1	7.5	1.852
					TOTAL	355.4	TOTAL 111.907
	1	.247	2.07	3.31	23.5	161.0	39.767
200/104	2	.070	1.81	3.33	9.5	57.3	4.011
					TOTAL	218.3	TOTAL 43.778
	2	.070	1.81	3.33	0.6	3.6	0.252
200/105	4	.134	1.88	3.11	10.0	58.5	7.839
					TOTAL	62.1	TOTAL 8.091

MEAN $WO_3 = \frac{VxWO_3TOT}{VTOT}$

$= \frac{126.850}{343.3}$

$= 0.369\ \%\ WO_3$

MEAN $WO_3 = \frac{111.907}{355.4}$

$= 0.315\ \%\ WO_3$

MEAN $WO_3 = \frac{43.778}{218.3}$

$= 0.201\ \%\ WO_3$

MEAN $WO_3 = \frac{8.091}{62.1}$

$= 0.130\ \%\ WO_3$

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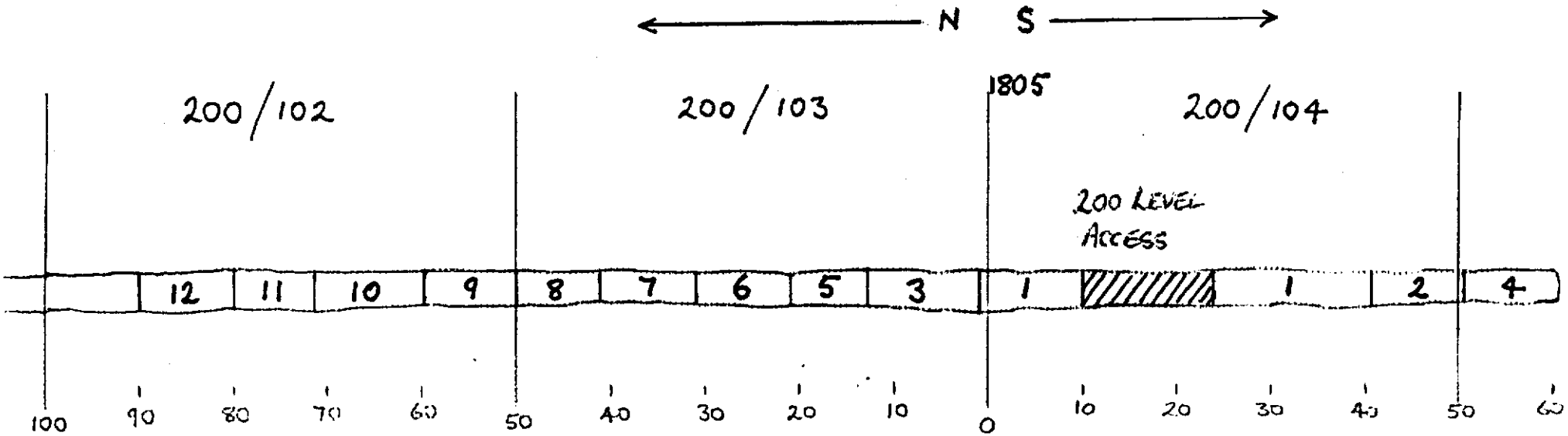
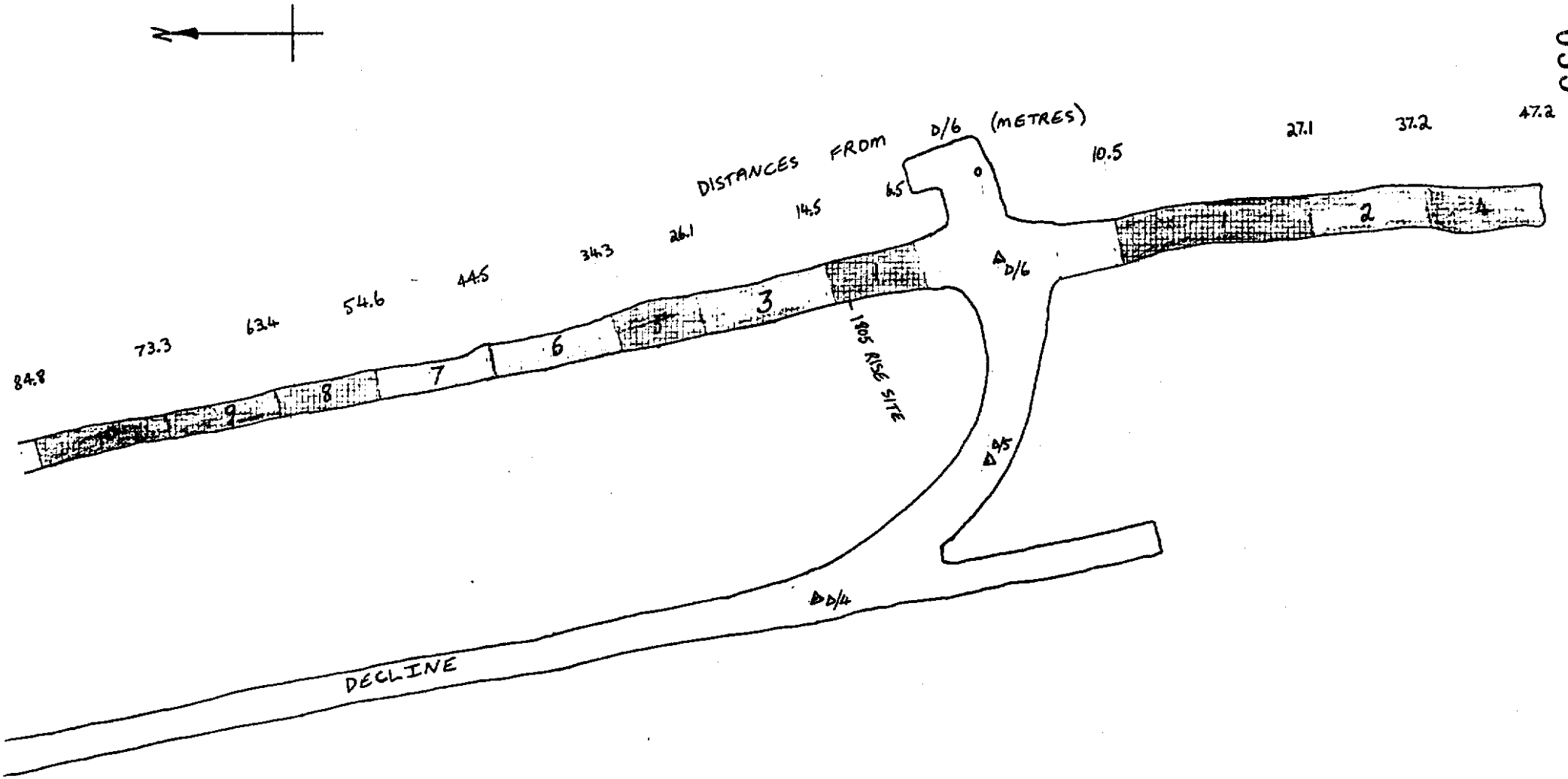
200 LEVEL SAMPLE/BLOCK LOCATIONS





Location Plan for 200 L Bulk Samples.

Drawn: 13.10.80