011373

92JNE43

L I M E C R E E K

T U N G S T E N

S H O W I N G

CHALOO CLAIM GROUP, BRALORNE
BRITISH COLUMBIA

D. L. COOK
JANUARY 1970

MAPS

(in envelope at back of report)

1. LIME CREEK TUNGSTEN, GEOLOGICAL MAP.

2. LIME CREEK TUNGSTEN (OVERLAY 1). OUTLINES OF SCHEELITE SKARN AT 20' VERTICAL INTERVALS.

3. LIME CREEK TUNGSTEN (OVERLAY 2) GROUND MAGNETIC SURVEY.

4. REGIONAL GEOLOGICAL MAP OF BRIDGE RIVER.

DIAMOND DRILL-HOLE SECTIONS

(included with report)

I N D E X

INTRODUCTION

Previous examinations of the Chalco claim group by company geologists had shown an area of about 250 square yards, of garnet-diopside skarn with average grade of fluorescent scheelite about 0·5 - 1% and up as high as 3%. This skarn appeared to be bounded by a coarse, clean, crystalline limestone to the North and West and peridotite and granitic rocks to the East and South.

The showings were in 2 outcrops 60' apart with no outcrop between, suggesting a larger area of at least 800 square yards of scheelite-bearing skarn.

On May 30th, 1969, a lease option was obtained from Bralorne Can-Fer Resources Limited with the following minimum expenditure commitments:

$ 5,000	prior to	December 31st, 1969
a total of $ 25,000	prior to	December 31st, 1970
a total of $ 85,000	prior to	December 31st, 1971
a total of $160,000	prior to	December 31st, 1972

During the period April 6th, 1969 to November 9th, 1969 an examination and evaluation of this property was carried out by the writer and 10 assistants in conjunction with a helicopter supported reconnaissance of the remainder of the Bender Range and adjacent areas to the Southwest and Northwest.

The following work was completed on the property:

1. A magnatometer survey.
2. Stream sediment sampling.
3. Geological mapping.
4. Excavation of benches and trenches to expose the geology.
5. 2209' of diamond drilling in 15 holes.

50°43.4' 122°38.5' 12 km East of Bralorne

elev 5300' LOCATION

The showing is located on Chalco No. 5 (Crown Grant No. L7700) of the Crown granted Chalco claim group (Nos. L7700 - L7705, L7765 and L7769 - L7771) on N.T.S. Map Sheet No. 92-J-10E.

Access to the showing is by 7 miles of 4 x 4 road from Bralorne townsite along the Northeast side of Cadwallader Creek, then 1 mile by a better, but steeper road, along and above the Northwest side of Piebiter Creek, a tributary of Cadwallader Creek.

The claims are at approximately latitude ~~50° 70'~~ 50°43.4' and longitude ~~122° 60'~~ long at an elevation of ~~5600'~~ above sea level.

Road access to Bralorne is by 60 miles of reasonably well-maintained all-weather gravel road from the town of Lillooet, and passes along the Northern shore of Carpenter Lake (B.C. Hydro dam).

An alternative, but far less satisfactory approach to Bralorne is from Vancouver via Pemberton, D'Arcy and Seton Portage.

p.122

HISTORY

Since the latter part of the 19th Century, the area has been mainly worked for gold, and scheelite was probably not recognized until the late 1930's, when the ultra-violet lamp was developed for prospecting.

The staking of the Chalco group was initiated in 1945 by Mrs. D. C. Noel, a pioneer prospector in the area who recognized the presence of copper, (chalcopyrite) and scheelite, but was mainly interested in the former. Apart from one prospect adit and some trenches, no other development is known to have been carried out.

British Columbia Land Surveyors, Cotton and Leach carried out a survey of the claims in 1956 and W. H. Patmore completed a geological map for Mrs. Noel in the same year.

Two years after Mrs. Noel's death in 1960, ownership of the claims was transferred from her estate into the hands of Bralorne Can-Fer Resources.

After preliminary examinations by geologists of Union Carbide Exploration Corporation, a lease option was entered into with Bralorne Can-Fer on May 30th, 1969.

328' 90 m

400' ↑ 122 m 120m

700' → 213 m 200 m

The following claims were searched at the Vancouver Mining Recorders' Office. They include the Chalco group of claims under option to Union Carbide Exploration Corporation, the Abo claims held by Union Carbide Mining (Canada) Limited and those claims held by others in the immediate area. They are all located on N.T.S. Map Sheet No. 92-J-10E.

Claim Name		Grant No.	Location Date	Registered Owners
Chalco "D" Fraction		7771	Dec. 20, 1955	Bralorne Pioneer Mines 355 Burrard St., Vanc.
Chalco #10		7765	Dec. 20, 1955	"
"	12	7702	Dec. 18, 1955	"
"	13	7705	Dec. 18, 1953	"
"	35	7703	Dec. 18, 1953	"
"	36	7766	Jan. 6, 1959	"
"	37	7767	Jan. 6, 1959	"
"	38	7768	Jan. 6, 1959	"
"	39	7769	Jan. 6, 1959	"
"	9 Fraction	7770	Jan. 18, 1953	"
"	5	7700	Jan. 18, 1953	"
"	6	7704	Jan. 18, 1953	"
"	8 Fraction	7701	Jan. 18, 1953	"
FJT	1	30520	June 13, 1969	T. C. Christy, Lillooet
"	2	30521	June 19, 1969	"
"	3	30522	June 14, 1969	"
"	4	30523	June 14, 1969	"

Claim Name		Grant No.	Location Date	Registered Owners
Bear	1	30517	June 13, 1969	T. C. Christy, Lillooet
"	2	30518	June 13, 1969	"
"	3	30519	June 13, 1969	"
Goat	1	30489	June 14, 1969	F. R. Christy, Box 496, Lillooe
"	2	30490	June 14, 1969	"
"	3	30491	June 14, 1969	"
"	4	30492	June 14, 1969	"
"	5	30493	June 14, 1969	"
"	6	30494	June 14, 1969	"
Franger	2	30328	June 1, 1969	C. Ross, Lillooet
"	3	30329	June 1, 1969	"
"	4	30330	June 1, 1969	"
"	6	30332	June 1, 1969	"
"	5 Fraction	30331	June 1, 1969	"
Abo	1	30301	May 28, 1969	Union Carbide Mining
"	2	30302	May 28, 1969	(Canada) Ltd.
"	3	30303	May 28, 1969	"
"	4	30304	May 28, 1969	"
"	5 Fraction	30305	May 28, 1969	[illegible]
Debbie	1	30276	June 3, 1969	B. Beck, Box 14, Bralorne
"	2	30277	June 3, 1969	"
"	3	30278	June 3, 1969	"
"	4	30279	June 3, 1969	"
"	5	30280	June 3, 1969	"
"	6	30281	June 3, 1969	"
"	7	30282	June 3, 1969	"

Claim Name		Grant No.	Location Date	Registered Owners
Debbie	9	30284	June 3, 1969	B. Beck, Box 14, Bralorne
"	10	30285	May 31, 1969	
"	11	30286	May 31, 1969	
"	12	30287	May 31, 1969	"
"	13	30288	May 31, 1969	
"	14	30289	May 31, 1969	"
"	15	30290	May 31, 1969	
"	16	30291	May 31, 1969	
"	17	30292	May 31, 1969	
"	18	30293	May 31, 1969	
"	19	30294	May 31, 1969	"
"	20	30295	May 31, 1969	
"	21	30296	May 31, 1969	
"	22	30297	May 31, 1969	"
"	23	30298	May 31, 1969	
Hubert	1	30455	June 8, 1969	
"	5	30499	June 8, 1969	
"	6	30500	June 8, 1969	"
Porky	1	30455	June 15, 1969	G. Rose, Lillooet

REGIONAL GEOLOGY

The regional geological map of C. W. Drysdale and W. S. McCann (Memoir 130, Department of Mines, 1922) is enclosed. Certain amendments have been made to the contact of the Bendor batholith, and where Cairnes (1943) has carried out further mapping.

The rocks of the Bridge River area are considered to range in age from Permian to Recent.

The Permian rocks are metamorphosed sediments and contemporaneous volcanic rocks thought to be a continuation of the Cache Creek series. They form the eroded core of an anticline which is flanked on both sides by the remnants of two series of Mesozoic (i.e. Upper Triassic and Lower Cretaceous) formations.

Between the Paleozoic and Mesozoic formations there are remnants of serpentine volcanics which covered the Paleozoic erosion surface (e.g. the Shulaps Mountains.)

Plutonic rocks, predominantly of granodiorite (Bendor Batholith) and quartz diorite (Dickson Batholith) together with their associated dykes (mainly quartz diorite, granodiorite and quartz monzonite) intrude the Paleozoic and Mesozoic formations.

Stocks and dykes of augite-diorite cut only those rocks older than Lower Cretaceous.

Unconsolidated till, gravel, sand, silt and clay of glacial and post-glacial age, cover the bottom and sides of many valleys.

The most recent of all deposits is thinly-bedded volcanic ash and pumice which overlies even recent gravels.

REGIONAL STRUCTURAL GEOLOGY

The major structural feature of the area is a broad anticlinal arch trending Northwestward and pitching at a low angle to the Northwest.

Bridge River has cut deeply into the Paleozoic core of this dome, exposing the contorted and faulted cherty quartzites, argillites and meta-basalts that occur near the base of the Permian rocks.

Normal faulting, resulting from the down-slipping of blocks in the direction of the pitch of the anticlinal arch, has taken place in the Permian rocks, indicating tensional stress in the crust, and may be interpreted as recoil after a period of compression.

Unconformably overlying the eroded Paleozoic core, and forming the limbs of the plunging anticline, are serpentine volcanic rocks, and the remnants of Mesozoic formations.

The limbs of the anticline have been affected by secondary and minor folds resulting in complex distortion of the formations.

The Southwestern limb dips towards the Coast Mountain batholith and is composed of ? Triassic serpentinites and Upper Triassic formations, which are now closely compressed and deformed. This limb is intruded by:

1. Augite - diorite which was probably intruded immediately after the enclosing formations were compressed and after the uplift of the anticlinal arch.
2. Granodiorite (the Bendor Batholith), which entered partly by magmatic stoping and partly by squeezing apart the enclosing formations, which have become strongly schistose along the contact. Certain of the granitic differentiates of this intrusive have produced coarse diopside, garnet, scheelite and molybdenum-bearing skarns where they have come in contact

with clean, crystalline limestones of the Permian rocks. The Northeastern limb of the anticline is mostly overlain by the *Triassic* serpentinites and Upper-Triassic rocks. It is intruded by flat-dipping non-metamorphosed sills of Rexmount andesitic porphyry.

REGIONAL ECONOMIC GEOLOGY

Of mineralization in the area, gold has always been the most important. This occurs in quartz veins of the augite-diorite which has been most prone to the formation of regular and persistent fissures along which the gold-bearing solutions (i.e. alkaline carbonate) have come. These veins are believed to be the last phase of igneous activity associated with the augite diorite intrusion.

Other mineral deposits are as follows:

1. Silver-copper type: Tetrahedrite, azurite and malachite with associated galena, occur in quartz veins associated with an apophysis of quartz diorite porphyry of the Bendor Batholith at the old Empire Mine near the source of Piebiter Creek.
2. Antimony: As stibnite in the western limb of the Bridge River anticline associated with diorite porphyry dykes in irregular masses of quartz.
3. Magnesite: Near Liza Lake associated with the serpentinites as complex veinlet systems.
4. Chrysotile asbestos: Occurs in stringers in the serpentinites.
5. Nickel-Iorn allay (?Awaruite). Occurs in the gravels of Bridge River and probably has its origin in the serpentinites.
6. Mercury: Occurs as cinnabar and the native metals in dolomitized volcanics (greenstones) and conglomerates of the Permian rocks near Tyaughton Creek.
7. Molybdenum: In skarns as molybdenite and powellite, e.g. the Chalco property on Piebiter Creek. Also in altered rhyolites as Molybdenite e.g. the upper Hurley River.

8. Tungsten:

a) As scheelite and molybdoscheelite in skarns at the contact of certain types of granitic rocks and limestones.

b) In veins in carbonatized and silicified serpentine or highly silicified limestone (Tungsten Queen Property). Occurs with Stibnite.

c) In gold-bearing quartz veins associated with the augite-diorite.

d) In shears in limestone (Tungsten King Property).

9. Chromium: As chromite associated with serpentinites of the Taylor Creek basin. An examination of a chromite specimen by Geological Survey mineralogist, R. A. A. Johnston showed the presence of microscopic diamonds. (Johnston 1915).

GEOLOGY OF THE LIME CREEK SKARN AND ASSOCIATED ROCKS

Layered Rocks:

The original layered rocks of the area were as follows, and represent a probable estuarine environment of déposition. They are considered to be of Hermian age and were named the Fergusson Series (Cairnes 1937).

A. Arenites

Sandstones, arkoses, limestones

B. Lutites

Probably claystones and mudstones

C. Volcanics

Basalts and trachyandesites.

The metamorphic derivaties of these rocks consist of the following rocks in order of abundance:

1. Micaceous, quartz schists with the micaceous minerals usually biotite, but also sericite (where most shearing has occurred) and chlorite. The mica and quartz content may vary so that the rock can be a totally micaceous schists on the one hand or a micaceous metaquartzite on the other. The original sediments were probably silts and clays to sandy silts and clays. These rocks form the bulk of the layered rocks (i.e. about 85%).

2. Coarse, crystalline limestone showing little or no bedding. It has apparently been completely crystallized, although with little or no mobilization, as it consists of large (0·1 - 0·2") calcite crystals closely interlocking, with occasional fine, but diffuse dark parallel bands which are probably very fine organically derived carbon lying in the original bedding planes. There is

The limestone occurs as one lens about $\pm$ 1000' long and $\pm$ 80' thick at its thickest point, together with at least 3 very narrow ($\pm$ 1' - 10') and shorter lenses lying stratigraphically above and below the larger lens. Elsewhere in the Bralorne area lenses of limestone can beseen, apparently in the same stratigraphic position and usually consistently adjacent to the contact of the Bendor batholith. Those limestone lenses which are well removed from the batholith probably represent the same stratigraphic zone and so may serve as marker beds for solving the structural picture in that area of the Permian rocks.

3. Metarkose and related rocks: These rocks occur as occasional beds (6" to 5' thick) within the schists. The original quartz and feldspar show varying degrees of replacement by tremolite, biotite and pyrite. Where this rock has been skarnized, the quartz and feldspar are replaced by diopside and/or hornblende (rarely the latter), minor clinozoisite, and rare wollastonite and zoisite. Some are higher in quartz than others, indicating the original rock was probably an arkosic sandstone.

4. Metachert & metaquartzite and related rocks: These rocks occur with slightly more frequency than (3) above, in beds of similar thickness. Mineralogically, these rocks are principally quartz (colloidal or crystalline) with varying content of primary feldspar and metamorphic hornblende, wollastonite and pyrite. Where these rocks have been skarnized, the metamorphic mineral is diopside. The original sediment varied from almost pure quartz sandstones to arkosic sandstones.

5. Metamorphosed basalt and trachyandesite occur in bands (2' to 5' thick) of lesser abundance than (3) and (4) above. Some if not all, are extrusive. Considerable replacement of their constituent minerals by chlorite, biotite and pyrite has occurred. In the case of one skarnized basalt, labradorite has been replaced by diopside and minor zoisite.

Intrusive Rocks:

These are peridotites and granitic rocks, the latter low in potassium feldspar.

1. The peridotites form a narrow zone of dykes (widest dyke is 9') about 20' wide to the east of the limestone derived skarn. They strike generally north to south and dip vertically. They are well fractured and serpentinized, skarnized in places that are closest to the limestone-derived skarn. Scheelite up to ± 0·5% is present in some of these skarnized areas. These rocks are apparently younger than the granitic rocks but may be related to them. Cairnes (1937) has named them the President Intrusives.
2. Granitic rocks in the immediate area are all dykes, principally of quartz monzonite, quartz diorite and diorite with lesser numbers of granodiorite. Rare examples of all other granitic types, with the exception of true granite, occur (See Appendix I). These rocks have had a tendency to intrude along the bedding of the metasedimetts, although some of the thicker dykes have transgressed the bedding.

The composition of the narrower dykes is usually constant, but very considerable variability can occur within the thicker dykes. e.g. Alaskite, granodiorite and quartz monzonite occur in a of 96'. There is some correlation between thickness of these dykes and their composition. (See Appendix II)

1800' to the north and east is the contact of the Bendor Batholith which is part of the Coast Range Batholith.

The age of the batholithic granite and therefore probably the dykes, are thought to be Cretaceous or Tertiary.

The Skarn & Skarnized Rocks:

These rocks are characterized by the presence of diopside and usually clinozoisite, but the latter is lesser amounts. Garnet is present usually predominant over diopside in those skarns derived from the limestone.

Those rocks least skarnized (i.e. the schists, arenites and volcanics) still show some of their original mineral composition (e.g. feldspar and quartz) but nearly always contain the skarn minerals diopside and clinozoisite, with little or no garnet.

Wollastonite and zoisite are rare skarn minerals.

Hornblende, on the rare occasions that it is present, is always high (i.e. about 50% of the rock) and in one instance, where the rock is sandwiched between garnet skarn and limestone, it contains no diopside, clinozoisite, zoisite or wallastonite.

Scheelite can occur in both the predominantly diopside skarn and the predominantly garnet skarn, but tends to be greatest in the uppermost area of skarnization well within the limestone.

Powellite and occasionally Molybdenite occur in the lower most region of skarnization, near the quartz monzonite dyke which has apparently been the influence producing the skarn.

There are almost always a few inches of diopside skarn developed within

Structure:

The layered rocks have an overall general dip of 50° South, striking West to East. Folding and faulting occur to an insignificant extent throughout the area, except at the Eastern end of the limestone lens where intense shearing with intrusion of peridotites and considerable folding has occurred. The overall effect of the shearing has produced an apparent right-hand movement (i.e. East Block South).

Some vertical jointing (strike Northwest - Southeast) is evident, particularly in the vicinity of the shear.

TONNAGE & GRADE

The drilling programme carried out on this property has allowed a reasonably accurate delineation of the scheelite-bearing skarn (the outlines of the scheelite-bearing skarn in horizontal section and at 20' vertical intervals are shown on Overlay 1).

The volume and bulk grade of horizontal, 20' thick slices of the skarn are shown on Table 1.

Height Interval Relative to Datum (5000')			Volume of Slice (Cubic Ft)		Approximate Bulk Grade (WO_3)		
5110'	to	5090'	10720	(1072 tons)	2.0	(2.08	$ = 343,040
5090'	to	5070'	50800	(6,152 tons)	0.9	(1.45%	$ 1,427,264
5070'	to	5050'	65040	(12,656 - Tons)	0.6	(1.16%	$ 2,328,704
5050'	to	5030'	87040	(21,360 tons)	0.4	(.97%	$ 3,246,720
5030'	to	5010'	112860	(T-32,648 tons)	0.4	(Avg) .86%	$ 4,440,128
5010'	to	4990'	48240		0.1		
4990'	to	4970'	23920		0.1		
4970'	to	4950'	7120		Tr		
4950'	to	4930'	4640		?Tr		

TABLE 1

* No information is available for the grade of this slice. It is assumed to be intermediate in grade between its adjacent (upper and lower) slices.

The proved tonnage of skarn (based on the above figures and using a tonnage factor of 10) is 41,040 tons. However, less than 0.1% WO_3 occurs below the 4970' vertical height level. Calculating then

Estimated

MAGNETIC SURVEY OF THE LIME CREEK SKARN AND SURROUNDING AREA

A magnetometer survey was carried out in the vicinity of the scheelite skarn using a McPhar MF 1 Fluxgate Magnetometer.

Relative Gamma readings were taken on lines 10' and 20' apart on 20' line intervals.. 198 readings were takne. Contouring was drawn at 100 Gamma intervals except where the relief is steepest. See Overlay 2.

Certain features of the contour pattern reflect aspects of the underlying geology and are noted on Overlay 2.

The most significant of these features is the tendancy for magnetism to increase as the WO_3 grade of the skarn increases which also corresponds with increasing hieght above datum.

CONCLUSIONS

The reserves of the Lime Creek Tungsten showing are too low for profitable exploitation of the body as a self-contained mine with its own mill. However, the following should be considered.

1. The Bralorne Can-Fer Resources Ltd. gold mine at Bralorne (which is 9 miles away) has facilities for treating scheelite ore.

2. Reconnaissance prospecting in the adjacent area has indicated other areas of scheelite mineralization which have yet to be proved. If some of these areas are comparable or better than the Lime Creek skarn, it may be feasible to treat all their ores through the one mill at Bralorne or through a mill more centrally positioned.

CHALCO PROPERTY

LEGEND FOR 1969 DRILL HOLE SECTIONS

ROCK TYPES

1	Granitic Rocks
	D - Diorite
	QD - Quartz-diorite
	GD - Granodiorite
	QM - Quartz-monzonite
	Mo - Monzonite
	Sy - Syenite
	Sd - Syenodiorite
2	Peridotite
3	Schist
4	Limestone
5	Basalt
6	Trachyandesite
7	a. Metaquartzite
	b. Metachert
8	Metarkose
9	Gneiss
10	Skarn
11	Skarnized

ABBREVIATIONS

M	Mud
S	Sand
C	Cavity
Fe	Ferruginous
Cu	Chalcopyrite
Ph	Pyrrhotite
P	Pyrite
G	Garnets
//	Sheared
Δ	Brecciated
Si	Silicified
Q	Quartz
T	Talcose
∴	Augen Texture
F	Fault

APPENDIX I

UNION CARBIDE RECORD BH 1 BRALORNE

Final Depth - 262'	Grid Ref. of Collar L10·6:00
	Collar Elevation - 5000'
Commenced - July 10th, 1969	Dip = -30°
Completed - July 19th, 1969	Azimuth = 30·5° (Mag.)

Logged by D. L. Cook

0' - 36'6" Red and white schist showing iron staining due to weathering along fractures. Pyrite in quartz-filled fractures. These veins have mostly lost their identity due to assimilation by the country rock during subsequent metamorphism.

3" limestone band at 32' with a core to bedding angle of 60°
Core to schistocity angles are:
60° at 33'
55° at 28'
55° at 19'
50° at 17'

33'6"-41" Coarsely crystalline limestone. At its upper contact there has been brecciation and partial digestion of the schist.

41' - 49' Black and red schist. Core to schistocity angle at 41' = 75° (// contact).

49' - 52' Quartz diorite from 49' to 51'3", Quartz monzonite from 51'3" to 52'. These granites probably represent two intrusive phases rather than differentiation of the one intrusive magma as their contact is sharp and they can be seen transgressing each other.

52' - 60' Coarsely crystalline limestone. Diopside or epidote veins at 59' at 60° to the core direction.

60' - 73' Quartz diorite, highly fractured.

73' - 101' Coarse crystalline limestone with core to bedding angles as follows:
60° to 65° from 83' to 86'
45° at 100'
73° at 92'1"

101'-106'4" Fine grained diopside skarn with minor schistocity at 30° to the core at 108' (<0·5% scheelite). Ferruginous weathering along fractures between 101' and 104'6". A set of en echelon fractures 1/8" wide with chalcopyrite occur between 104'6" and 105'2".

106'4" - 119' Red (biotite) schist with ferruginous weathering along fractures between 111'10" and 112'11". Minor slickenside at 20° to the core direction. Schistosity to core angles are:
35° at 109'10"
65° at 110'8"
45° at 111'8"
40° at 112'2"
65° at 118'.

119' - 120' Medium-grained biotite, quartz, epidote, diopside rocks without schistosity.

120' - 142'6" Red (biotite) schist. Schistosity at 141'6" is 25° to core direction.

142'6" - 151'6" Green, partly quartzitic schist. Schistosity to core angles are:
50° at 144'
45° at 145'6"
70° at 151'6"

151'6" - 242'6" Red schist with the following schistosity to core angles:

45° - 50° at 157'6	50° at 202'
50° at 161'6"	50° at 208'
55° at 169'	45° at 214'
60° at 176'6"	50° at 220'
50° at 181'6"	50° at 225'
30° at 184'	55° at 229'
55° at 190'6"	55° at 235'
55° at 196'	60° at 240'

Silicified from 161' to 173'.

4" quartz blow with marginal pyrite between 152'8" and 153'.

Pyrite at 166'.

Minor fault fractures with pyrite at 187' and from 189' to 190'6".

Minor pyrite in fractures from 235' to 236'.

242'6" - 245'1" Volcanic dyke at 55° to the core direction. Chloritized and probably Trachyandesite.

245'1" - 262' Schist.
Schistosity to core angles are:
70° at 246' 70° at 258'
50° at 250' 55° at 261'6"
Minor pyrite in fractures at 259'9" and 265'. Fault at

Core Recovery: Hole No. 1

Drill Run	Recovery	Loss and Nature of Loss	
' - 23'	4'	19'	Overburden
' - 32'	7'	2'	Only very minor grinding evident.
' - 42'	6'6"	3'6"	Grinding throughout.
' - 52'	4'6"	5'6"	" "
' - 60'	7'6"	6"	" "
' - 73'	3"	12'9"	Caved ground and mud seam.
' - 83'	10'	—	
' - 93'	7'9"	2'3"	Grinding throughout
' - 99'	6'		
' - 109'	7'6"	2'6"	" "
' - 119'	8'6"	1'6"	" "
' - 142'	2'	23'	" "
' - 146'	2'6"	1'6"	" "
' - 151'	2'10"	2'2"	" "
' - 155'	2'	2'	" "
' - 161'	5'	1'	Grinding at 156'
' - 166'	3'	2'	Grinding at 7 points between 163' and 165'8".
' - 173'	4'4"	2'8"	Grinding at 169' and ? caved before 173'.
' - 177'	3'	1'	Grinding mainly at 174' and 176'
' - 182'	5'		
' - 191'	7'	2'	No grinding evident.
' - 197'	5'	1'	Grinding throughout (possible cavity at 194').
' - 206'	7'	2'	Grinding mainly at 205'
' - 216'	5'6"	4'6"	Grinding throughout
' - 223'	4'	3'	Grinding mainly in lower section.
' - 228'	4'	1'	Grinding mainly in lower section.
' - 235'	4'	2'4"	Grinding mainly in upper section.
' - 243'	5'	3'	Grinding throughout.
' - 252'	5'6"	3'6"	Grinding throughout.
' - 262'	10'		

% Recovery = 60

UNION CARBIDE RECORD BH 2 BRALORNE

Final Depth - 89'

Commenced - July 21st, 1969

Completed - July 22nd, 1969.

Grid Ref. of Collar L4-88:3-5W
Collar Elevation - 5070'
Dip-30°
Azimuth - 59° (Mag.)

0" - 15' Overburden.

15' - 35' Schist (Red and green to 20', green from 20" to 35'). The schistosity has the following angles to the core:
40° at 15' 6"
30° at 18'
35° at 25'
42° at 35' (distortion of the schistosity has occured due to the influences of silicification and skarnification). A diorite/quartz diorite band about 2" thick occurs at 20'. Its contact is parallel to the schistosity and therefore is at 30° to the core. A second 2" band of quartz diorite, occurs at 24' at 10° to the core.

35' - 45' Silicified schist with diorite between 41'6" and 42'. The core to contact angle of this silicification with the overlying schist is 25°.

Pyrite occurs between 44' and 45'.

45' - 47'6" Fine-grained garnet skarn containing about 0·5% scheelite.

47'6" - 50' Gradational from skarn through quartz diopside rock with minor scheelite to granitic rocks.

50' - 56'6" Diorite and uetaquartzite.

56'6" - 61' Calcite ? diopside rock. Scheelite between 57'6" and 57'7" ($< 0·25\%$).

61' - 64' Coarse-grained garnet skarn with powellite of less than 0·25%.

64' - 70' Medium-grained garnet skarn with about 0·25% scheelite. The frist 2" has $< 0·25\%$ chalcopyrite.

70' - 89' Silicification ([illegible] between 70' and 75'), pyritization (mainly at 71') and [illegible] or epidotization (between 70' and 75') occur in schist. Although decreasing in intensity, they still occur at the bottom of the hole.

The schist is green between 70' and 75' and red between 78' and 80'. 2" of $< 0·25\%$ chalcopyrite at 79'.

MR. J. E. ROCKINGHAM
TORONTO

DECEMBER 29th, 1969

R. D. WESTERVELT

JOHN WILKINS
DAVE COOK √
HELMUTH URHAHN

1969 TUNGSTEN ASSAYS

Dear Eric:

During the 1969 season, samples submitted for tungsten assay from Carbide's field operations were routinely run at Coast Eldridge's lab in Vancouver.

From all the samples assayed, a representative suite was selected and the pulps were sent to Carbide's lab in Grand Junction for comparative checks.

Comparative results were received as follows:

	% WO_3 Assay by Coast Eldridge	Assay by Grand Junction
1. RIBA PROPERTY		
Sample No. 9	0·05	0·06
14	0·12	0·14
22	0·05	0·08
2. CHALCO PROPERTY		
Sample No. 32946	Trace	0·04
32912	Trace	0·02
32948	0·07	0·38
32904	0·07	0·08
34776	0·33	1·30
32917	0·88	0·97
32939	1·03	0·43
32918	1·41	1·72
32923	2·27	2·22
32913	3·22	4·71

Continued .../2

COMMENTS:

1. In General, there is very close agreement between the two labs on the very low results.

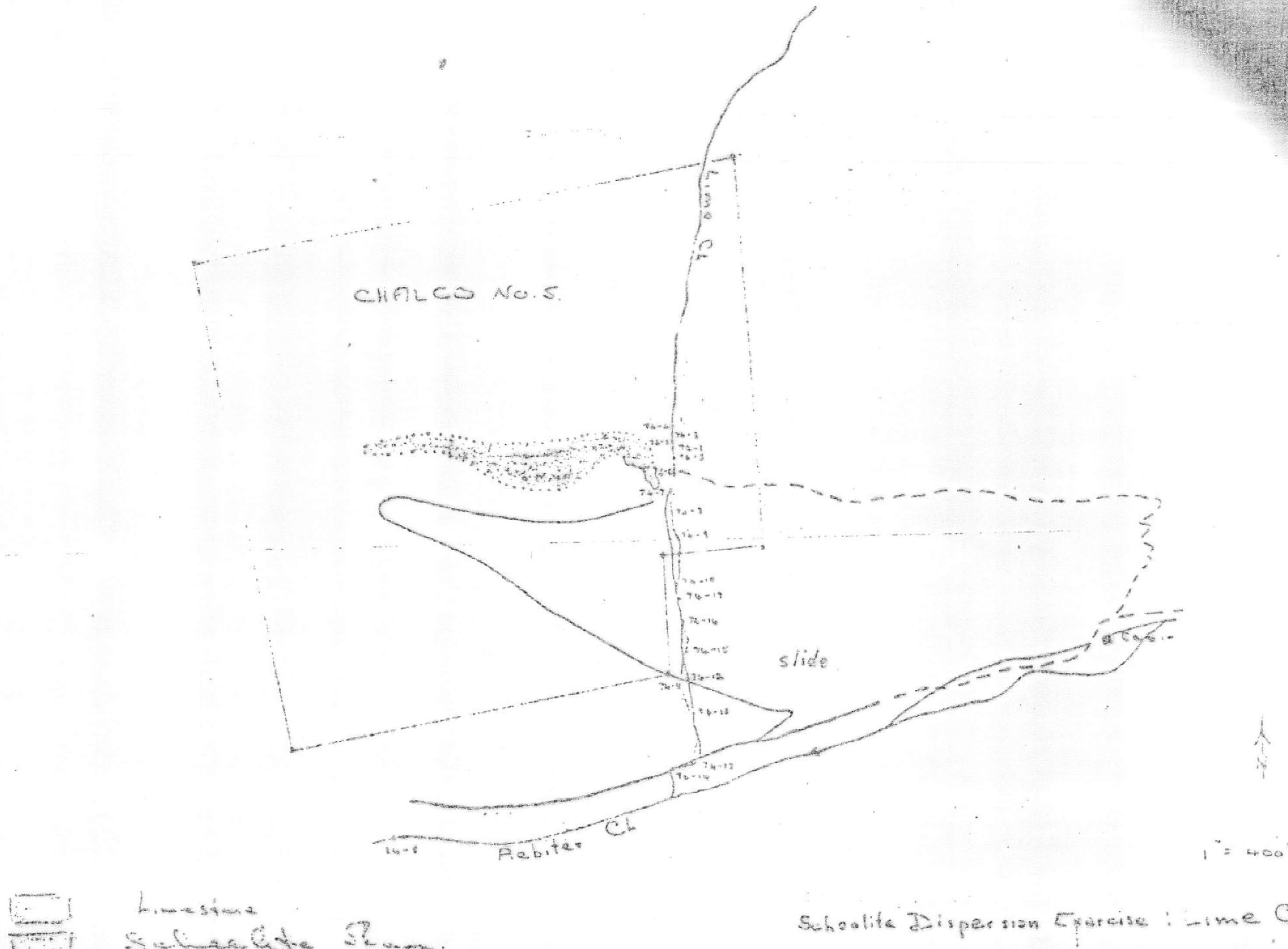
2. In the higher ranges, there is considerable discrepancy with Grand Junction being both higher and lower than the results reported by Coast Eldridge. This most probably has resulted from the coarseness of scheelite in these samples and improper mixing and sampling of the pulps.

3. Unfortunately, these discrepancies occur in the ranges of economic interest. Although these variations are not sufficiently serious to affect the overall results of the 1969 season, the problem should be bourne in mind for future reference.

4. I would suggest in future that any assays above 0·9% WO_3 be suspected and that representative checks be sent to Grand Junction for priority comparative purposes.

R. D. Westervelt

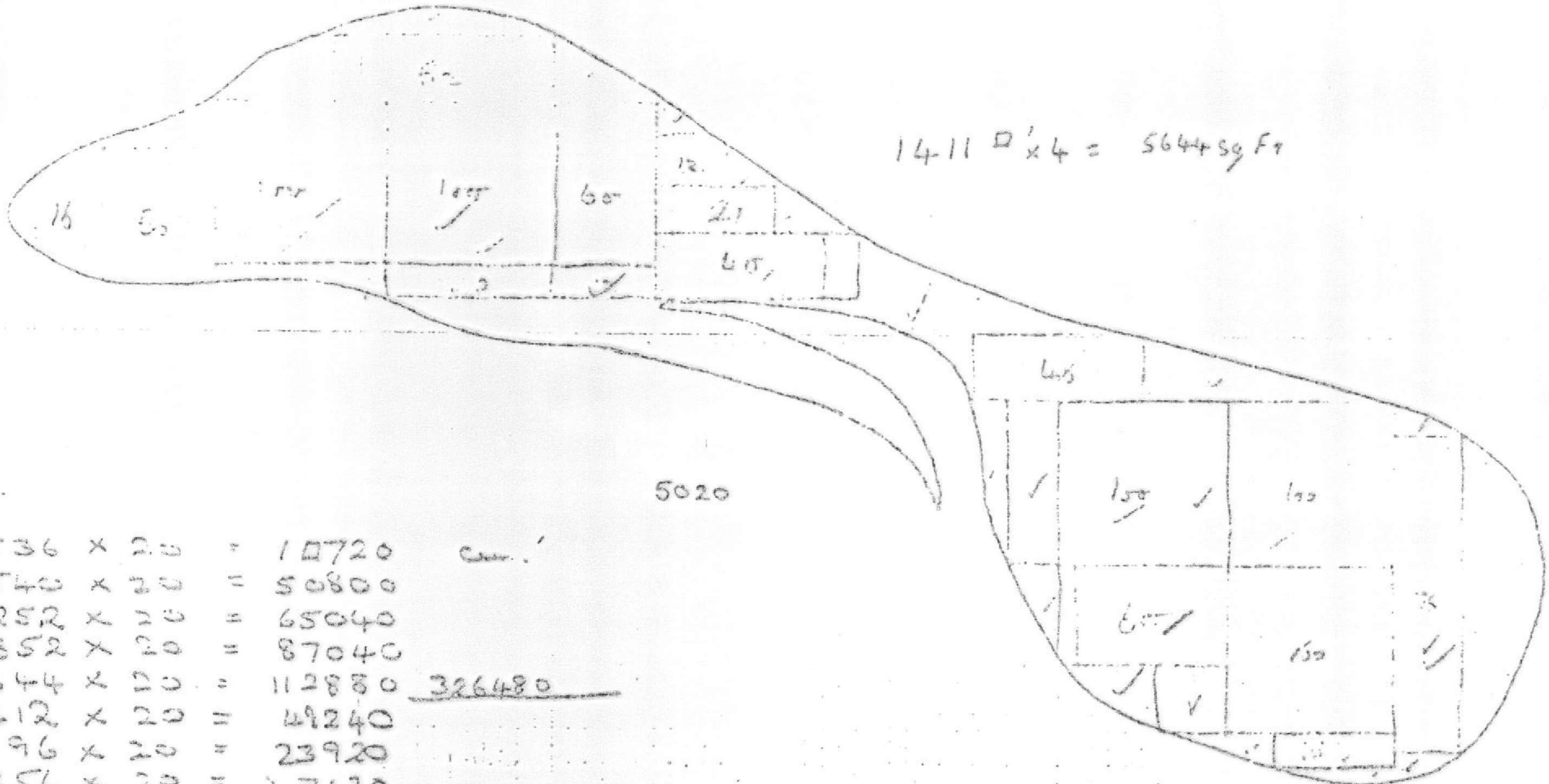
RDW:dm



Schoolite Dispersion Exercise : Lime Ck

Samples 74-1 to 74-18 (74-1, 74-8 + 74-10 Dust

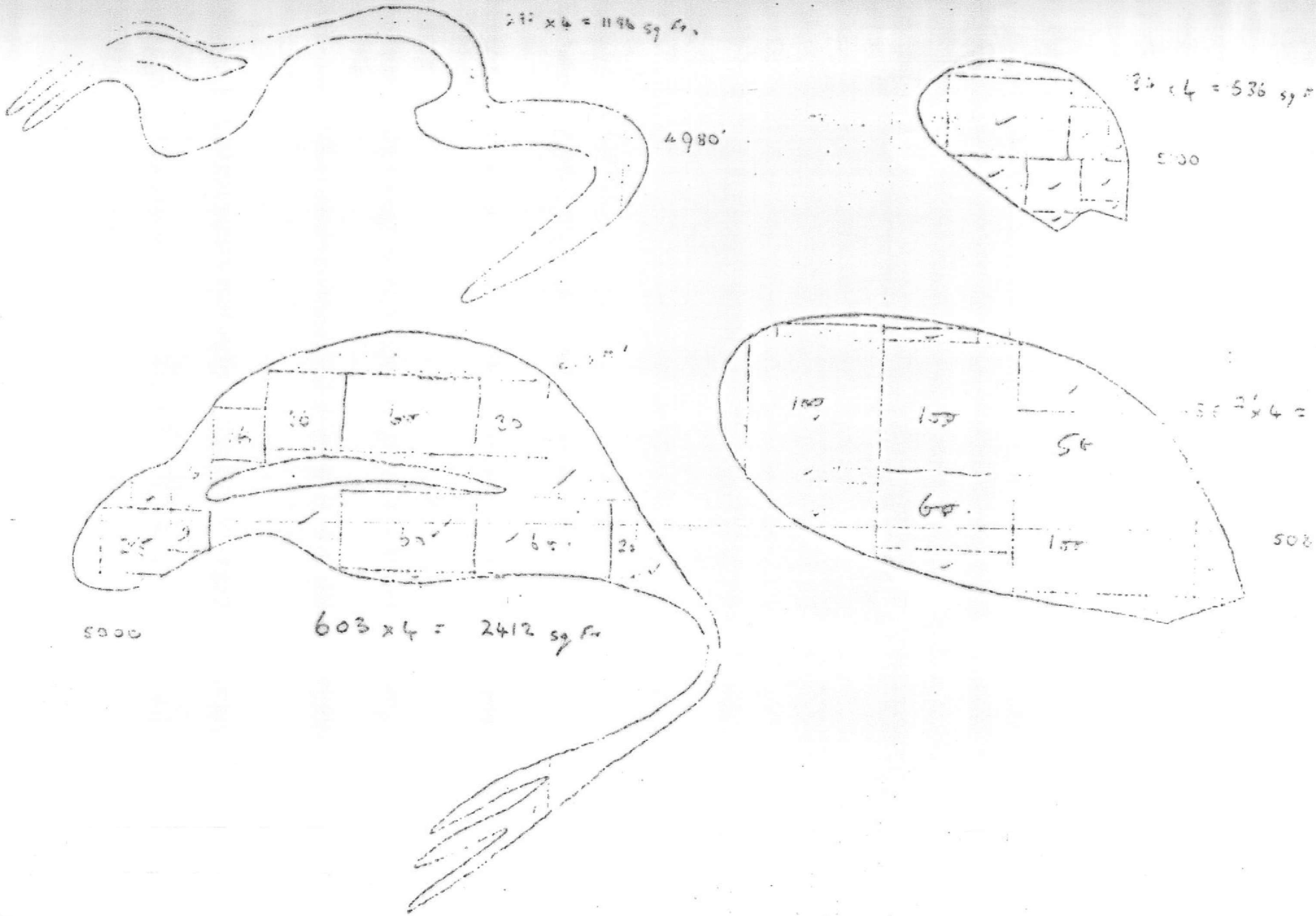
1411 □' x 4 = 5644 sq Ft



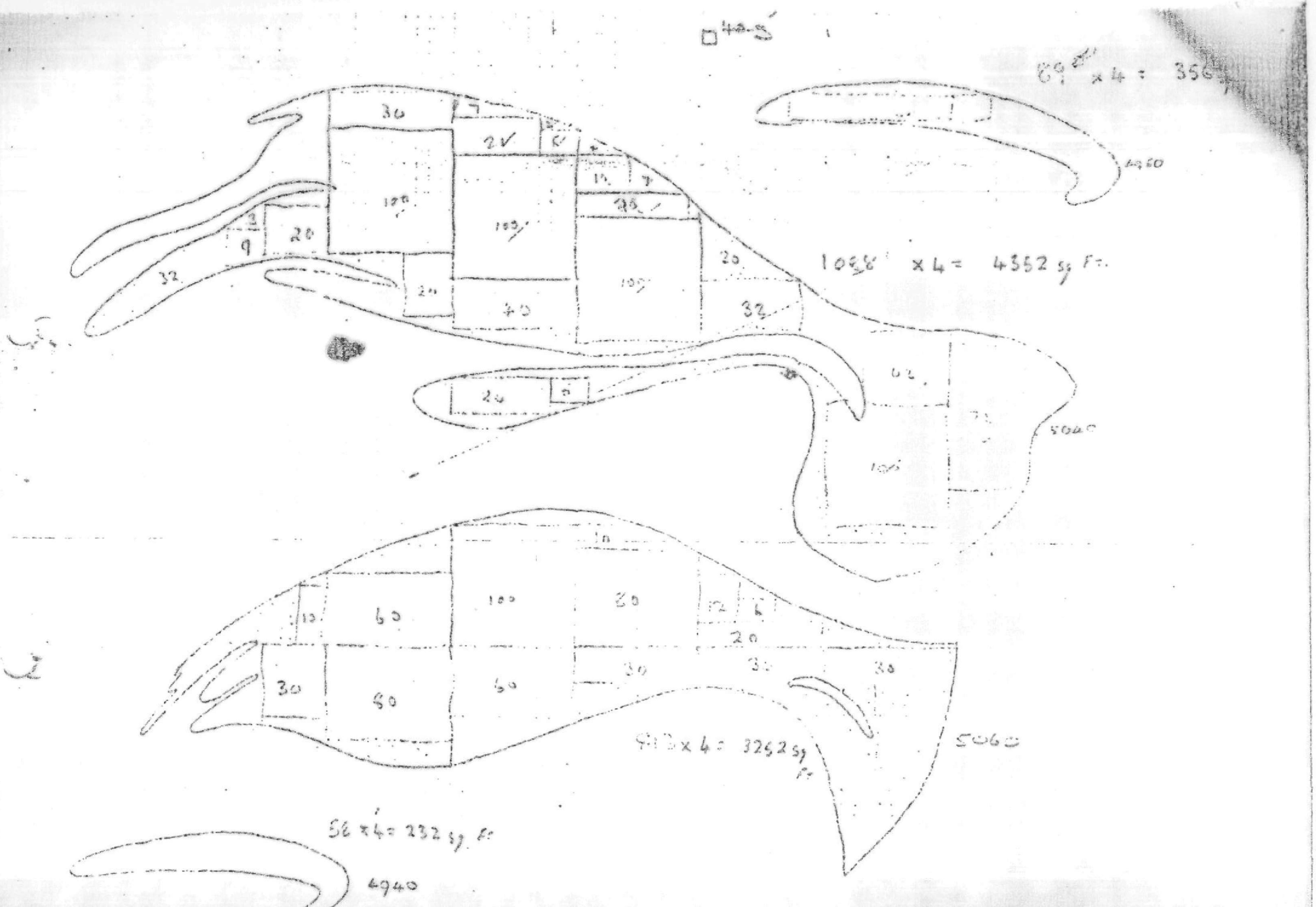
5020

536 x 20 = 10720 cu.'
540 x 20 = 50800
252 x 20 = 65040
352 x 20 = 87040
644 x 20 = 112880 326480
412 x 20 = 49240
196 x 20 = 23920
356 x 20 = 7120
232 x 20 = 4640

410400 cu.'



x 4 = 1196 sq ft.
4980'
= 536 sq ft
603 x 4 = 2412 sq ft
5000
508


1088' x 4 = 4352 sq Ft.
58 x 4 = 232 sq. ft
5060
4940