COMINCO LTD.

EXPLORATION WESTERN DISTRICT

1991 EXPLORATION REPORT

PAN GROUP

Sullivan Mine Claims

Fort Steele Mining Division
NTS 82F/9, 82G/12

ASSESSMENT REPORT

Latitude 49° 42.5'N Longitude 116° 00'

Work Performed October to December 1991

Operator: Cominco Ltd. (Kootenay Exploration)
1051 Industrial Road #2
Cranbrook, B.C. V1C 4K7

May 1992 P. W. Ransom

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1.00 INTRODUCTION

1.10 Location and Access

The Sullivan property surrounds Kimberley, B.C. Community, logging and exploration roads provide good access to most of the property (Plate 1).

1.20 Property and Definition

The Sullivan property is 100% Cominco owned and comprises 680 Crown grants, 1013 mineral claims and claim units and one mineral lease (Plate 1).

1.30 Specific Location

DDH 6465, the hole being reported on, was drilled 4 km NNW of Sullivan Mine on the Hope 12 Crown granted mineral claim (Plate 2).

1.40 Physiography

Terrain is varied from being subdued to nearly flat adjacent to the Rocky Mountain trench on the east to mountainous on the west. Where there is no development vast stands of mature timber predominate.

1.50 History

Sullivan was discovered in 1892 shortly after the smaller North Star and Stemwinder deposits a few kilometres to the south. Minor production and local smelting took place before 1909. Cominco, then the Consolidated Mining and Smelting Company of Canada Ltd., acquired the property, and by 1923 developed the mine, conducted research on differential froth flotation that permitted separation of the various sulphides, and commenced mining and milling at 3000 tons per day. Production was expanded in stages reaching a maximum of 11,000 tons per day. Present production is about 6000 tons per

day. Total size of the deposit, including milled dilution, is 162,000,000 tonnes of 6.0% Pb, 5.9% Zn and 67 gm/t Ag.

1.60 Objective

The objective of the 1991 program was to commence a deep exploration drill hole to test the faulted continuation of the Sullivan sulphide deposit north of the Kimberley Fault.

1.70 Procedures

Three bridges capable of carrying 100 ton loads were constructed to provide heavy equipment access to the drill site in Mark Creek valley. Diamond drill hole 6465 was collared at -68^0 W at the selected site.

2.00 DETAILED TECHNICAL DATA AND INTERPRETATION

2.10 Geology

The Sullivan orebody is a stratiform deposit in strata near the contact of the lower and middle divisions of the middle Proterozoic Aldridge Formation. The Aldridge Formation is a sequence of siliciclastic sediments over 5 km thick. Both divisions contain beds with thicknesses from lamination to very thick. In general the lower division is characteristically thin bedded, the middle division is typically medium bedded. Pyrrhotite is disseminated in both divisions, particularly in the thin beds; Lower Aldridge is therefore, more rust weathering than Middle Aldridge. Depositional setting of these strata is inferred to be an intracratonic basin.

At Sullivan several unusual rock types are present. Intraformational cross-cutting and stratabound pebble fragmentals and tourmalinite are below the sulphides. These rocks are interpreted as the result of penecontemporaneous basin instability and initial alteration associated with hydrothermal venting. Above these and associated rocks is the orebody, up to 100 m of sulphides, much of which is laminated. Very thick (up to 5 m) siliciclastic beds containing clasts, up to 1 m thick and 10 m long of barren laminated pyrrhotite, are intercalated with the upper (except very central) part of the sulphide pile. These are interpreted as debris flows derived from the margins of the sub basin; the barren pyrrhotite clasts are inferred to be rip-ups derived from the distal fringe of the sulphide body that had already been deposited. These relationships indicate the central part of the orebody was a sulphide mound and that laminated ores on the flanks were deposited in the topographically lowest parts of the sub-basin. Very thick (up to 10 m) graded beds occur over the bulk of the deposit; these are capped by very thick argillite containing fine laminations and disseminations of pyrrhotite and, very proximally, limited areas of laminated sulphides up to 5 m

thick. Each of these very thick graded beds is interpreted to be a thickened turbidite, formed by acceleration into, and capture by the sub-basin of what would otherwise have been an ordinary turbidite had no sub-basin been present. The laminated argillites comprise slowly deposited fines that accompanied the turbidite plus residual fines associated with introduction of pebble fragmentals, debris flows and ore. These unusual rocks constitute the sub-basin facies. They are covered by a regionally extensive hemipelagic carbonaceous laminite up to 20 m thick that marks the top of the Lower Aldridge Formation.

The Sullivan orebody is cut by the 55^0 north-dipping Kimberley Fault. Net offset is sinistral oblique slip and the faulted continuation of the sub-basin facies is 4 km to the northwest at a depth of 2.5 km. The Kimberley Fault was not penecontemporaneous, as there are no related changes in thickness of Aldridge stratigraphic units. The fault may have been active during Proterozoic, Cambrian, Devonian and Eocene periods of extension. Deflected strata on the north side of the Fault indicate substantial dextral movement, inferred to have taken place during Cretaceous contraction. These relationships indicate sinistral offset during periods of extension quite substantial. Several steep, generally westerly dipping, normal faults of less than 30 m offset cut the orebody. The orebody is on the crest and east limb of an open gently north-plunging anticline. Maximum dips are about 55^0 ENE.

2.20 Diamond Drilling

DDH 6465 was drilled to a depth of 180 metres during December 1991. Normal Middle Aldridge strata were cored over the interval drilled; detailed rock descriptions are in the log, Appendix A.

3.00 DISCUSSION OF RESULTS

Normal Middle Aldridge strata were cored. Bedding is flat-lying in outcrop at the collar and appears to be flat-lying over most of the interval cored. Comparing this information with bedding from outcrop and other core holes, DDH 6465 can be interpreted to be penetrating the relatively flat west limb of large overturned anticline. The axial plane of the anticline dips moderately to steeply west and surfaces about 400 metres to the east.

This hole is 1 km northeast of DDH 6464 that penetrated 30 cm of stratiform sulphides within the faulted continuation of the Sullivan sub-basin north of the Kimberley Fault at a depth of 2.5 km. The Cub west dipping normal fault, that has about 500 m offset, projects through this area and the expectation is that mineable thicknesses and grades are at a depth of 2 km in the vicinity of DDH 6465.

The core is located at Cominco's storage in Kimberley; the core was not assayed. T.K.

4.00 CONCLUSIONS

DDH 6465 cored Middle Aldridge strata to 180 m. The potential sulphide target is inferred to be at a depth of 2 km.

5.00 REFERENCE

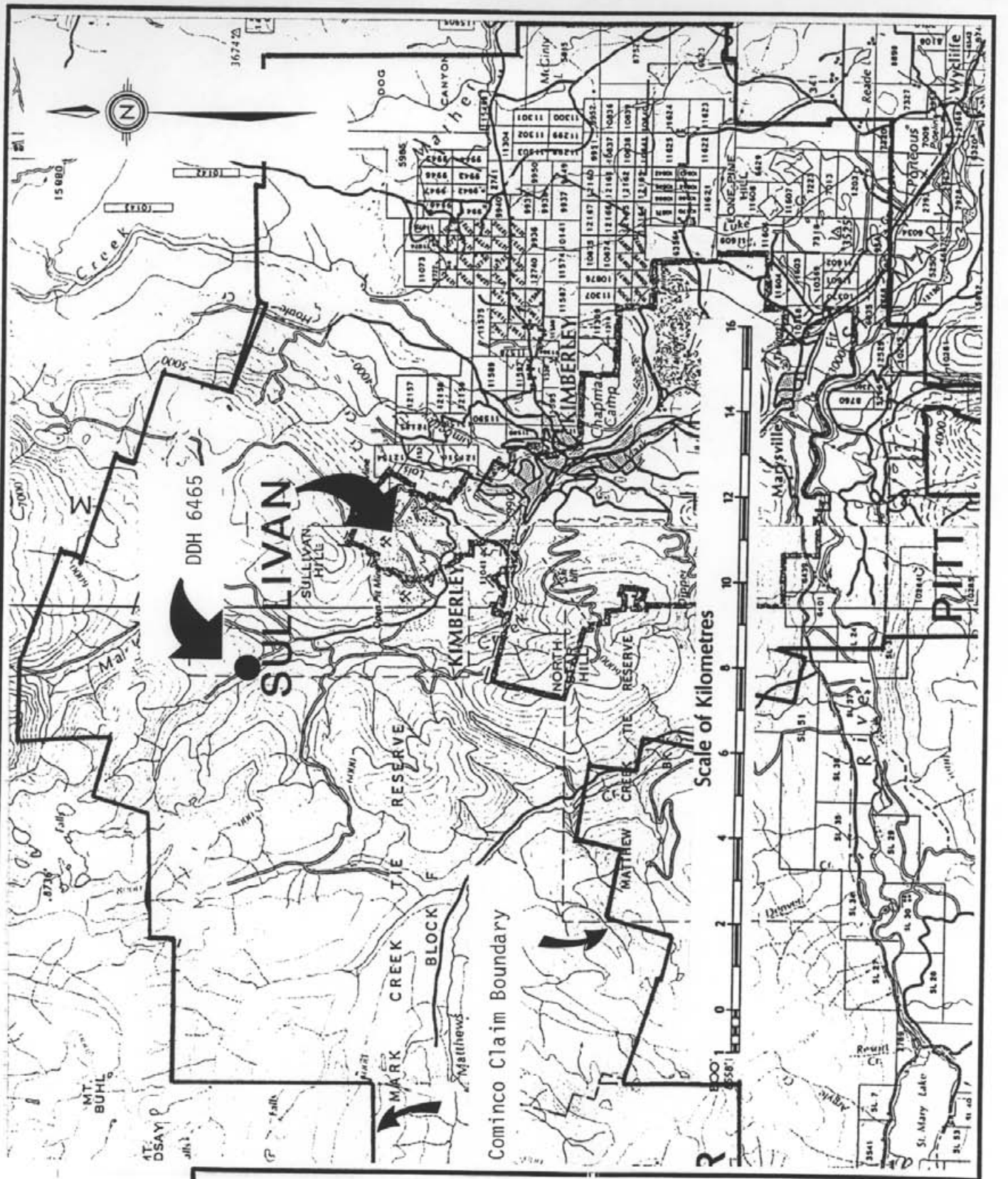
Ransom, P. W. (1989) Diamond Drilling Report, Assessment Report, Telfer and Burgess Groups.

Signed by: P. Ransom
P. W. Ransom
Project Geologist

Approved by: D. Anderson
D. Anderson
Senior Geologist

Endorsed by: W. J. Wolfe
W. J. Wolfe
Manager Exploration

cc: Mining Recorder (2 copies) ✓
Western District
Kootenay Exploration



Iss'd To:	Date:

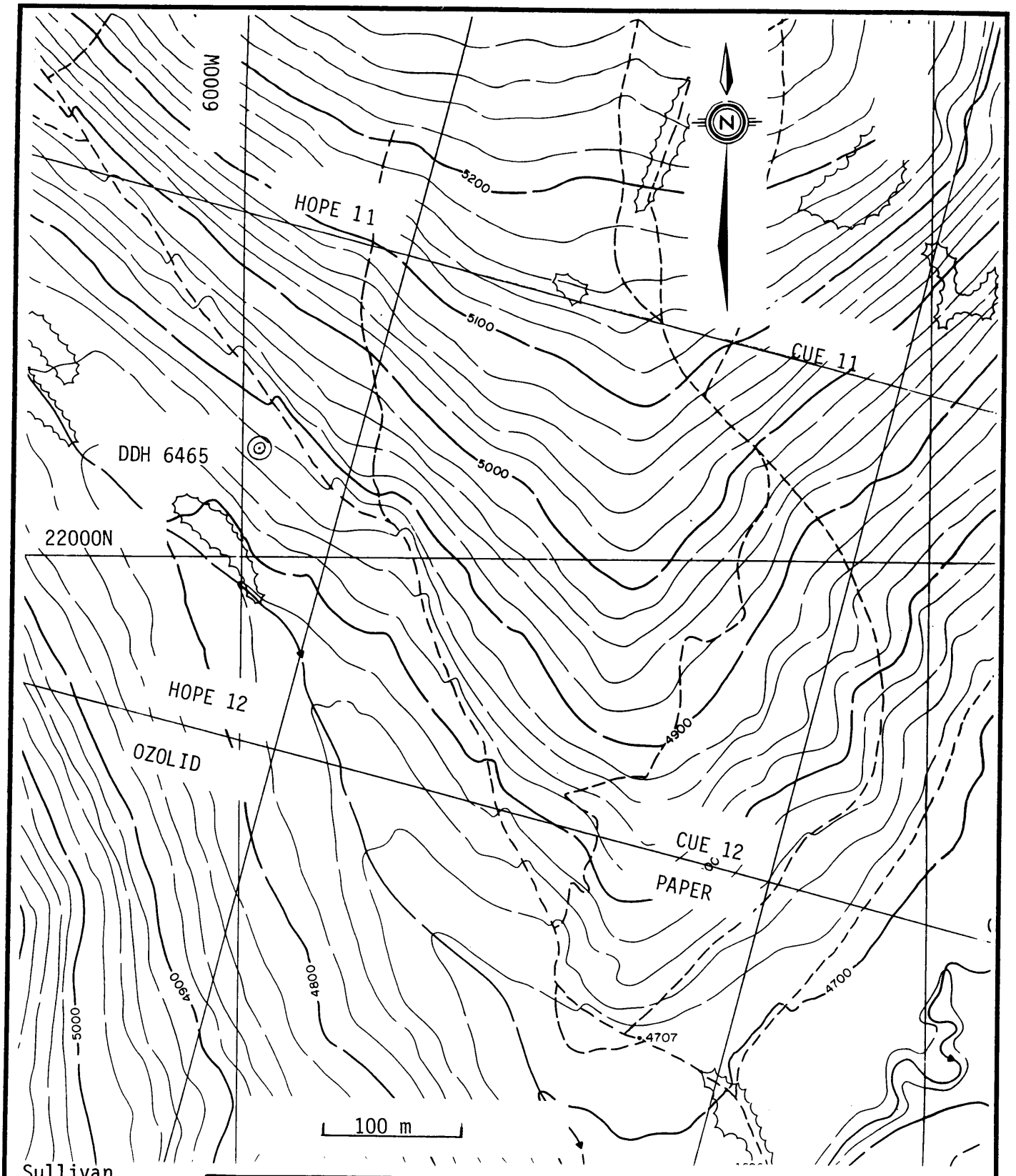
LOCATION MAP

COMINCO CLAIMS NEAR KIMBERLEY

AND DDH 6465

Drawn by:	Scale:	Date: May 1992	Plate: 1

BCIL - 3271 - C.L.



Sullivan
Imperial
Grid Reference

Cominco

Iss'd To:	Date:

DRILLING SURFACE PLAN

DDH 6465

Drawn by:	Scale: 1:4800	Date: May 1992	Plate: 2

EXHIBIT A

STATEMENT OF EXPENDITURES

DIAMOND DRILLING - SULLIVAN MINE CLAIMS

FORT STEELE MINING DIVISION

Roadbuilding, bridge construction and site preparation:	
Cominco Ltd., Kimberley Metals	10813.09
Remote Contracting	25258.51
Drilling:	
Connors Drilling 2007 W. Trans Canada Highway Kamloops, B.C. V1S 1A7	24186.91
Supplies:	1856.44
Transportation:	
Truck 20 days @ $40/day	800.00
Salaries:	
P. W. Ransom 20 days @ $285/day	5700.00
TOTAL:	$68614.95

COMINCO LTD.

EXPLORATION WESTERN DISTRICT

AUTHOR'S QUALIFICATIONS

As author of this report, I, P.W. Ransom, certify that:

I am a geologist active in mineral exploration.

I am a graduate of McGill University with a degree of Bachelor of Science.

I have been continuously engaged in mining and exploration since 1966.

I am a member of the Geological Association of Canada.

I supervised Cominco Ltd.'s Sullivan Surface diamond drilling program in 1991.

P. W. Ransom
Project Geologist

IN THE MATTER OF THE

B.C. MINERAL ACT

AND

IN THE MATTER OF A DIAMOND DRILLING PROGRAM

CARRIED OUT ON THE SULLIVAN MINE CLAIMS

in the Fort Steele Mining Division of

the Province of British Columbia

More Particularly N.T.S. 82F/9, 82G/12

A F F I D A V I T

I, Paul W. Ransom, of the rural district of Wycliffe, in the Province of British Columbia, make Oath and say:

1. That I am employed as a geologist by Cominco Ltd. and as such, have a personal knowledge of the facts to which I hereinafter depose:

2. That annexed hereto and marked as Exhibit "A" to this my affidavit is a true copy of expenditures incurred on a diamond drill program on the Sullivan property.

3. That the said expenditures were incurred between September 1 and December 31, 1991.

P. Ransom

P. W. Ransom
Project Geologist

D R I L L H O L E R E C O R D **COMINCO LTD.**

Property Sullivan	District Western	Hole No. 6465	
Commenced Dec. 14, 1991	Location NW Mark Creek	Tests At	Hor. Comp.
Completed Dec. 20, 1991	Core Size HQ	Corr Dip -68^0	Vert Comp
Co-ordinates 22310 N; 5950W (Sullivan Mine Grid)		True Brg 270^0	Logged By P. W. Ransom

Objective Test Faulted Continuation of Sullivan Deposit

From	To (feet)	
0.0	26.0	Overburden, broken bedrock. Middle Aldridge Formation.
26.0	47.0	Wacke, some very weakly calcareous; medium grey; very thick bedded, some contacts not clear, others with rare 1 to 3 cm thick slightly darker (carbonaceous?) laminite are sharp and flat; resedimented appearance, pyrrhotite wisps aligned along laminations; 54^0 @ 26.5′, 56^0 @ 44.0′.
47.0	78.5	Wacke, approaches quartz wacke below 77.0′, moderately to weakly calcareous; medium grey; very thick bedded, only rare sharp and flat contacts are with slightly darker laminites (one is a 20 cm interval at 60.0′; as with preceding interval, beds appear resedimented, there is less pyrrhotite some of which is disseminated along vague laminations and some oriented in cleavage (noted 75 - 78.5′); 58^0 @ 59′.
78.5	93.0	Wacke and sub wacke, not to rarely very weakly calcareous; medium grey; thick to medium bedded, some weak pyrrhotite disseminated along laminations, decreasing with depth, most abundant pyrrhotite is confined to a 10 cm interval of darker laminite at 83.0, only distinct contacts are those of narrow darker laminites, beds have a massive appearance; core largely broken from 87.0 to 93.0, fault at 88.5′ of 5 cm gouge and platy rock at about 37^0 with an associated close-spaced fracturing of 22^0; 58^0 @ 79′, 70^0 @ 83, 65^0 @ 89.5′, 75^0 (undulating slightly) at 90.5′.
93.0	102.5	Wacke, subwacke; medium grey with few thin dark grey layers; laminated and very thin bedded; contacts initially were sharp to distinct, suspect flat; tight to isoclinally folded, cleavage folia of biotite? or dark carbonaceous material developed only in hinge zones at 65^0. A 10 cm silicified zone at 98.5 is probably afault, probably a thrust as adjacent laminae are isoclinally folded and parallel to it @ 50^0.
102.5	174.0	QW - (QA) 60% (some very weakly calcareous), W-SW-A 40%; light grey, medium to rarely dark grey; very thick to thick bedded, medium to thin bedded and some laminations in intervals usually less than 50 cm;

1 Foot = 30.5 cm

grading noted, occasional carbonaceous clast noted (108, 150, 158-159); effects of folding in SW-A layers 123-138 and 158-167; 42^0 @ 109′, 45^0 @ 139′, 56^0 @ 170′. Attempt to mark core for orientation produced ambiguous marks on concave surface.

174.0	187.0	Porphyritic gabbroic intrusion; upper contact indicates a sill, lower contact broken; green with altered pale greenish white plagioclase phenocrysts.
187.0	336.0	QA (QW) with less than 10% W, SW/A; light grey very thick to thick bedded with thin SW/A tops and interbed intervals less than 40 cm thick, bed contacts sharp to distinct, flat to wavy (some not clear because of broken core; 64^0 @ 216, 65^0 @ 255′, 67^0 @ 275′, 55^0 @ 290′, 60^0 @ 306′, 55^0 @ 334′. From 187.0-250.0 core commonly broken; 4′ short between 222 and 228, FAULT 223-227.5 30 cm recovered is clay and incohesive fine (1-5 mm) rock fragments; 5′ short 228′-235′, 3′ short 235′-239′, 2 short 239′-242;, 2′ short 242′-245, 4.5′ short 245′-250;, interval 228′-250′ is typically fragments of QA 1 to 5 cm across, helper mentioned mislatch at 250′ accounting for that 4.5 m core loss. From 250-302 core condition is fair to good; 302-336 several broken sections and possibly fault crush rock (QA) 316-327 (some of which is healed, some incohesive).
336.0	352.0	W, SW, A; dark medium grey gradually becomes lighter below 349.0; thick to medium bedded; contacts sharp to distinct and flat; argillaceous patches and rip-ups in some beds indicate possible amalgamation; very fine grained; bedding 79 @ 344′, 65 @ 349′. Cleavage in pinch-swell siliceous layers at 347′ indicates strata are about horizontal.
352.0	362.0	QW, minor W, SW, A; medium grey; thick (few thin) bedded; contacts sharp and flat; very fine grained; 58^0 @ 356′.
362.0	364.5	W, minor SW and A; dark grey; laminated; contacts sharp and flat: 55^0.
364.5	387.0	QW (QA) with 35% W, SW, A; medium grey; thick, lesser medium, bedded, with a few thin beds; contacts generally sharp and flat, some wavy to irregular; very fine, possibly some fine, grained; several pebble to plate-like clasts from 5x5 mm to 5x30 mm within a 20 mm band of a thick bed; 55^0, 30^0, 0^0 @ 374.
387.0	392.0	W (SW, A); medium grey; thin, very thin bedded and laminated; some cross-laminated; contacts sharp to indistinct, most flat, some wavy; 56^0 @ 391.5′.

392.0	398.0	QW with 10% W, SW, A as tops; light grey; 3 beds - medium, very thick and thick; contacts distinct to sharp; very fine and fine grained.
398.0	400.0	W, SW,A; dark medium grey; medium and thin bedded, contacts sharp and flat, 56^0.
400.0	410.0	QA, QW; medium grey; thick bedded; contacts distinct to sharp.
410.0	415.0	W, SW (A); medium grey; medium to thin bedded; contacts distinct to sharp 60^0 @ 413'; core lightly broken.
415.0	418.0	QA; light medium grey; single thick bed; contact sharp; fine grained.
418.0	432.0	W, SW, A; grey; thin to medium bedded, two thick beds; contacts sharp to flat, occasionally wavy, 3 cm flame structure at 42; rounded black argillite pebble clasts in one thick bed and a shredded laminated clast in the other; 65^0 @ 430; 10 cm crush zone at 431' (FAULT?).
432.0	452.0	QA, with 5% A, light medium grey; very thick bedded with some medium and thick beds; contacts sharp and flat to wavy (some broken); fine and very fine grained.
452.0	455.5	SW, A (W, SW); medium grey; thin and very thin bedded; contacts sharp and flat to 453.5 then attenuated and shredded below: several rounded black argillite clasts to 15x40 mm (localized debris flow).
455.5	495.5	QA, QW 70%; W,SW, A (30%); light grey to medium grey alternation of a small number of medium to thick beds of QA, QW with intervals of SW A (W) in which laminations and beds are attenuated to shredded and in which rip-up clasts are common; however contacts of many beds are sharp and flat; fine to very fine grained; 57^0 @ 458', 58^0 @ 488'.
495.5	503.0	W, SW and A; dark grey; laminated and very thin bedded; laminations and contacts sharp and flat; beds are graded; 58^0.
503.0	575.0	QW, QA (W) 80%, light medium grey, medium and thick bedded; W, SW, A 20% medium grey, thin and very thin bedded and laminated; contacts are usually sharp and flat, some are wavy, possible flame structure at 503. The W, SW, A occurs in intervals 0.5 to 2.0 feet thick; contacts within these intervals above 525 are typically shredded and flat rip-up fragments are common. From 515-530 core is partially bleached along fractures and there is some irregular shearing resulting in broken core; also

		quartz veinlets and irregular pods are present in 2 areas. 62^0 @ 537; 68^0, 10^0, 0^0 @ 541′; 60^0 @ 568′.
575.0	578.0	Only 0.5 feet of material recovered, one 3" fragment and remainder is pebbles; suspect mislatch.
578.0		Pebbles continue 0.5 feet then for about 1 foot core separates on a vertical fracture, broken but nothing unusual.
578.0	593.0	W, SW, A; medium to dark grey; medium and thick bedded with a few thin beds below 590; contacts generally distinct to sharp and flat, rarely vague; 60^0 @ 591′.
593.0	595.0	W, QW, SW, A; medium grey two thick beds.
595.0	598.0	W, SW, A; medium to dark grey; medium to thin bedded and laminated; contacts sharp and flat; 66^0 @ 597.5.

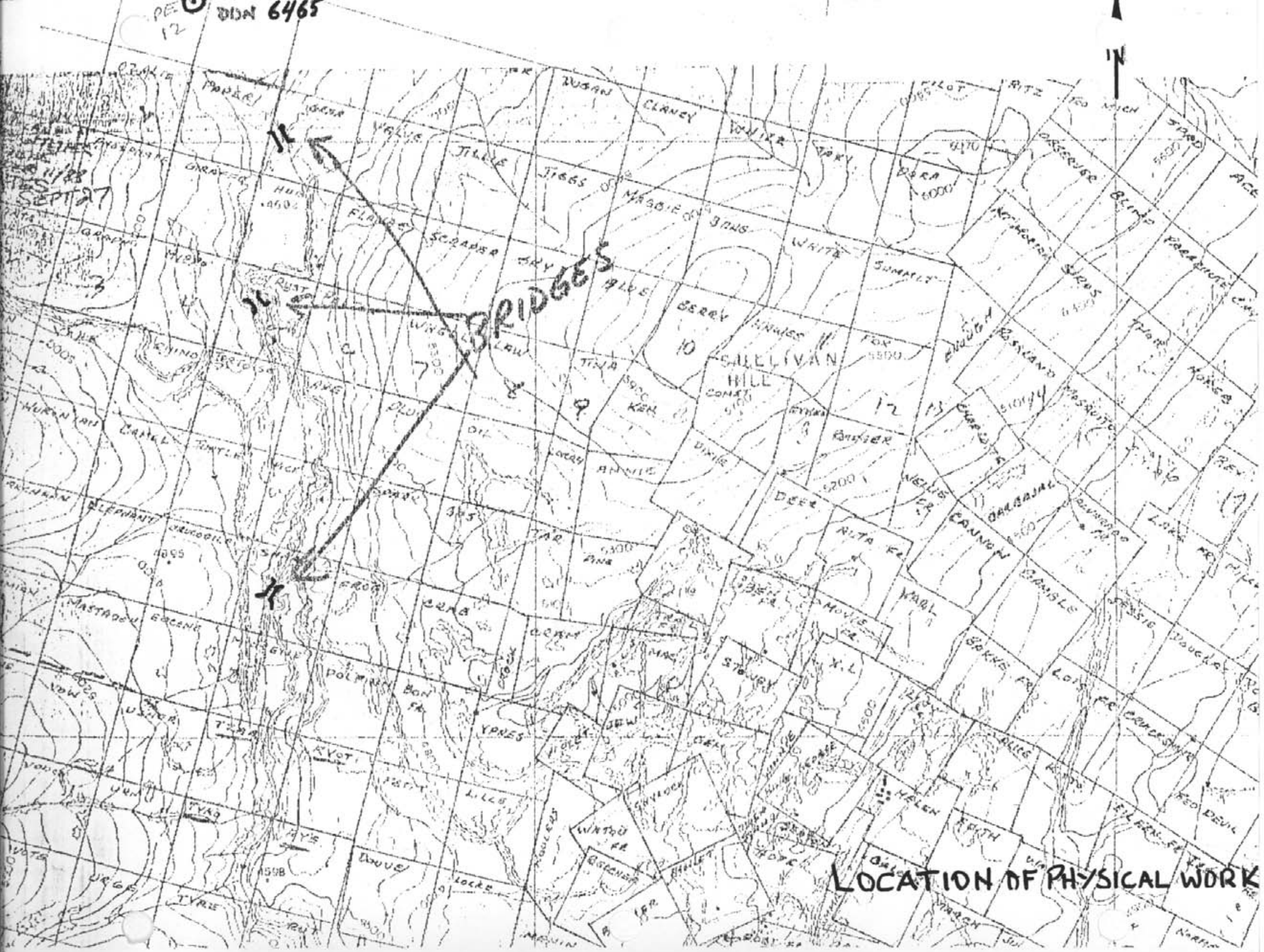
Drilling temporarily halted.

APPENDIX B

CLAIM LISTING

SULLIVAN MINE GROUP OF MINERAL CLAIMS

			Number of Units
Crown-granted M.C.			680
Held by Assessment:			
a)	TWO POST CLAIMS		
	Luke Group	75	
	Rho Group	20	
	Med Group	15	
	Donna, Etc. Group	15	
	Uke Group	11	
	Mar Group	17	
	Bad Group	36	
	Late Group	91	
	Mat Group	268	
	Jackpot	1	549
b)	REVERTED CROWN GRANTED MINERAL CLAIMS		
	Tip 4-12	9	
	Hope 2-12	11	
	Sun 2-12	11	
	Cue 2-12	11	
	B.C., Silver Bell, Tarrant	3	
	Black Hills, Yankee Girl, Wasp Fr.	3	
	Blue Dragon	1	49
c)	MINERAL CLAIMS (54)		
	Dip 1-8	56	
	Fal 1-14	84	
	Golf 1-3	17	
	Quark 1&2	12	
	Fin 1-3	18	
	Mead 1-3	36	
	Gin 1-9	110	
	Clair 24-32	56	
	Mark 1-3	17	
	Pan 1-9	9	415
Greenhorn Mineral Lease			1
GRAND TOTAL			1694


DDH 6465
SEPT 27
BRIDGES
SULLIVAN HILL
LOCATION OF PHYSICAL WORK