Starr

Property File

082FSW068

002989

GEOLOGICAL REPORT

on the

Y A N K E E G I R L M I N E

YMIR, B. C.

To:
Messrs. Weekes & Crawford

By:
Charles C. Starr,
April 1, 1934

I N D E X

	Page
SUMMARY	0
INTRODUCTION	1
LOCATION	1
TOPOGRAPHY	1
HISTORY	1
PRODUCTION	1
DEVELOPMENT	2
GENERAL GEOLOGY	2
MINE GEOLOGY, Veins	3
Fracturing	4
Rocks	5
Rock Structure	6
ORE	8
DETAILS (See Level Maps) 400 Level	8
540 "	9
800 "	11
935 "	12
1035 "	12
1235 "	13
SECTION at Y. G. * Lakeview junction	16A
ORE CONTROLS	16
PROBABLE ORE EXTENSIONS	19
PROBABLE CONTINUATION OF ORE BELOW 1235 LEVEL	21
" " " " ABOVE 540 "	23
PROBABLE ORE IN THE LAKEVIEW VEIN	24
DUNDEE VEIN	24
CONCLUSION	25

SUMMARY

The Yankee Girl vein lies in an area of schist intruded by granite which it cuts at an acute angle.

The Lakeview vein dips and strikes, locally at least, with the schist-granite contact. The Yankee Girl vein is an offshoot from the Lakeview; dips and strikes are, respectively, N 65° E, 64° N and N 40° E, 65° N. The Dundee vein is parallel to the Yankee Girl and probably also an offshoot from the Lakeview. All veins show both pre-mineral and post-mineral faulting along their walls.

The vein filling is partly replaced schist or granite, quartz, pyrite, galena, and sphalerite. The ore was formed in two stages; during the first nearly barren quartz and pyrite were deposited. The veins then re-fractured and black quartz and fine grained pyrite, galena, and sphalerite, carrying gold, were deposited, chiefly in thin lenses parallel to the walls.

The location of the orebodies seems to be controlled by the character of the wall rocks, outward rolls (anticlines) in the hanging wall, and possibly by vein junctions.

Granite is the most favorable wall rock, although one wall may be schist if the other is granite. Hanging wall rolls, or anticlines, have a steeply east pitching axis in the west end of the mine, gradually changing to a steep west pitch in the east part of the mine. The anticlinal axes corresponds well with the ore-shoots in the west and central part of the mine, but not so well in the east part where the junction with the Lakeview vein may have interfered. Lamprophyre dikes are later than the ore.

The Hobson ore-shoot will likely bottom between the 1235 and 1035 Levels. The 781-784 ore-shoot will likely bottom at about the same elevation. The 792-785 ore-shoot may bottom about the 1035 Level. These ore-shoots and the McDowell should still contain a very substantial amount of ore between the 540 and 1235 Levels. Above the 540 Level considerable exploration should be done along the anticlinal axes. Below the 1235 Level the ore zone probably shortens, but may reasonably be expected to be of substantial length for many hundred feet, but the kind of wall rock cannot be predicted to much depth with any degree of certainty.

The anticlines are fairly strong on the 1235 Level and should extend to good depths; their axes appear to radiate from a point about 2000 feet below the 1235 Level.

The Lakeview vein is largely an unknown quantity but has moderately good possibilities in all directions.

The Dundee vein appears to have little chance of producing much ore.

GEOLOGICAL REPORT

on the

YANKEE GIRL MINE

INTRODUCTION: The study of the geology on which this report is based was carried out with considerable detail in the underground workings, but needs to be supplemented by a study of the surface, which cannot be done at present on account of snow. About six weeks were spent underground.

LOCATION: The Yankee Girl Mine is situated in the Nelson Mining Division about two miles east of the town of Ymir, B. C.

TOPOGRAPHY: The veins outcrop sparingly on the south slope and shoulder of a mountain, at elevations of 4,500 to 5,500 feet, and are opened by tunnels from the south slope.

HISTORY: The five claims of the property were located about 1900. Since that time the property has been under numerous ownerships and ore has been shipped to the smelter by nearly all owners.

PRODUCTION: Up to 1915 there were shipped about 23,000 tons of ore of an average value of a little over $20.00 per ton. From 1915 to date, shipments have totalled 90,150.0 tons of an average value of $13.30; a gross production of about $1,200,000.

DEVELOPMENT: Development is through four tunnels and six intermediate levels, three of them short.

The approximate footages, omitting raises, are as follows:

Level		Elevation	Ft. Drifts	Ft. X-cuts
50	Tunnel	4654	250	30
160	Intermediate		170	30
230	"	4570	140	40
310	"	4490	140	-
400	Tunnel	4410	1,800	120
540	"	4284	2,380	300
800	Intermediate	4050	1,480	280
935	"	3925	900	130
1035	"	3830	1,000	260
1235	Tunnel	3650	2,930	1,950
	Total		11,190	3,140

Of the development on the 1235 level, 2400 feet is drift on the Yankee Girl Vein, 400 ft. drift on the Lakeview Vein, and 130 feet drift on the Spur Vein.

GENERAL GEOLOGY: (Largely from C. G. S. Memoir 76 by Drysdale.)

A broad belt of Pend d'Oreille schists runs nearly north and south and dips nearly vertical through the central part of the Ymir district. These schists consist chiefly of argillites, with micaceous schists, impure quartzites, and occasional marble; they are of Cambrian or Carboniferous age.

The schists have been intruded by large masses of granitoid rocks of Jurassic age which have a north-northeast strike, and from which numerous dikes and tongues of granite protrude into the schist at small angles from the main body.

The Yankee Girl Mine lies in the schist where it is cut by several of these granite tongues. There is a strong tendency for the granite to follow the schisting which is nearly vertical and strikes from fifteen to forty degrees east of north, at the mine.

Drysdale's mapping of the contact zone is probably more or less diagrammatic, and the granite tongues project into the schists from the north and not from the south as shown on his map.

MINE GEOLOGY - Veins: The Yankee Girl vein is in a strong fracture of both pre-mineral and post-mineral movement. West of the orebodies it strikes N 60° E; in the vicinity of the orebodies it is somewhat curved but averages N 75° E; the average dips are 61° and 64° respectively, to the northward.

West of the ore-zone (roughly about co-ordinate 7000 East) the vein is little but a gouge seam with some associated shearing of the rocks, except at the Yukon orebody where there is considerable quartz and silicification. A parallel zone 350 feet further west also shows a little quartz. Through the ore-zone, the vein varies from gouge with scant silicification and quartz, to a quartz filled fissure with a strong dissemination of iron, lead and zinc sulphides. At the north end of the workings the Yankee Girl Vein appears to join and merge with the Lakeview Vein.

The Lakeview vein is a strong mineralized fault-zone striking N 40° E and dipping 63° westward. On the 1235 level, the vein consists of a 20 to 30 foot zone of schist partly replaced by quartz and with considerable silicification; there

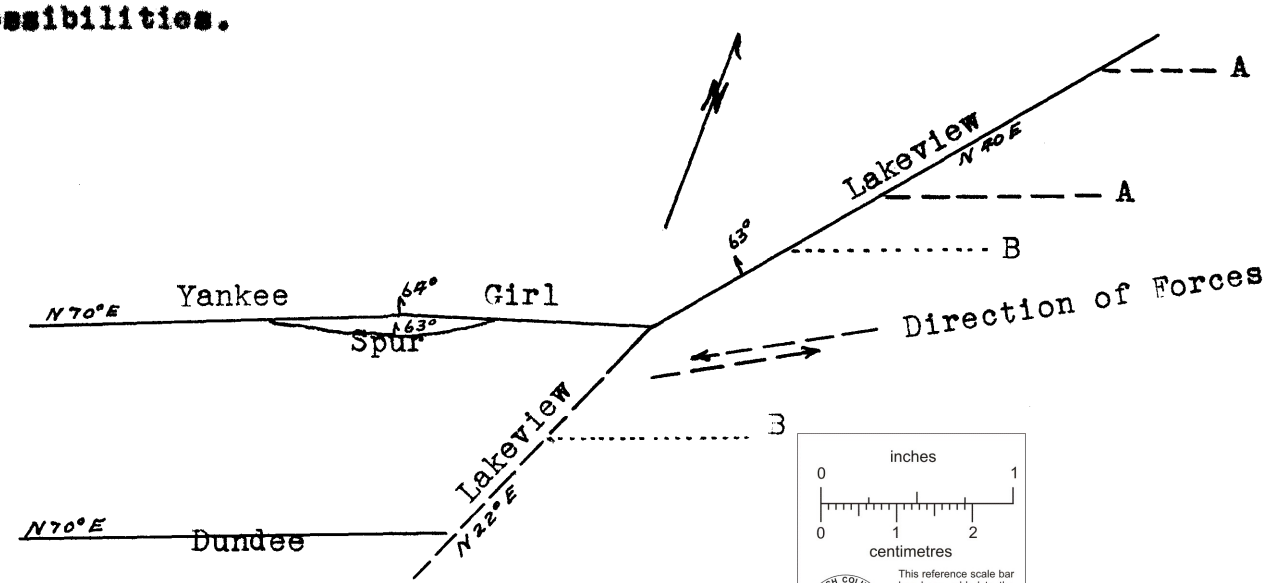
is a small amount of sulphide, mostly iron. Whether this exposure is typical of the vein as a whole is open to question.

The Spur Vein occupies a secondary fracture which cuts across the curve in the Yankee Girl vein and joins that vein at each end. It strikes somewhat on a curve, averaging N 65° E, and dips 63° north. It is similar to the Yankee Girl vein, but narrower as a rule and less productive.

The Dundee vein (not owned by the Yankee Girl Co.) strikes N 63° E and dips 67° northerly. It is a strong fault-vein with gouge and shearing and contains some quartz, especially at the east end.

There are several other veins known, which occupy secondary cross fractures between the main veins. While one of them, the Shaft vein, has produced some ore, they are probably of quite limited extent and value.

FRACTURING: The sketch below indicates the fracture system. Solid lines indicate positively known fractures; broken lines inferred fractures; dotted lines, possibilities.



Apparently the forces involved tended to cause fracturing along a line more or less N 60° E. Since the line of least resistance was along the granite-schist contact, N 20° to 40° E, faults had a tendency to follow in that direction for some distance, and then to break obliquely across the formation, to relieve the side strain. The Lakeview vein corresponds to the N 40° E fracture and according to the No. 6 D. D. Hole, swings to about N 20° E, south of where the Yankee Girl fracture breaks off. The Yankee Girl and Dundee veins occupy the N 70° E relief fractures. It is not improbable that there are other similar fractures which are unknown.

Whether the Lakeview fault (vein) continues indefinitely northwest on the same course, or whether it throws off branches (A-A) running easterly, and complimentary to the Yankee Girl and Dundee veins, is not known.

An alternative possibility is that the Lakeview faults the Yankee Girl and Dundee veins and that they continue to the eastward as indicated (B-B). This possibility seems quite improbable as all observable data indicate that the Yankee Girl, and probably the Dundee, veins turn and join the Lakeview and form branches of it. In the case of the Yankee Girl, this is to be seen on the 1235 level; in the case of the Dundee, conditions are not so clear, but are indicated to be the same. (See the 100 Scale map.)

ROCKS: Throughout the mine the Schists consist essentially of argillites, occasionaly showing small bands of quartzite, or sometimes tending toward mica schists. In general, they are tough rather than hard and evidently did not shatter sufficiently to allow easy replacement by quartz. However, they are apparently easily replaced by quartz and ore minerals under the proper conditions, since a very considerable part of the vein, both in and out of the ore-zones, consists of a replacement of schist by quartz and sulphides. The dip and strike of the schist is quite variable, ranging from N 10° W to N 40° E and the dip is from steeply west to steeply east.

The Granite is very variable in grain and composition, ranging from very fine to fairly coarse, and from granitite to diorite and gabbro, and occasionally becoming slightly porphyritic. All the igneous rocks belonging to the tongues are grouped in this report as "granite".

The only other igneous rocks in the mine are small porphyritic dikes of post-mineral age which with a few exceptions are basic in character and are grouped under the name "lamprophyre".

ROCK STRUCTURE: The granite tongues in the schist are not clear-cut and regular, as an ordinary dike would be, but are very irregular. On a large scale, however, the granite has a fairly definite trend about N 30° E and vertical, but in detail, schist and granite are inextricably mixed. In places

the mixture might be compared to concrete in which cement (granite) has been forced into elongated, vertically standing pieces of broken rock.

Contacts, as observed in the mine, are generally indefinite and can only be determined by the predominance of one rock over the other. The dips and strikes and even the location of the contacts shown on the maps are, therefore, open to considerable variation. Even the class of rock, granite or schist, is in some places open to question, since there are occasional areas in which the two rocks occur in about equal amount. This mixing of the rocks has occurred in two ways; by a number of small dikes closely spaced in the schist; and fragmentary schist inclusions in the granite.

It is not possible to correllate the sequence of alternating rocks on the foot and hanging sides of the veins, to determine the amount of the pre-mineral faulting. Neither has it been possible to connect with certainty, the rocks in either wall, with the corresponding rocks in the same wall on the next levels. On the basis of the average strike and dip of the vein and contacts, as nearly as obtainable, the trace of the granite on the Longitudinal Section of the mine should pitch about 65° to the eastward. On the 100-Scale "Longitudinal Section" an attempt has been made to indicate the probable continuity of the rocks from level to level on the hanging wall side of the vein, but it has required so much imagination

that it is of little value except to indicate the general trend.

On the plan (100-Scale) a N 25° E line has been drawn, just west of the known ore-zone, which marks the approximate west limit of strong granite and the favorable zone for ore. The eastern limit of this zone is not evident.

ORE: The vein filling consits of partly replaced rock (either schist or granite), quartz, pyrite, galena, and sphalerite. There is also a small amount of pyrrhotite, and rare chalcopyrite, siderite (or ankerite?), calcite, and chlorite.

There were apparently two definite stages in the formation of the ore. In the first, probably closely following the initial faulting, white quartz with pyrite was deposited, containing little lead, zinc,silver or gold. Later, the vein was crushed by further movement along the fault, and black quartz with pyrite, galena, and sphalerite, carrying gold and silver, were deposited in the fractures; also replacing some of the partly silicified rock.

This deposition was in fine grains of intimate mixture and in a rather concentrated form; it occurs chiefly in elongated lenses parallel to the vein walls.

DETAILS: (See Level Maps). No study was made above the 400 level, on account of bad ground and timbers.

400 Level: At the Hobson stope (Sta. 415-417) the vein swelled out to a maximum width of twenty feet, but less than a half of this width was mined. The remaining foot wall part contains

much quartz but little sulphide, and is probably low grade, though possibly some of it would make mill ore. A 60 foot shoot of rather narrow low-grade ore shows near the face of the east drift on the Yankee Girl vein, where it is bordered by a lamprophyre dike along the footwall. The eastern part of the level is all in granite, except for about a hundred feet of schist in the hanging wall at the east end of the Hobson Stope.

540 Level: A little quartz occurs in the vein near the portal, but nothing of consequence until the Yukon ore-shoot is reached. This occurs in a strong swell in the vein and is unique in that it is the only stope in the mine which is entirely within schist walls. The Spur vein probably splits off from the Yankee Girl at Sta. 16; although the dip is not what would be expected, silicification and scattered quartz extends in the footwall from the Hobson stope to this slip, and ends there. The vein running northeast from Sta. 16, shows black quartz and some sulphides which may constitute ore for a foot or so in width. It is rather attractive looking and may, or may not, be the footwall seam of the Yankee Girl vein. The Spur vein on this level to the southeast of the Hobson stope should be a favorable point for ore.

From Sta. 522 eastward to beyond Sta. 525, the vein has a live appearance, with quartz and some narrow bands of black quartz and fine grained sulphide ore; the average value is low. It is probable that the 800 level stopes will extend very close to the level at this point. The showing on the level is sufficient to justify some raising, as a little improvement in value would make commercial ore. At Sta. 523

a foot of white quartz extends south from the drift but is of little probable consequence. At Sta. 524 a lamprophyre dike is bordered on both sides by barren appearing quartz. It is doubtful if either of these occurrences have any great extent.

Midway between Stas. 526 and 527 strong fracturing with some gouge, a little quartz, and silicification comes in from the southwest and is probably the Spur vein. This vein also shows in the new crosscut between Stas. 525 and 526. It appears to contain no ore at either of these points.

At Sta. 527A, the vein widens and becomes somewhat indefinite. The drift has turned to the north, leaving the vein and running in the hanging wall, barely exposing the post-mineral gouge in the right bottom corner. At Sta. 529 a strong wall and gouge is encountered running N 50° E and dipping 63° north. While by no means certain, it seems probable that this is the Lakeview vein.

Between Stas. 528 and 529 the granite of the hanging wall is strongly silicified, with many quartz stringers running to the northeast, diagonally with the vein. There are also a number of small rather acid dikes in this area.

A raise was started at Sta. 527A which entered ore within a few feet; to the west, the ore turned low grade within a short distance; upward and to the east, it would appear that the stope has left the main vein in the footwall and followed one of the branch veins which soon played out. A little work should be done in this stope to see if ore continues eastward along the footwall.

800 Level: At the east face of the level there is a lamprophyre dike which is underlain by a heavy graphite gouge striking N 40° E; this is probably the Lakeview vein.

At the face the post-mineral gouge is on the hanging wall of the vein; to the west it cuts through the vein reaching the foot at Sta. 824; at this point, also, the hanging wall of the vein passes out of the north side of the drift and is not again exposed until it reaches the crosscut at Sta. 802.

West of Sta. 823 the footwall bulges to the southward making a total vein width of nearly 30 feet, the post-mineral gouge cutting across the bulge to join the footwall again just east of the manway raise.

Between Stas. 802 and 823 there is strong silicification of both granite and schist, with considerable quartz, but so far as known, none of the second-stage mineralization, or commercial ore.

The Spur vein branches off into the footwall just east of St. 803; in this vicinity the post-mineral gouge seems to dissipate and scatter, to appear again on the hanging wall near Sta. 805. Westward from here to Sta. 810 the vein is comparatively narrow but shows some second-stage mineralization and fair values.

Just west of Sta. 810 the vein is cut by a strong north-south fracture along which some quartz has formed. This fracture faults both the Yankee Girl and Spur veins two or three

feet, and is itself faulted by the veins about the same amount. This necessitates recurrent or continuous movement along the vein fissure.

From Sta. 813 west to the far end of the Hobson stope, the vein shows quartz and considerable second-stage mineralization.

935 Level: The strong gouge slip at the east face of the level undoubtedly is the footwall of the Lakeview vein. At Sta. 905 the hanging wall of the Yankee Girl vein swings out to the northward, going west, and does not appear again until near Sta. 902. There is considerable quartz but little gouge along the hanging wall, where it can be seen. The footwall side of the vein has been partly stoped; the hanging wall side does not appear particularly promising for ore.

The Spur vein fracture forks off about at the crosscut at Sta. 902; it is opened by a crosscut and drift about 200 feet to the westward but is small and low grade.

The first small vein found in this crosscut is low grade and probably of no great extent. The west drift on the Yankee Girl vein is in ore and has decidedly favorable ground ahead of it.

1035 Level: The east end of this level has not been extended far enough to catch the Lakeview vein. The vein shown in the crosscut and short drift 90 feet west from the face is not the Lakeview vein, although about parallel to it, and may connect with it at about the 1235 level. It was not found on the 935 level.

The Spur vein forks off between Stas. 1004 and 1005.

The unopened part of the Yankee Girl vein east of the crosscut to the vertical raise seems moderately hopeful for ore, and is worth drifting on.

The west face of the Yankee Girl drift shows wider and better appearing quartz and pyrite than for a long distance back; it should be driven further, especially as it is close to the point where the Hobson ore-shoot is expected.

1235 Level: The first sign of life on this level is between Stas. 1207 and 1208 where the vein widens and shows increased quartz for about fifty feet. This, likely, corresponds to a similar showing near the portal of 540 tunnel.

The Yukon stope, Stas. 1209 and 1211, occurs where both walls swell out sharply, giving a width of 30 feet. There is no great amount of quartz here, but second-stage mineralization is in evidence. It is likely that a considerable quantity of low grade ore may eventually be mined here. Between Stas. 1213 and 1214 the vein again widens (there is a corresponding widening between Stas. 511 and 513 on the 540 level) and for about fifty feet shows a narrow seam of ore. About a foot of low grade ore shows where the hanging wall side of the drift has been broken into, and this apparently extends some distance west just over the post-mineral gouge. A few shifts development and sampling are warranted here.

The Spur vein leaves the Yankee Girl at either Sta. 1216 or 1218, it is doubtful which. In this area there are two veins striking northerly, and in places showing two or three feet

of barren appearing quartz. The development of quartz along the sharper granite-schist contacts is not uncommon, and this appears to be an occurrence of that sort, but of more than usual strength.

At about Sta. 1220 the vein is quite narrow, but shows more quartz than for a considerable distance either way; this is probably the point where the Hobson ore shoot passes through, although no ore is in evidence.

Whether or not it is the Spur vein which shows in the crosscut at Sta. 1223A and in the back drift at Sta. 1241 is problematic. The strike is not normal for the Spur, and the dips recorded are much too flat. Also the dips of the Spur vein on the level above would indicate it to lie further south on the 1235 level. On the other hand the D. D. holes Nos. 1, 2, and 4 do not show any sign of a vein where this Spur would be expected to occur. If the exposed vein is the Spur, it should join the Yankee Girl vein on its dip within the next 200 feet of depth. As the Yankee Girl vein approaches the Lakeview there is a swing in the strike, and a decided widening with a strong development of first-stage quartz. At about a hundred feet from the junction with the Lakeview, the drift leaves the hanging wall and the post-mineral gouge, and follows the footwall which, as it approaches the Lakeview, becomes indefinite with strong silicification filling the acute angle between the veins.

It is uncertain whether the Yankee Girl hanging wall

joins the Lakeview as shown on the map, or further northeast at the first crosscut. It might be advisable to crosscut to the hanging wall at one or two points on the possibility of finding ore there.

The Lakeview vein shows in the short drift from the crosscut at Sta. 1231, as a ten foot belt of quartz and silicified rock overlying a strong gouge. From this drift it swings somewhat to the southward, as indicated by No. 6 D. D. Hole which shows low values. Northeast from the Yankee Girl junction the vein consists of a broad zone of more or less silicified schist with some quartz and pyrite, but with little zinc and lead sulphides. The hanging wall is granite, and against this is more quartz than elsewhere in the vein. Along the footwall there is a strong graphitic gouge with an average dip of 55° west. The occurrences of the vein on the upper levels, however, indicate an average dip of 68°.

There seems to be generally a slight decrease of quartz in the vein to the northeast, but just beyond the last crosscuts the point of a tongue of sheared aplitic granite was picked up, along which there is an increasing amount of quartz with, at the face, some fine sulphides.

The immediate footwall of the vein is a band of schist ten or twelve feet wide, which borders on granite.

In the three last footwall crosscuts the granite appears for a few inches, only, just at the face and is strongly

sheared and aplitic; the contact is practically vertical. These exposures of granite are not as complete as could be desired, but are borne out by the good exposure of granite in the face of the crosscut at Sta. 1231 and in the extreme end of D. D. Hole #6.

While the observed contact with the footwall granite is vertical, the Section through the junction of the Lakeview and Yankee Girl veins (see next page) shows that granite forms the hanging wall of the junction on all levels, and that schist forms the footwall. This suggests the probability that the observed dip is local and that the granite-schist contact at this section dips as well as strikes with the Lakeview vein.

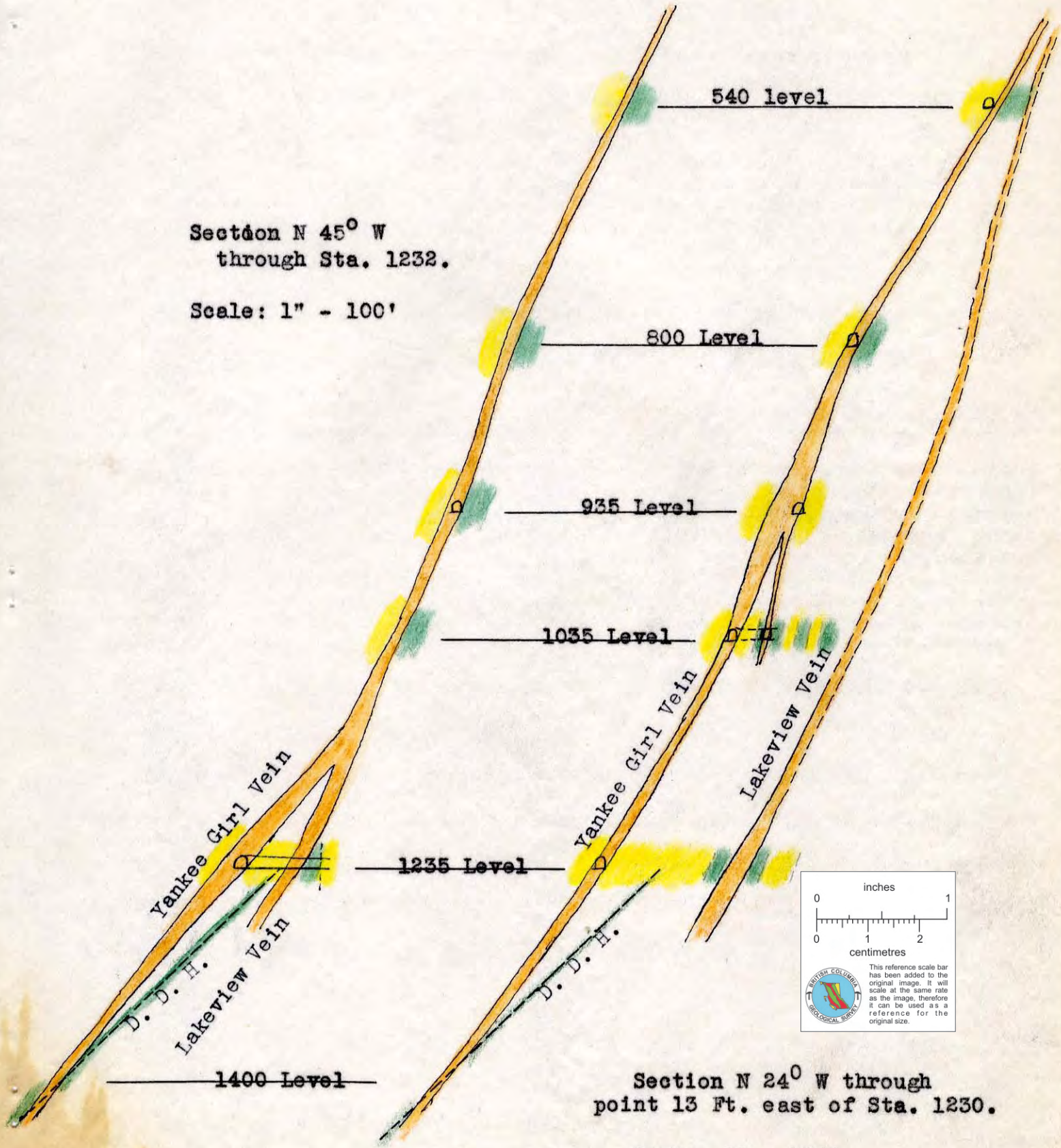
It is worth while to explore the Lakeview vein a little further; this can be done cheaply by extending both the 540 and 935 levels eastward along the footwall gouge.

ORE CONTROLS: Former observers have deduced that the location of orebodies were controlled by the intersections of veins, and by the presence of granite walls.

Little evidence was obtained during the present study either for or against the intersection theory.

That granite is favorable to ore seems certain, although scarcely to the extent that has been believed.

The following tables indicate the influence of granite as regards pay ore:-



Section N 45° W
through Sta. 1232.

Scale: 1" - 100'

Section N 24° W through
point 13 Ft. east of Sta. 1230.

Scale: 1" - 100'

Schist - Green Granite - Yellow

Stopes above and below levels. Geology on Levels.

No. of Stopes	Length	Hanging Wall			Footwall		
		Granite	Schist	Mixed	Granite	Schist	Mixed
Y. G. Vein:							
6	475		X			X	
1	70			X			X
5	263		X				X
1	70			X		X	
1	95			X			X
1	110		X				X
4	425			X		X	
1	50			X			X
Spur V. 6	240		X			X	

Assay and Geology on Levels. Yankee Girl and Spur Veins

Length		Value oz. plus	Hanging Wall			Footwall		
			Granite	Schist	Mixed	Granite	Schist	Mixed
450	315	0.25		X			X	
	135	0.50		X			X	
450	400	0.25			X		X	
	50	0.50			X		X	
	90	1.00		X				X
185	35	0.50			X		X	
	150	0.25			X		X	
	110	0.25		X				X

Apparently it is almost as favorable to have only one wall granite, as both. It also appears from observation of the vein filling that schist is about as easily replaced by quartz and ore as granite is, once it is properly fractured. It is probably the tough fracture of the schist, and its tendency to form gouge, which prevents its brecciation sufficiently to be replaced or to leave open fissures. An exception to this is where it has been baked to an unusual hardness.

If the character of the wall rocks were the only ore controlling factor it would follow that the ore-shoots would rake with medium steepness to the eastward, but it is evident that they do not.

Thickening of the vein is a usual accompaniment of ore, and this is more often due to an outward bulge in the hanging wall rather than in the footwall.

These bulges in the hanging wall are platted on the Longitudinal Section and connected through from level to level. In the central and western part of the mine these bulges, which are essentially steeply plunging anticlines, have a close correspondance with the oreshoots; in the eastern part of the mine the correspondence is not so close, possibly due to the effect of the Lakeview intersection. They show a steep rake to the eastward in the western part of the mine, changing to a steep west rake in the eastern part.

Presumably these bulges, or anticlines, caused greater brecciation in the rock under them, and also directed and partially confined the rising mineralizing solutions.

With a few exceptions the orebodies are closely associated with considerable widths of first-stage quartz which has been fractured, and the fissures filled with second-stage ore.

Lamprophyre dikes have nothing to do with the ore occurrence, since they are of later origin than the ore. They are, however, more numerous in the vicinity of ore, probably because of more fractures near orebodies which gave them easier access, and to that extent are a favorable indication.

These dikes form markers by which to gauge the post-mineral faulting which is roughly twenty feet in horizontal throw along the Yankee Girl vein, and about a third of that

on the Spur vein. Scant slickenside evidence points to a vertical throw of about double that. The hanging wall has moved west and downward, as compared to the footwall. There is no evidence as to the amount of movement along the Lakeview vein, but the direction must have been similar.

The pre-mineral movement along the veins has not been worked out, but it is not believed to be very great.

The post-mineral gouge, as a rule, follows the hanging wall of the vein, but there seems a tendency for it to divide at the oreshoots with a branch following each wall, or, perhaps more properly, each ore margin. For some distance near the east end of the 400, 800, and 935 levels the main gouge is along the footwall. It crosses the vein sometimes in one definite diagonal seam, and sometimes dissipates into a number of small seams to reappear on the other wall after a short distance. While the faulting represented by this gouge undoubtedly has had some effect in thickening and thinning ore in the stopes, it is not thought to be of much importance.

PROBABLE ORE EXTENSIONS: The Yukon shoot should continue between the 540 and 1235 levels about as on these levels, and I see no reason to expect any material change for a considerable depth below the 1235 level. It is a strong anticline and apparently has not been greatly influenced by wall rock.

The Hobson shoot, I would expect to extend down to between the 1035 and 1235 levels. There is no very conclusive

data to support this idea but inferences are drawn from the following data:- No ore is found on the 1235 level where the oreshoot is due, although there is more quartz there than for a considerable distance either way; the "anticline" is fairly well marked. There is a preponderance of schist on this level. The west face of the 1035 level shows increasing quartz, slight second-stage mineralization, and a suggestion that an anticline is beginning; there is also a good probability that granite will be found within a short distance. I therefore believe ore in the Hobson shoot on this level is probable, and that it will extend upward to the 800 level.

The #781-784 ore-shoot also seems to have pretty well played out on the 1235 level, although the anticline is well marked. There should be considerable ore left between the upper levels, and very likely above the 400 level in this shoot. Granite is present on one wall or the other throughout.

The 792-785 oreshoot appears to be two shoots which have joined in the center. Neither branch appears very promising on the 1235 level; on the 1035 level the vein has not been opened up where the shoot should cross. On the 935 level there is a fair anticline with increased quartz and silicification, but only low grade ore. On the 800 level the anticline is broad and fairly definite with a fair amount of quartz in the vein, but comparatively low values. Above the level values rapidly increase; the reason for this increase is not evident. On the 540 level the west branch shows fair second-stage mineralization and low values.

I would anticipate the 800 level stope coming through to the 540 level at this point, and exploration should be carried above the level. The east branch of the ore-shoot does not appear favorable on the 540 level. Granite is present on all levels, more or less, but is least on the 1235 level and most on the 800 level.

A weak, flat, anticline shows on the 1235 level at the 770 stope but was not found on the upper levels although some stoping has been done along the probable line of its axis.

The McDowell ore-shoot on the 1235 level shows two anticlines which join just above the 1035 level. On the 935 level and the 800 level there is one large well marked anticline which shortens materially on the 540 level. Although the showing on the 540 level is not particularly favorable, yet I think some further exploration should be done above it. Granite forms both walls of this oreshoot up to the 935 level; above that the hanging wall is granite and the footwall largely schist. The anticlinal structure along this oreshoot does not agree any too well with the ore, as evidenced by the stopes and assays. It may be that its influence has been modified by the proximity to the junction with the Lakeview vein, which parallels the east border of the structure.

PROBABLE CONTINUATION OF ORE BELOW 1235 LEVEL: The junction of the Yankee Girl and Lakeview veins between the 540 and 1235 levels trends N 10° W and pitches 65° northward (according to not entirely conclusive data). Dips taken on the Lakeview vein on the 1235 level show

it flatter (55 degrees) than above (70 degrees). If it is true that the Lakeview does flatten to this extent the junction will trend N 70° W and pitch 53°.

The west border of the predominant granite zone trends about N/25° E (allowing for dip) and is located 500 feet westward of the junction for the hanging side of the vein, and 1100 feet for the foot side, both measured along the Yankee Girl vein on 1235 level. Using the extreme cases of the above data the Yankee Girl vein in granite will be cut off at between 500 and 2500 feet vertical depth, below the 1235 level. Either set of data used to obtain this result are about equally dependable - or undependable. There is also some suggestion that the granite may be dipping more flatly northwest in depth, which would increase the length of the vein in favorable ground at depth. As far as wall rocks are concerned, the only definite conclusion that can be reached is that the extent of the vein in favorable rocks is shortening in depth, but probably rather slowly.

Another factor to be considered in this connection is the reported presence of almost continuous granite in the Wild Horse tunnel, the present face of which is 740 feet below the 1235 level and 1500 feet north of the projected vein at that elevation. This granite is underneath what Drysdale has mapped as schist on the surface. This suggests the possibility of an increase in the size of the granite tongues along the vein in depth, or the possibility that the main granite mass may be encountered at quite shallow depths below present workings, or perhaps that the tunnel has followed lengthwise in a granite tongue. There is hardly sufficient data to hazard a guess as

to the rock conditions at the vein at the level of the Wild Horse tunnel.

As to the structural ore-controls in depth, the vein junction undoubtedly extends a long distance, and I see no reason to predict any radical change in the hanging wall rolls or anticlinal structures; in the levels now opened there is a tendency for them to converge downward toward a point about 2000 feet below the 1235 level under the Hobson stope.

As for the probabilities of more shallow extensions -- the Hobson, 784-781, and 792-785 ore-shoots seem to have rather poor chances of containing substantial quantities of ore below the 1235 level, although the anticlinal structure is strong. The reasons for this opinion are the absence of ore on the level, and the probable scarcity of granite in the area below them. However, they should be explored when lower levels are opened.

The 770 and McDowell ore-shoots should show up well with deeper development, as they have well marked anticlines, probable granite in the walls, and the proximity of the junction in their favor.

As to the chemical end of the ore deposition, - The ore is primary and has undoubtedly been formed under intermediate conditions of heat and pressure. I see no reason to expect any material change in the deposition for a considerable further depth, and am inclined to view the slight decrease in ore on the present lowest level as due to other than chemical reasons.

PROBABLE CONTINUATION OF ORE ABOVE 540 LEVEL: Above the 540 level and east of the

Hobson stope there is indicated by the underground workings to be a considerable amount of granite; a study of the surface should throw further light on this. The anticlinal structure seems slightly weaker than on the lower levels but this may be local to that level only. The block seems worthy of considerable exploration, as previously noted.

PROBABLE ORE IN THE LAKEVIEW VEIN: The Lakeview vein is mostly an unknown quantity, since only 400 feet of drifting has been done on it. Except that ore, or near-ore, appears in a shallow shaft on the Evening Star claim some 1200 feet east of the 1235 level workings, nothing about the surface along this vein is known to the writer.

On the 1235 level the vein is in schist between two granite tongues, and a third tongue is entering the face of the drift; apparently, though not certainly, the vein also strikes and dips with the formation on the upper levels. However, there are plenty of possibilities, taking into consideration the erratic nature of the granite tongues, of the vein entering the more favorable granite either north, south, up, or down; this is especially true to the north.

I believe this vein is worth more development but, except for short drifts on it from the 540 and 935 levels, it would perhaps be advisable to await results of development on the Evening Star calim, especially so as there is plenty of other more important work to be done on the Yankee Girl Vein.

DUNDEE VEIN: (Other ownership). This vein is opened for 1050 feet on the tunnel level (Elev. 3260 approx.),

and is parallel to the Yankee Girl in dip and strike. It consists of a zone of strong gouge and shearing of somewhat greater width than the Yankee Girl. Quartz is rather scarce, the greatest amounts being where the vein was first cut , and near the east face; neither place shows very much.

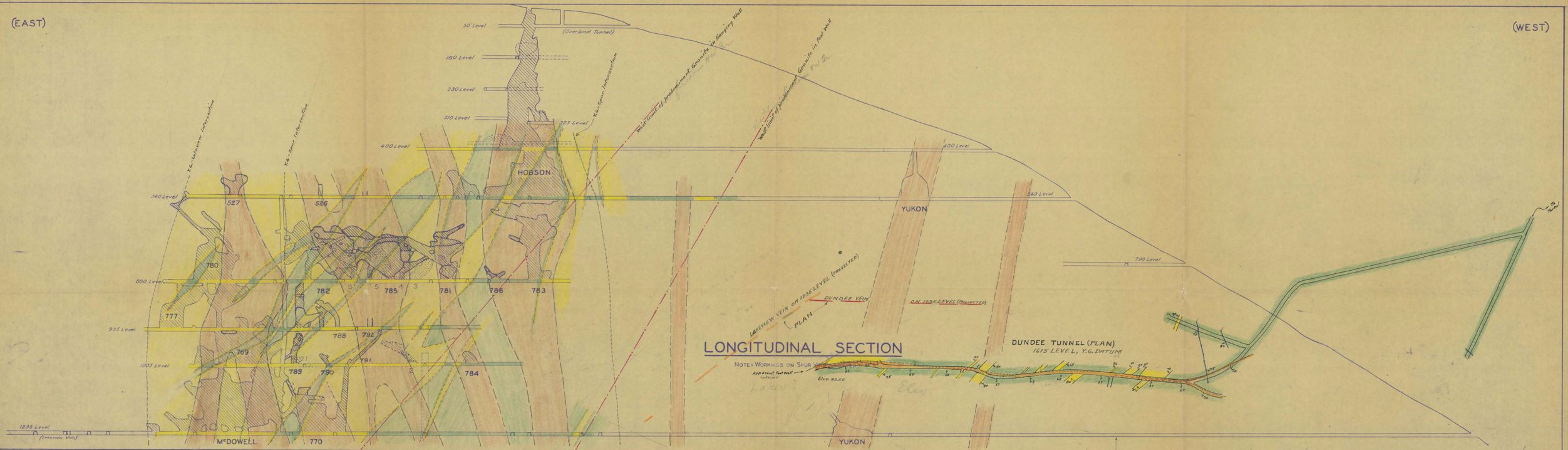
From the west end to within two hundred feet of the east face the walls are schist which is cut by a number of small granite dikes or tongues. Schist continues to the face of the drift on the hanging wall side; on the footwall side granite first shows in the crosscut 170 feet from the face and also in the other two crosscuts to the east, and in the drift about 155 feet back from the face. In the crosscuts the vein is separated from the granite by two to four feet of schist. A small amount of black quartz and fine grained sulphides (second stage mineralization) show in the back of the small stope near the face of the drift.

I am under the impression that the Lakeview vein is encountered at the face of the drift; if this is true it is the end of the Dundee vein. There should be a limited amount of ore above this point toward the Dundee shaft, but little or none to the east or below.

CONCLUSION: I believe the Yankee Girl property has a substantial amount of ore reasonably assured, and that the possibilities of developing several times as much more are excellent.

Respectfully submitted,

Chas. C. Starr



LEGEND.

SCHIST
GRANITE
VEINS
HANGING WALL ANTICLINE

NOTE: On Stope section rocks in Hanging Wall, only, are shown. Dundee Tunnel enlarged from print by A. Lakes.

YANKEE GIRL MINE

YMIR, B.C.

PLAN AND LONGITUDINAL SECTION

SCALE: 1" = 100 FT.

3-15-33

002990

Property File
082 FSW 068