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NOTES ON A VISIT TO THE PROPERTY OF THE COWICHAN COPPER CO. LTD.

1. A visit was made to the company's property at Cowichan Lake, Vancouver Island with Messrs. O. G. MacDonald and W.P. Watson for the purpose of assessing the possibilities of making a geophysical survey to locate further ore-bodies along the south-easterly extension of the Blue Grouse ore-bodies in the the general zone of metamorphism and mineralization that has recently been recognised by Mr. MacDonald.

2. All of the workings both in the Blue Grouse and the Sunnyside areas were inspected under the guidance of Mr. MacDonald. Also the extension of the Blue Grouse zone to the south-east was examined for 4,000 ft and a traverse made from the Sunnyside workings across the claims in an easterly direction to the new road.

3. Although the whole area is well metamorphosed due to an underlying major intrusive there is considerable evidence that the Blue Grouse ore-bodies lie in a zone of more highly metamorphosed volcanics several hundred feet wide and striking south 35° east. It contains numerous small and apparently irregular masses of feldspar porphyry. The more intense metamorphism is characterised by the development of epidote and garnetite rocks. Whilst considerable chalcopyrite is often present in the garnetite bodies it is by no means confined to them.

4. Owing to a recent destructive fire a surface examination in the claim area is readily made of the numerous rock outcrops. The bed-rock however is concealed for a considerable proportion of the ground and only occasional float is found to indicate the presence of the zone of the Blue Grouse mineralization.

5. It is suggested that a self-potential geophysical survey is made along this zone in the hope of locating further bodies of copper ore.

Such a survey would cover a belt 1,000 ft wide and 4,000 ft long with readings taken at 50 ft intervals. It would entail setting out a grid of stations with which to locate the positions at which readings are taken. Main lines would be set out 150 ft apart with stations at 50 ft intervals and stations at 50 ft on each side of them.

6. This grid would be useful for plotting the rock exposures and ore occurrences as well.

7. Such a survey would take from 10 to 15 days to complete but the cost cannot be estimated closely although $1,000 is a reasonable estimate as follows:

Geological Engineer as instrument man	$ 500
Assistant	180
Two men staking lines for five days	120
Transportation, board and lodging	100
Hire of instrument	25
Incidentals	75
TOTAL	$1,000

Signed "A.C. Skerl"

REPORT ON A SELF-POTENTIAL SURVEY OF PART OF THE PROPERTY OF THE COWICHAN COPPER COMPANY

Dr. A. C. SKERL.

May 8, 1953.

INTRODUCTION.

This survey was undertaken to test the possibility of an ore zone striking south 35° east through the property as suggested by the evidence of the topography, the apparently more intensive metamorphism and a series of float fragments of ore along this direction.

SUMMARY OF RESULTS.

1. The general arrangement of the anomalies is actually along a belt 700 ft. wide running due south from the Blue Grouse workings to the Sunnyside area for 3,000 ft. although only the northern half of the distance has been covered so far.

2. The anomalies suggest the presence of ore-bodies with sharply defined ends and ranging from 250 ft. down to 75 ft. in length.

3, Trenching, diamond drilling and underground exploration will be necessary to determine the actual dimensions and grade in each case however.

4. The topographic features and the float fragments of ore now appear to be the result of glaciation.

R E C O M M E N D A T I O N S.

The geophysical survey should be extended to cover:

1. The ground between the Blue Grouse and Sunnyside workings.
2. The area immediately west of the Blue Grouse main working.
3. A possible extension of the zone to the north.

F I E L D P R O C E D U R E.

The field work consisted of setting out numbered stakes on a rectangular grid system at 50 ft. intervals and then taking self-potential readings for each position.

An arbitrary point was taken as 100, all the values calculated in reference to it and then plotted on the accompanying plan.

40 man days were needed to stake the ground tested and a total of 1250 readings were made in 12 days by an instrument man and a helper.

The topography is quite steep, ranging from 700 to 1800 ft. in elevation. Owing to an intensive fire nearly two years ago a large proportion of the top soil has been eroded away. This condition made it difficult at times to get a satisfactory contact.

The irregularities of the equipotential lines at 10 unit intervals away from the anomalies do not have much significance because the actual differences are small and the individual readings can be considered as correct to say 5 units only.

When there is a series of concentric lines higher than 120 an anomaly can be considered appreciable.

D E S C R I P T I O N O F A N O M A L I E S.

Each anomaly is identified by the letter and number of the co-ordinate nearest to its centre and marked by a stake in the ground.

1. F7. this suggests an important ore-body extending for 150 ft. N.W. from the open cut at F8.

2. A series of open cuts at 25 ft. intervals from station F5 to F 8 should expose any ore that is present.

2. G12. this corresponds to the main old working under which the present adit is being driven. It shows that the mineralization could extend for 250 ft. in a N.S. direction.

3. H15. the survey is not completed here but some very high readings were obtained in conjunction with the old open cuts.

4. U25. a small but definite anomaly here corresponds to an old open cut and suggests a length of up to 75 ft. for the ore.

5. M29. here a small but sharp anomaly in a boulder strewn depression near the head of a gully indicates about 75 ft. of mineralization.

6. K 30. another short anomaly that is linked to M29 could represent a length of 50 ft. of the ore already exposed here.

7. V33. there is the beginning of an anomaly here that extends west outside of the surveyed area. No evidence of ore could be found in the outcrops and old trenches although about 50 ft. to the south chalcopyrite mineralization in lava is exposed on the west side of the new logging road. The anomaly may represent the main portion of a very flat dipping body. Further readings to the west may help.

8. Q34. this is a north trending anomaly for 200 ft. and fragments of garnetite-epidote rock with chalcopyrite suggest a disseminated type of deposit. Some trenching followed by drilling should be done to determine the quality of this ore.

9. C66, this isolated and small anomaly is of doubtful value but should be tested by a cut into the depression on the hillside in which it occurs.

signed "A.C. Skerl"

REMARKS ON THE COWICHAN COPPER CO.

Dr. A. C. SKERL. May 8, 1953.

INTRODUCTION.

This brief account is based on 16 days recently spent on the property. Most of this time was occupied conducting a self-potential survey which is reported on separately but all of the old workings were inspected and the old maps and reports studied.

CONCLUSIONS.

1. There appears to be an excellent opportunity for developing several ore-bodies of chalcopyrite all within 800 ft. of the portal of the present tunnel.
2. Other deposits are known at the Sunnyside workings and more are indicated by the geophysical work.
3. The actual sizes and grades are not known but the old records suggest that an average stoping grade of about 5% copper can be expected over widths of 3 to 15 ft. and for lengths of up to 250 ft. according to the geophysical anomalies.
4. The actual average grade will be determined by the amount of low grade material that it is found economic to mine.
5. It is expected that the ore-bodies will be pod-shaped with the longest dimension down dip but probably pitching to one side.
6. The individual ore-bodies can be expected to terminate at various depths but other blind ones will probably take their place.

R E C O M M E N D A T I O N S.

1. Continue the present tunnel to the downward projection of the main ore-body which should be drifted on each way and a raise put through to the old level above.

2. Complete the geophysical survey.

3. Trench anomalies where practical.

4. Shallow X-Ray drilling.

5. Further tunnels where practical to explore other ore-bodies at say 100 ft. below surface.

6. Underground diamond drilling for deeper extensions and blind ore-bodies.

7. The question of a mill or shipping ore should be kept in abeyance until at least two or three of the deposits have been explored underground. Only development rock should be shipped unless some particularly high grade ore is encountered that would not be benefited by milling.

signed "A.C. Skerl"

1758 Western Parkway,
Vancouver, 8, B.C.,
22nd. June 1953.

Mr. O. G. MacDonald,
President,
Cowichan Copper Company.

Dear Sir,

I have to report the following results as of June 20 1953 for the Self Potential Geophysical Survey that I am conducting over part of your property.

In a north trending belt 2500 feet and 1000 feet wide fifteen anomalies have been found that indicate possible mineralization for a total length of 2500 feet. All but one of these anomalies are shown on the accompanying plan.

The northern third of this belt includes the original main workings on Blue Grouse Mountain.

In the case of seven of the anomalies the presence of chalcopyrite is already known as indicated on the plan.

The survey is now approaching the Sunnyside workings which reach from 1000 feet to 1500 feet south of the belt mentioned above.

A campaign of bulldozing followed up by diamond drilling is recommended to test the commercial possibilities of the anomalies found so far.

Yours Sincerely,

Signed "A. C. Skerl"
A. C. Skerl, P.Eng.

REPORT ON A SELF-POTENTIAL SURVEY OF THE PROPERTY OF THE COWICHAN COPPER COMPANY, COWICHAN LAKE, B. C.

BY DR. A. C. SKERL.

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I N T R O D U C T I O N.

In April 1953 Mr. O. G. MacDonald, the President of the Cowichan Copper Company requested the writer to examine the company's claims and assess the possibilities of conducting a geophysical survey that might discover further ore-bodies.

It was recommended that a self-potential survey be made starting in the area of the known ore-body and extending in the direction of the supposed belt of more intense mineralization.

A preliminary survey was therefore made by the writer over the known ore-body and a well-defined anomaly was obtained. The survey was then extended and this account is a report on the results achieved.

As indicated on the map the survey covers ground for which this work is not claimed for assessment purposes but the results are needed for the interpretation of the rest. The costs submitted by the management have been segregated so that only the work in the claims for which assessment is filed is included.

The line cutting and staking of stations continued for most of the time between May 1 st. and October 20th 1953 but the instrument work was confined to the periods 12th June to 26th June and 1st to 20th October 1953 apart from the preliminary work.

S I T U A T I O N.

The accompanying map, taken from the company's prospectus of July 1953, shows the location of the property on the south side of Cowichan Lake, Vancouver Island, B.C.

The area is one of considerable relief ranging from 500 to 1800 feet above sea level. Some of the slopes are very steep making the progress of the survey difficult and slow.

H I S T O R Y.

The original properties were known as the Blue Grouse and Sunnyside for which the first recorded work was in 1915 and by 1919 about 2,500 tons averaging 7% copper are reported to have been shipped.

In 1920 the Consolidated Mining and Smelting Company did about 3,000 feet of diamond drilling in eight holes most of which were under the main working in the Blue Grouse claim. Several intersections of good grade and width were obtained but the company relinquished its option.

In 1928 the Pacific Tidewater Company started a projected 500 feet cross-cut adit into the hillside but abandoned it at 60 feet.

In 1953 the present company extended this tunnel and by means of a raise encountered the ore that had been indicated by the diamond drilling. Two shipments of development rock in February and April respectively of 1954 totalled 1,258 tons averaging 6.3% copper.

C L A I M S.

There are sixty claims altogether of which three are crown granted.

They include the Timber Block 107 totalling 600 acres for which the company has the licence to mine the base metals.

They also include the old workings known as the Blue Grouse and Sunnyside that are about 4000 feet apart.

The accompanying plan (scale 1" - 1500') shows the relationship of the area surveyed to some of the claims.

Of the total area covered by the geophysical survey 40% was in the following six claims for which this report is therefore submitted as assessment work:

NAME	TAG
Osslyn	B 18914
T T 3	A 86699
4	A 86700
8	A 86704
Lake 2	A 45081
5	A 45086

G E O L O G Y.

There is no published account of the geology of the general area but one is expected shortly from the B.C. Department of Mines.

A limited amount of detailed geological mapping has been done by L. Gatenby and the writer. This work is now being extended.

Most of the claim area was originally underlain by volcanic rocks, largely of basaltic composition, that had one or more lenticular layers of limestone.

Strong overfolding along both northerly and westerly aligned axes was followed by the intrusion of numerous dykes of feldspar porphyry both steep and flat in attitude. This intrusive period was accompanied by intense but variable metamorphism probably due to an underlying granite mass at an unknown depth.

In places the basalts were converted to epidote rock whilst the limestone in some cases was completely changed to garnetite rock often containing economic amounts of chalcopyrite associated with minor quantities of pyrrhotite and magnetite.

Chalcopyrite mineralization also occurs as veinlets and disseminations in the epidotised basalts.

Underground a number of faults have been encountered that may be significant in the location of the ore-bodies.

The area was glaciated in comparatively recent times so that fresh sulphides are found at or very near the surface.

G E O P H Y S I C A L S U R V E Y.

The mineralization, the fresh sulphides at the surface and the shallow overburden in most parts of the claims determined the choice of the self-potential method for a geophysical survey of the property.

The instrument employed was constructed by Professor Clarke of the Geophysical Department of U. B. C. and it is designed to be unusually sensitive.

FIELD PROCEDURE.

Copper electrodes immersed in a saturated solution of copper sulphate in porous pots were used to make contact with the ground by placing them in shallow holes containing a little water.

The instrument was set up at one station of a 50 ft. grid and readings recorded of the potential difference for successive stations up to 500 feet away before moving to a new set-up. In this way the potential differences were determined in millivolts for nearly 3,000 stations covering an irregular area of some 170 acres.

The instrument has been calibrated so that the signs of the potentials have been reversed. Normally a strong anomaly with a negative sign is the indication of a good generator at the surface but with this instrument it is recorded as positive.

Station C.O. was considered to be some distance from any mineralization and arbitrarily assigned a value of 100

millivolts. The values for all other stations were then calculated with reference to it. In this way the values for all stations are positive and plotting is simplified.

Numerous checks were made with previously determined stations and minor adjustments made so that usually individual readings can be considered as correct to 5 units.

Owing to an extensive fire two years previous to the survey a large proportion of the top-soil has been eroded away. This condition made it difficult at times to get a satisfactory contact.

The values obtained were plotted on the accompanying map, scale 1 inch to 100 feet, on which equipotential lines have been constructed and areas of similar value coloured to show the anomalies to better advantage.

R E S U L T S.

It can be seen on the map that the self-potential survey outlines a belt from 600 to 1000 feet wide and trending north for 6000 feet that contains over twenty significant 'positive' anomalies.

A number of these anomalies are already known to have associated copper mineralization which strengthens the possibilities of the rest.

In several cases the dip of the body responsible for the anomaly is clearly indicated by a corresponding 'negative' anomaly.

In the following descriptions of the various anomalies each one is identified by means of the letter and number of the station nearest to its centre or by the stations at each end if it is a large anomaly.

1. F.7 This suggests an important ore-body extending for 150 feet N.W. from the open-cut at F.8 from which ore was removed in the past. The geological mapping strongly suggests that the main body is completely cut off from the surface by a porphyry dyke. There is a strong corresponding negative anomaly 150 feet to the S.W. suggesting a normal dip of 45° in that direction.

2. F.10 to H.13 This anomaly that is 250 feet long corresponds to the main old workings beneath which a large ore-body is now being developed over a width of 50 feet and a length of 130 feet to date (May 20 1954). The geology indicates that it could be part of No. 1 anomaly with a large dyke between.

3. N.0 to Z.8 This, the largest known anomaly, is at least 750 feet long with two extra high sections at R.3 and V.6. It is known to follow a contact between limestone and carbonaceous shale at least in part. A strong 'negative' anomaly at X.0 suggests a flat dip to the west. The overburden is fairly heavy and no mineralization has actually been seen. It is a likely place for ore to occur but it is just possible that enough of the carbonaceous shale has been

converted to graphite which is known to give high anomalies. It should certainly be tested by several diamond drill holes.

4. M.16 to S.10 This is another large and pronounced anomaly with an easterly strike of 400 feet.

Copper ore can still be seen in the old open pit at its eastern extremity with mineralization over a width of at least ten feet. It dips here at 45° to the south and a seam of graphite associated with a little recrystallised limestone was found in the immediate hangingwall. An old diamond drill hole at -45° is reported to have intersected the ore at 130 feet below the outcrop where it assayed 3.54% copper over 3.1 feet. The average dip between the open cut and the intersection is 48°.

A steeper drill at -70° failed to find ore but a small rake to the west would account for this failure. Further diamond drilling to the east is needed.

There is a small negative anomaly at V.20 about 400 feet to the south that could correspond to this ore-body.

5. M. 7 This is a distinct but minor anomaly centrally located with regard to the four previously described anomalies.

6. P.20 to R21 This is a well-defined anomaly 100 ft. long and will require testing.

7. U.25 A small but definite anomaly here corresponds to an old open cut with copper ore exposed for a width of 3 ft. A length of 75 ft. is indicated. It is linked by a weak anomaly with No. 6 so that an overall length of 500 feet of

a structure is possible. This in turn strikes north toward the main old open pit another 500 feet north and also across the western extremity of No. 4. The possibility of a fault structure linking together all these anomalies should be born in mind.

8. K.30 Here some sheared volcanic rock with good chalcopyrite mineralization is exposed in an outcrop and gives an anomaly that is 50 feet long.

9. M.29 This is a small but sharp anomaly 75 feet long in a boulder strewn depression at the head of a gully and 75 feet west of No. 8.

10. P.33 to Q.35 Here a distinct anomaly was found to represent two zones of epidotised lava with disseminated chalcopyrite about 50 feet apart and each 100 feet long.

11. W.34 Here there are three mild anomalies just west of the logging road where some epidotised basalt with chalcopyrite is exposed in the road cut. It is possible that there is a flat area of such material 250 feet by 100 feet in extent.

12. Z.37 This is similar to No. 11 and chalcopyrite was found at the west end of the anomaly that is 100 feet long.

13. Cw.41 to Ew.42 This is a strong anomaly 200 feet long where a piece of float well mineralized with chalcopyrite was found.

14. X.45 This is a small anomaly 100 feet long.

15. X.52 This is very small and of doubtful value.

16. Fw.64 This is a definite anomaly 125 feet long and 400 feet east of the Sunnyside workings.

17. Lw.63 , Pw.63 , Qw.64 These are three small anomalies in the Sunnyside area but not directly associated with any of the old workings. Detailed mapping here may reveal their relationship.

18. Qn. 32 to Nn.39 This in the north area and consists of three small anomalies over a distance of 350 feet that may possibly be related to each other.

R E C O M M E N D A T I O N S.

Drill a series of vertical diamond drill holes at 100 feet intervals along the strike of the large anomalies that are numbered 3 and 4 above and approximately 125 ft down the dip of the supposed ore-bodies so as to cut them between 100 and 150 feet below the surface.

There will be 8 such holes for No. 3 and 4 for No. 4 anomaly. Two holes are also suggested for No. 1 anomaly.

A total of 2,500 ft costing $ 10,000 is estimated for this work.

The results obtained will guide the further drilling of these anomalies.

At a later date a number of other anomalies will require testing by shallow diamond drilling.

Dr. A. C. Skerl, P. Eng.

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NOTES ON A VISIT TO COWICHAN COPPER SEPTEMBER 28, - OCTOBER 1, 1954

- A. C. SKERL -

1. At 106 ft the 1200 S cross-cut encountered the ore-body immediately in the hanging wall of the flat fault and within 15 ft of the projected position.

The grade here is excellent probably averaging 10% Copper for the 20 ft of length and 10 ft of width opened up so far. Two horizontal samples were taken from east to west both 5 ft long across the face at 126 ft but the assays are not yet available.

The full width is not exposed but may well be as much as the 50 ft average on the 1290 level above, where it was opened up for a length of 140 ft.

This new exposure enables the calculation of a probable body of ore totalling 100,000 tons and averaging 5% copper between the 1200 level and the surface using the calculated factor of 8.3 cubic feet per ton for this heavy chalcopyrite - garnetite ore.

If it proves to be as much as 140 ft long and average 50 ft wide on the 1200 level then another 33,000 tons would be added to the block above the level and a similar amount below down to an arbitrary limit of 40 ft.

2. The 1290 sub level to the N.W. has crossed a body of garnetite 40 ft wide that appears to be the faulted portion of the main ore-body but it is only sparsely mineralized with chalcopyrite and averages 1.25% copper.

The horizontal displacement on the flat fault that dips 30°S is 100 ft but the true movement may be more or less according to the direction. However the evidence of "ribbing" on the fault plane suggests normal faulting with a movement downward of the hanging wall block of over 100 ft. The low grade garnetite could then correspond to the weaker south end of the present ore-body and further exploration to the north may encounter a better grade of ore corresponding with a strong self-potential anomaly.

A raise at 45° from the 1200 W cross-cut would make this exploration feasible.

3. To reach the projected position of the ore in the old workings further to the south which gave such a strong self-potential anomaly the 1200 S cross-cut would have to be driven to a position 600 ft south of the main cross-cut or 350 ft beyond the probable end of the present ore-body.

This would be 300 ft vertically below the outcrop and 170 ft below the value of 3.54% copper over 3.1 ft obtained by C.M.&S. in hole N°3.

With the ore dipping at 48° and with an unknown rake this is too far from the surface for a connecting raise so that it would be best to check the ore by further diamond drilling from surface and then, if warranted, to drive an adit at the 1350 level to meet the ore at about 300 ft from the portal.

At 300 ft west of these old workings a bulldozer cut across the anomaly exposed a zone 40 ft wide of dark brown and black sandy clays representing highly leached and oxidized limestone with associated calcareous and carbonaceous beds. Porphyry is present on the south and lava to the north. The dip is about 50°S.

The degree of weathering is unexpected and suggests the presence of a portion of the pre-glacial deeply weathered land surface that was not removed by the ice sheet.

It almost certainly corresponds to the ore-bearing horizon in the old working although no sulphides or limonite directly attributable to oxidized sulphides were recognised.

It is difficult to understand how thisweathered material alone could produce a potential of half a volt so that the fresh rock below must be tested for sulphides by diamond drilling to a depth of at least 100 ft and preferably deeper.

4. A cut across the largest anomaly that is situated further west has exposed a similar zone of highly weathered sediments.

Here again diamond drilling will be necessary and if successful an adit could be driven from the northeast end of this occurrence before driving a long cross-cut from the main workings.

PROGRESS REPORT OF COWICHAN COPPER CO. LTD.

September 1, 1954.

Active exploration of your company's holdings on the south shore of Cowichan Lake was started in January 1953. The objective was to develop a mine, shipping ore to help defray costs.

Work done to date consists of a two mile road to property, necessary mine buildings and ore bin, geological and topographical mapping of immediate mine area, self potential geophysical survey of approximately 100 acres and about 1600 feet of underground development work. The underground development work has been explained much in regard to geology and structure and has produced about $50,000.00 in net smelter returns from ore, shipped. In general the work both surface and underground has produced data which warrants an expanded development program.

GENERAL GEOLOGY:

The B. C. Dept. of Mines has mapped the mine area as lying on the crest of an overturned fold plunging to the West. The rocks are Franklin Creek gabbros and basalt including members of the Sutton Creek limestones. Along the crust of the fold the limestones are isolated block remnants in a zone trending north to N.W. The main limestone members on the limbs of the fold outcrop about 1/3 mile east and 2/3 mile west of the present mine workings. An intrusive rock called feldspar porphyry and probably related to Saanich granodiorite outcrops in irregular sills and dike bodies in a zone about 1000 ft. wide and trending West to N.W. This area containing the intrusive rocks cuts obliquely across the folded area. Copper mineralization is found in the area contained by the fold crest and the porphyry intrusive zone.

MINERALIZATION:

The mineralization is considered to be contact metamorphic. It is found chiefly in garnitite bodies which probably are metamorphised limestone blocks. The mineralization is chalcopyrite with minor amounts of pyrite and magnetite. Chalcopyrite is found disemminated through the garnetite and in concentrated masses bordering small pre-mineral internal fractions in garnetite. Not all garnetite is "ore" but every garnetite body discovered to date has some parts that are "ore grade". Economically the size and distribution of these blocks is important. Some chalcopyrite mineralization has been found in fractures or structure in the meta-basalts. This type of mineralization is worthy of consideration.

SURFACE MAPPING:

The original surface mapping established the location and trend of the garnetite fragment zone within the porphyry zone. It was mapped for about 1500 ft. but has a probable length of more than a mile. Much of the surface along the trend of the mineralized zone away from the present workings is overburden covered.

Small outcrops of garnetite with chalcopyrite and chalcopyrite in meta-basalts were mapped in area near present workings. No through-going faulting or shearing was observed. The basalts in the neighborhood of the porphyry are strongly metamorphised and fractured with development of skarn minerals.

GEOPHYSICAL SURVEY:

During June and July 1953 a self potential geophysical survey of a block about 1000 ft. square centered over the old workings was conducted by Dr. A. C. Skerl. Later in the summer G. A. MacDonald continued the survey to the north for another 1000 ft. and to the south to cover the old Sunnyside workings a distance of about 3000 ft.

This type of geophysical survey measures the spontaneous polarization currents produced by electrochemical reactions of natural conductors in the ground. This can be sulfides or graphite. A continuous conductor over a vertical or slope depth of about 50 ft. is necessary for the production of a measurable difference of potential. Depth of deposit and depth of overburden are important potentials of 100 to 700 are common over the apex of a sulfide body. Depth penetration for good sized blind sulfide bodies is probably in order of 250 ft. Conductivity of the wall rocks is purely electrolytic.

Results of these self potential surveys is encouraging an anomaly trending north south, over 200 ft. long and with highs about twice background was obtained over the old pit, now called East ore body. Four anomalies were produced within 700 ft. of the old pit with trends in three directions i.e. north south, east-west, and about north west. Readings on these anomalies ranged as high as 650 millivolts over a base of about 150. Much of the surface over these anomalies is overburden covered but near each some porphyry in place has been found. Two of the anomalies contain known small pads of garnitite and copper mineralization.

Graphite which can be produced by dynamic metamorphism (shearing, faulting) of carbonaceous rocks could be produced by structure in or along walls of sedimentary rock or garnitite but should not occur in the basalts, as seen in the underground workings the structure along the hanging wall of the garnitite ore bodies probably contains some graphite. However, the flat structure in porphyry sill of main adit probably contains sedimentary fragments and shows some garnetite, chalcopyrite and probably some graphite. On surface graphite leaches out relatively easily and would be hard to find in outcrops. The

important point is graphite is more than likely produced only in structures in sedimentary rocks or garnetite bodies. Geophysical anomalies within the porphyry area could be produced by either mineralization or structure in or along side garnetite bodies.

UNDERGROUND DEVELOPMENT

About 1600 ft. of underground development work has produced about 4100 tons of copper ore grading 5.55% after minor sorting.

The main adit about 500 ft. long was driven along old diamond drill hole #9. The adit is about 225 ft. slope distance below the old workings. All development work to date has been done from a sub-level midway between the two levels. Work on the sub level is about 50% drifting and crosscutting and 50% raising.

Ore shipments have been made from two bed type garnitite bodies known as the West and East ore Bodies. A third garnitite body (North ore body) was located under a post mineral flat fault but is not developed as yet. These three garnitite beds are probably parts of one original limestone bed which has been cut by a steep dike - like porphyry body about 30 ft. thick, and moved by a flat fault. The ore mineralization in the garnitite is chalcopyrite disemminated and in small concentrated bodies bordering small internal fractures in the garnitite.

The development work has delimited the East ore body above the flat fault and partly developed the West ore body above the fault. The West ore body is open along strike to the south and also down dip. The north ore body is not developed.

The underground development work has furnished a good deal of structural information about the mineral deposit as well as doing a good sampling job. It has shown the presence of silt and dike like feldspar porphyry intrusives with mineralization in garnitite on both sides of the dike porphyry. The foot wall and hanging wall of garnetite bed is on line through the porphyry indicating some normal faulting on the porphyry walls (not a straight displacement). The strong looking structure on the hanging wall has very little apparent movement when cutting through the porphyry dike. The small internal fractures in the garnetite bodies are pre mineral and localize the mineralization. Two altitudes of aulting have been observed which are later than the mineralization (1) north to N.W. steep dipping and (2) the flat fault (seemon sub level) with strike of N 65°W and 30° dip S.W. The north ore body was located beneath this flat fault.

Sectional steel test holing has proven very valuable in this type of mineral deposit. A test hole driven Westerly from the original sub-level crosscut is reported to have returned garnetite sludge at about 40 ft. after passing through the porphyry dike. As the meta-basalt footwall was found on both the West and East ore bodies, this indicates a repetition of the garnetite beds at depth A test hole over the back of the main adit near the face gave garnetite sludge indicating the downward continuation of the north ore body, also a test hole near the

face of the main adit and below the level is reported to have returned garnetite sludge. For grade determinations a resume' of ore shipments is included in this report.

CONCLUSIONS

The grade and size of the mineralized bodies located in the limited area of the underground workings is better than original expectations. Considering the area of the potential mineralized zone and the geophysical survey results, I believe the property warrants an expanded development program on the surface and underground.

ORE SHIPMENT DATA

Shipment No.	Weight Dry Lbs.	Grade Cu %	Grade Ag. oz/Ton
1	823936	7.75%	0.85
2	1656236	5.61%	0.88
3	1983920	6.27%	0.93
4	1887501	5.00%	0.79
5	1865771	4.28%	0.64
	8217000	5.55%	

West Ore Body - shipments #1 to #4

Wt = 6,351,000 lbs.

Grade= 5.90%

East Ore Body - shipment #5

Wt = 1,866,000 lbs.

Grade= 4.28%

- - - - - - - - -

COPY

PROGRESS REPORT ON THE COWICHAN COPPER MINE

26 April 1954

DR. A. C. SKERL.

SUMMARY.

The development work to-date has been eminently successful in opening up a block of probable ore of 50,000 tons averaging 5% copper that further work in the near future may well expand into 200,000 tons.

GENERAL.

The evidence of the underground work to-date suggests that the ore-body at present being developed represents an original lens or possibly overturned, tight synclinal fold of limestone that has been completely replaced by garnetite and chalcopyrite with subsidiary amounts of pyrrnrotite and magnetite.

This ore-body has a hangingwall that dips from 45° to 60° West and a footwall that flattens from 50° to 20° West.

A pronounced rake of 30° to the south is controlled by a strong footwall fault that may represent movement along the original bedding.

At the surface the old workings, trenches and geophysical anomaly indicate a length of 300 feet with a central section of 100 feet long and 50 feet wide in which the old open-cut is situated. It narrows down to a few feet in width at the north and south ends.

On the 1290 level which is 110 feet vertically below the original outcrop a length of 90 feet of ore has been opened up over a width of 15 feet in the footwall part of the ore-body. At the

north end it is bounded by the flat dipping fault that defines the rake of the ore-body but the south end is still in ore and could continue so for 100 feet or even 200 feet if there is a corresponding rake to the upper edge of the ore-body.

A raise in the hangingwall section found the ore cut off by a porphyry dyke which also cuts off the ore on the east side of the 1290 level at the north end. This dyke is known on the old 1360 level cross-cut above where it is 35 feet wide; it appears to be 20 feet wide at the 1290 level. Underground this dyke is almost vertical and strikes north but the only corresponding dyke present on the surface would have to dip at 45° east down to the 1360 level. On the surface this dyke pinches out at its north end directly above the present north end of the 1290 level so that there is a possibility of it having a similar shape underground. At present the dyke forms a barren zone between the west ore in the workings driven by the present company and the ore originally mined east of the dyke and at a higher elevation.

From the new development work 1258 tons of ore has been shipped that averaged 6.30% copper which compares well with the 2,500 tons averaging 7.0% shipped during the first world war.

The average grade of the ore-body is probably 5% as presently developed after allowing for the low grade that was sorted out.

The present workings are not sufficient to block out much positive ore but the results can reasonably be interpreted as showing 50,000 tons of probable ore averaging 5% copper in the block developed by the 1290 and 1360 levels.

Geologically there is the reasonable possibility of 200,000 tons of 5% copper ore in this lens above the 1200 level but a considerable amount of development will be necessary to demonstrate its presence.

A combination of drifting, raising and diamond drilling would determine this ore as outlined in the following UNDERGROUND DEVELOPMENT PROGRAMME.

1. The most important work is the continuation of the 1290 level to the south to extend the known length of ore and to provide income from the development ore shipped to the smelter.

2. Outline the width of ore on the 1290 level by cross-cutting to the hangingwall at 50 ft. intervals or diamond drilling every 20 feet.

3. Make a direct connection from the original raise to the north end of the 1290 level.

4. Raise to north at +30° from north end of 1290 level keeping the porphyry dyke on the east wall.

5. Raise at present position of south heading on 1290 level.

6. Raise again at 100 feet further south if ore extends that far.

7. Diamond drill a flat hole from the main cross-cut on the 1200 level at 480 feet from the portal at S.15°E. for 200± feet to pick up the ore-body on the level. If successful expand ore by further holes.

8. Crosscut on the 1200 level to develop any ore found by diamond drilling.

SURFACE DIAMOND DRILLING.

A programme of diamond drilling from the surface of the

geophysical anomalies obtained last year has already been submitted.

This work will be invaluable for determining the possible scale of operations that can be planned for the future.

Dr. A. C. Skerl, P. Eng.

COPY

C O W I C H A N C O P P E R C O M P A N Y.

M E M O R A N D U M O N P O L I C Y.

DR. A. C. S K E R L.

26 April 1954.

The following figures are significant in considering milling the ore instead of shipping crude ore to Tacoma.

1. Consider a block containing 50,000 tons of ore of 5% copper grade. When sorted to say 6% by discarding 25% of the tonnage averaging 2% there would remain 37,500 tons that would net $18 per ton at the smelter or $675,000. Costs would be:

Mining at $5	$250,000
Sorting @ $1	50,000
Freight etc. @ $4	150,000
Total	$450,000

The profit from mining this block of ore would be $225,000.

2. Next consider milling the ore to give a 20% grade that nets $90 per ton at the smelter and assume a milling cost of $2 per ton and an extraction of 90%. This would yield 11,250 tons of 20% concentrates, or a total of $1,012,500.

Costs would be:

Mining @ $5	$250,000
Milling @ $2	100,000
Freight @ $4	45,000
Total	$395,000
Net Profit	$617,500

Thus milling would give more than twice the profit that shipping of crude ore does at present rates.

3. If it is assumed necessary to prove up 100,000 tons of ore to warrant a mill then development and additional machinery will cost say $50,000 and a simple mill $100,000. To raise this money by shipping ore it would be necessary to mine 35,000 tons of ore and sacrifice $175,000 of potential profit. Also it would take three years at the present limit set by the smelter and could also jeopardise the tax free period for milling.

4. An alternative would be to raise the necessary capital for further development, a mill and working capital by selling say 400,000 shares to yield $200,000. With escrow shares there would then be a total of 1,750,000 shares issued as compared with 1,350,000 if the present share position was stabilised.

Thus a shareholder's present interest would be reduced by 30% permanently.

5. If it were possible to ship say 4,000 tons per month then the mine could officially go into production and within 9 months accumulate enough surplus to buy the additional equipment and mill. After allowing another 3 months for mill construction there would still be 2 years of tax free period left for the milling operation. The shareholders would have then preserved their present interest and so ultimately reap a much larger profit in the presumably many years of production ahead.

6. A still better arrangement, if possible, would be to borrow the money on the basis of paying back with a substantial interest within say twelve months of going into production. (Sgd.)"A.C. Skerl".

COPY

February 2nd, 1954.

Mr. Oswood MacDonald, President
Cowichan Copper Company.

Dear Sir:-

GRAVITY DETERMINATIONS ON THE COWICHAN COPPER COMPANY ORE.

Specific gravity determinations were made by J. R. Williams & Son Ltd. on five samples selected from the list of samples taken in the northeast raise driven off of the sublevel during the period of January 8th and 21st.

The following table shows the sample numbers, the percentage of copper present, the specific gravity of the sample, the calculated number of pounds per cubic foot, the equivalent number of cubic feet of rock in place to weigh one ton, and the calculated percentages of weight of chalcopyrite, garnetite and pyrite present in the samples.

Sample No.	Percentage of copper in sample	Specific Gravity of sample	Calculated				
			Pounds per cubic foot.	Cubic Feet per ton.	Percent Weight of Chalco-pyrite.	Percent weight of Garne-tite.	Per-cent wei-ght of Py-rite
6227	3.05	3.633	226.3	8.83	8.97	64.	27.03
6283	6.30	3.825	238.3	8.39	18.80	49.20	32.0
6277	9.75	3.767	234.7	8.52	28.70	47.30	24.0
6278	11.80	3.756	234.0	8.54	34.70	44.60	20.7
6279	15.15	3.891	242.4	8.25	44.60	33.15	22.25
AVERAGE	9.21	3.774	234.9	8.51	27.10	47.75	25.15

Respectfully submitted,

(Sgd.) D. Nelson

COPY

February 2nd, 1954.

Mr. Oswood MacDonald, President,
Cowichan Copper Company.

REPORT ON SAMPLING OF THE NORTHEAST RAISE IN THE COWICHAN COPPER MINE IN JANUARY, 1954.

Dear Sir:

Chip samples were cut at 5-foot intervals along the northwest and southeast walls from the roof to the floor of the raise driven off the sublevel at the Cowichan Mine on January 8th and 21st. The line of cutting was approximately at right angles to the floor of the raise and would therefore represent a true cross-section of the mineral zone for the distance covered.

The foot of the raise for descriptive purposes was assumed to be where the raise floor starts at a 45 degree slope, from above the sublevel or at a point 22.22 feet north 51° 20' East from the station at the floor of the manway raise which gives access to the sublevel. This was taken at the zero point of the raise. Samples were cut at 5 foot intervals starting at the line 5 feet above the zero point.

The cross-sectional thickness of vein represented and the results of the sampling are shown in the following table:-

Location. Southeast side. Slope Distance above zero point	Thickness of vein represented.	Percentage of copper in sample.
5	5.17 feet	4.75%
10	5.50 "	9.75%
15	5.80 "	11.80%
20	6.11 "	15.15%
25	6.42 "	13.00%
30	6.42 "	Sample not taken but assumed at 13.00%

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REPORT ON A SELF-POTENTIAL SURVEY OF PART OF THE PROPERTY OF THE COWICHAN COPPER COMPANY

Dr. A. C. SKERL.

May 8, 1953.

INTRODUCTION.

This survey was undertaken to test the possibility of an ore zone striking south 35° east through the property as suggested by the evidence of the topography, the apparently more intensive metamorphism and a series of float fragments of ore along this direction.

SUMMARY OF RESULTS.

1. The general arrangement of the anomalies is actually along a belt 700 ft. wide running due south from the Blue Grouse workings to the Sunnyside area for 3,000 ft. although only the northern half of the distance has been covered so far.

2. The anomalies suggest the presence of ore-bodies with sharply defined ends and ranging from 250 ft. down to 75 ft. in length.

3. Trenching, diamond drilling and underground exploration will be necessary to determine the actual dimensions and grade in each case however.

4. The topographic features and the float fragments of ore now appear to be the result of glaciation.

R E C O M M E N D A T I O N S.

The geophysical survey should be extended to cover:

1. The ground between the Blue Grouse and Sunnyside workings.
2. The area immediately west of the Blue Grouse main working.
3. A possible extension of the zone to the north.

F I E L D P R O C E D U R E.

The field work consisted of setting out numbered stakes on a rectangular grid system at 50 ft. intervals and then taking self-potential readings for each position.

An arbitrary point was taken as 100, all the values calculated in reference to it and then plotted on the accompanying plan.

40 man days were needed to stake the ground tested and a total of 1250 readings were made in 12 days by an instrument man and a helper.

The topography is quite steep, ranging from 700 to 1800 ft. in elevation. Owing to an intensive fire nearly two years ago a large proportion of the top soil has been eroded away. This condition made it difficult at times to get a satisfactory contact.

The irregularities of the equipotential lines at 10 unit intervals away from the anomalies do not have much significance because the actual differences are small and the individual readings can be considered as correct to say 5 units only.

When there is a series of concentric lines higher than 120 an anomaly can be considered appreciable.

D E S C R I P T I O N O F A N O M A L I E S.

Each anomaly is identified by the letter and number of the co-ordinate nearest to its centre and marked by a stake in the ground.

1. F7. this suggests an important ore-body extending for 150 ft. N.W. from the open cut at F8.

2. A series of open cuts at 25 ft. intervals from station F5 to F 8 should expose any ore that is present.

2. G12. this corresponds to the main old working under which the present adit is being driven. It shows that the mineralization could extend for 250 ft. in a N.S. direction.

3. H15. the survey is not completed here but some very high readings were obtained in conjunction with the old open cuts.

4. U25. a small but definite anomaly here corresponds to an old open cut and suggests a length of up to 75 ft. for the ore.

5. M29. here a small but sharp anomaly in a boulder strewn depression near the head of a gully indicates about 75 ft. of mineralization.

6. K 30. another short anomaly that is linked to M29 could represent a length of 50 ft. of the ore already exposed here.

7. V33. there is the beginning of an anomaly here that extends west outside of the surveyed area. No evidence of ore could be found in the outcrops and old trenches although about 50 ft. to the south chalcopyrite mineralization in lava is exposed on the west side of the new logging road. The anomaly may represent the main portion of a very flat dipping body. Further readings to the west may help.

8. Q34. this is a north trending anomaly for 200 ft. and fragments of garnetite-epidote rock with chalcopyrite suggest a disseminated type of deposit. Some trenching followed by drilling should be done to determine the quality of this ore.

9. C66, this isolated and small anomaly is of doubtful value but should be tested by a cut into the depression on the hillside in which it occurs.

signed "A.C. Skerl"

REMARKS ON THE COWICHAN COPPER CO.

Dr. A. C. SKERL. May 8, 1953.

INTRODUCTION.

This brief account is based on 16 days recently spent on the property. Most of this time was occupied conducting a self-potential survey which is reported on separately but all of the old workings were inspected and the old maps and reports studied.

CONCLUSIONS.

1. There appears to be an excellent opportunity for developing several ore-bodies of chalcopyrite all within 800 ft. of the portal of the present tunnel.
2. Other deposits are known at the Sunnyside workings and more are indicated by the geophysical work.
3. The actual sizes and grades are not known but the old records suggest that an average stoping grade of about 5% copper can be expected over widths of 3 to 15 ft. and for lengths of up to 250 ft. according to the geophysical anomalies.
4. The actual average grade will be determined by the amount of low grade material that it is found economic to mine.
5. It is expected that the ore-bodies will be pod-shaped with the longest dimension down dip but probably pitching to one side.
6. The individual ore-bodies can be expected to terminate at various depths but other blind ones will probably take their place.

R E C O M M E N D A T I O N S.

1. Continue the present tunnel to the downward projection of the main ore-body which should be drifted on each way and a raise put through to the old level above.

2. Complete the geophysical survey.

3. Trench anomalies where practical.

4. Shallow X-Ray drilling.

5. Further tunnels where practical to explore other ore-bodies at say 100 ft. below surface.

6. Underground diamond drilling for deeper extensions and blind ore-bodies.

7. The question of a mill or shipping ore should be kept in abeyance until at least two or three of the deposits have been explored underground. Only development rock should be shipped unless some particularly high grade ore is encountered that would not be benefited by milling.

signed "A.C. Skerl"

1758 Western Parkway,
Vancouver, 8, B.C.,
22nd. June 1953.

Mr. O. G. MacDonald,
President,
Cowichan Copper Company.

Dear Sir,

I have to report the following results as of June 20 1953 for the Self Potential Geophysical Survey that I am conducting over part of your property.

In a north trending belt 2500 feet and 1000 feet wide fifteen anomalies have been found that indicate possible mineralization for a total length of 2500 feet. All but one of these anomalies are shown on the accompanying plan.

The northern third of this belt includes the original main workings on Blue Grouse Mountain.

In the case of seven of the anomalies the presence of chalcopyrite is already known as indicated on the plan.

The survey is now approaching the Sunnyside workings which reach from 1000 feet to 1500 feet south of the belt mentioned above.

A campaign of bulldozing followed up by diamond drilling is recommended to test the commercial possibilities of the anomalies found so far.

Yours Sincerely,

Signed "A. C. Skerl"
A. C. Skerl, P.Eng.

TELEPHONE: ALMA 1332-Y

DR. A. C. SKERL
A.R.S.M., PH.D., P. ENG.
CONSULTING MINING GEOLOGIST

1758 WESTERN PARKWAY
VANCOUVER 8, B.C.

3rd. September 1955

C O W I C H A N C O P P E R C O M P A N Y .

P R O G R E S S R E P O R T.

During the month ending 17th. August 1955 the following results were obtained :

1. The 1290 level was advanced to the north in the good ore that had been indicated by previous test-holing for 34 feet of which the first 20 feet was 20 feet wide and then was reduced to 10 feet by the presence of unreplaced limestone.

At the end the face unexpectedly broke into a system of caverns formed by the action of ground-water on limestone. The main cavern is 60 feet long in a northerly direction and 15 feet wide. It is roofed on the east half by semi-oxidised ore and on the west side by porphyry. Several smaller caverns extend as far as 30 feet to the east where the limestone has been dissolved out along cross fractures. The main cavern is floored to an unknown depth with partly oxidised fragments of ore and porphyry brought down in part at least by the blasting. It is possible that the original floor is on the flat-lying porphyry assumed to be approximately 30 feet below the level.

It seems likely that the oxidation is limited to where the limestone has been dissolved away and so ore should be found above the cavern by the raise now being driven.

2. The 950 adit was advanced to 358 feet in fresh rock although there is considerable minor faulting. In the last 100 feet there

have been four dykes of porphyry in the amygdular lava.

3. Exploratory diamond drill holes Nos.38 , 39 and 40 were drilled flat to the E.N.E., E.S.E. and due E. respectively from the north end of the main ore-body on the 1200 level. No ore intersections were obtained but the extent of the main porphyry sill was further defined.

A. C. Skerl

92C/14E
92C-17

COWICHAN COPPER MINES LIMITED

Possible Ore Control

The ore shoots now being mined at the Cowichan Copper mine, the G-H orebodies and the E zone, show no directly observable reasons for being where they are, considered either separately or in relationship to one another. Successful exploration for additional ore shoots requires that some predictable structural pattern be recognized. Geological mapping of the mine workings and surface has failed to disclose any marker beds or groups of beds which can be traced far enough to illustrate the structures. There is, on the other hand, evidence to show that the more friable beds have been so broken up by rock movements that they cannot be traced continuously. A possible control of the distributions of ore shoots has been deduced from observed structural elements, and this control is thought to provide a reasonable explanation for the presently known occurrences and to indicate a basis for systematic exploration of the property.

The general geology of the mine area is described in Bulletin 37, B.C. Department of Mines, "Geology of the Cowichan Lake Area", by J.T. Fyles. Briefly, the rocks are Franklin Creek basalts and Sutton sediments all overlain on the east by sediments of the Nanaimo series. The ore occurs in skarn zones (G-H orebodies), and in less well

garnetized and epidotized tuffaceous bands (E zone), interbedded with the basalts. The skarns probably are of sedimentary and tuffaceous origin (Fyles p. 54). The principal intrusive rock is a grey feldspar porphyry which occurs in bodies of very irregular shape. Faults are numerous but none have been shown to have displacements of more than a few tens of feet.

The largest body of skarn exposed in the present mine workings is a lenticular mass up to 350 feet long and up to 60 feet wide in horizontal section and plunging 35 degrees in a direction south 30 degrees west from surface to the 1100 level, a vertical distance of nearly 400 feet. No other skarn body of comparable size has yet been recognized but a number of smaller ones are seen in the workings. In a south-trending drift on the 1100 level several large skarn blocks are surrounded on three sides by basalt. Parts of these blocks exhibit thin banding closely folded. The blocks are believed to represent a boudinage structure in which the friable rocks have been fractured -- the fractures were filled and the blocks separated by flowage of the incompetent basalt. A similar separation of fractured skarn blocks is exposed on surface near the Sunnyside adit about one half mile south. The existence of boudinage structure offers a possible explana-

tion why the skarn beds have not been traced for appreciable distances either in the workings or diamond drill holes. The altered tuffs are continuously exposed in the "E" zone for a horizontal distance of about 300 feet on the 1340 level and for a lesser length and in an offset position on the 1100 level. They have a fairly consistent attitude, at these places, strike north 10 degrees east, dip 65 degrees west.

Two directions of shearing have been recognized in and near the principal skarn body, strike north 10 degrees west, dip 45 degrees west; strike north 80 degrees west, dip 35 degrees south. Neither is strongly developed.

The structural elements upon which the following rationalization is based are:

1. The plunge of the principal skarn body, 35 degrees at south 30 degrees west.
2. The two shear directions, strike north 10 degrees west, dip 45 degrees west; strike north 80 degrees west, dip 35 degrees south.
3. The attitude of the E zone tuffs, strike north 10 degrees east, dip 65 degrees west.

The line of intersection of the two shear planes (Fig. 1) plunges 34 degrees in the direction south 29 degrees west. The attitudes of the planes bisecting the angles

between the shear planes are shown to be strike north 34 degrees east, dip 82 degrees southeast, and strike north 40 degrees west, dip 35 degrees southwest.

If the two shear directions are conjugate, i.e. formed at the same time as a result of the same stress, their line of intersection is the intermediate axis of the structural system of which they are a part. The system may include folds as well as shear planes. Shear planes and folds bear a common relationship to one another if the line of intersection is common to all (Fig. 2). Since the line of intersection of the two shear planes has the same orientation as the plunge of the principal skarn zone it is reasonable to suppose that the skarn plunge is related to the shear system.

Of the two planes bisecting the angles between the shear planes, one must be the axial plane of the related folds. The two planes bisecting the angles between the shear planes (Fig. 1) are strike north 40 degrees west, dip 35 degrees southwest, and strike north 34 degrees east, dip 82 degrees southeast. The plane of the "E"-zone tuffs, strike north 10 degrees east, dip 65 degrees west, meets either plane (Fig. 3) on a line which plunges 34 degrees southwest on bearing south 29 degrees west. Taking either of these planes as the axial plane, which bisects the angle between the limbs of the fold, (Fig. 3) shows the attitude

of the other limb of the fold must strike north 63 degrees east and dip 51 degrees southeast and that the north 34 degrees east plane must be the axial plane, because of the directions of the dip of the beds.

It is indicated, then, that the rocks in the mine area may have been compressed into a series of folds having limbs with strike north 10 degrees east, dip 65 degrees west; strike north 63 degrees east, dip 51 degrees southeast; an axial plane strike north 34 degrees east, dip 82 degrees southeast, and a plunge southwest at 35 degrees. This folding may control the distribution of ore shoots if the mineralization is allied to friable, permeable strata in the rock succession. The most likely places for such shoots to form would be on the crests or troughs of folds (G-H orebody); secondarily on limbs (E zone). Either could be influenced by crosscutting shears and fractures, formed at the time of the folding or later.

On Figure 5 the folding is shown applied to the G-H and E zones on the 1340 level and possible limits of the strike north 10 degrees west, dip 45 degrees west zone of movement are indicated.

Similar occurrences of mineralized skarn are exposed at the Sunnyside workings about one half mile south of the Cowichan workings. A garnet-epidote alteration zone has been traced from the Cowichan toward the Sunnyside (Fig. 4).

This indicates that the Cowichan and Sunnyside probably lie on the same zone of movement in which the folding is the dominant expression of the movement along the north 10 degrees west shear direction, i.e. that a north 10 degrees west, 45 degrees west fault zone appears here as a zone of folding and tensional fracturing (irregular porphyry bodies). Near north-south faults are shown by Fyles on the north side of Cowichan Lake, so similar structures may be expected elsewhere.

The foregoing is a theoretical analysis based on a limited number of structural observations. It provides a framework which may guide exploration. Its validity should be tested. If it helps to find orebodies it serves its purpose whether or not it proves exactly true.

This zone could be prospected by systematic drilling from both surface and underground bases. The folding pattern outlined could be applied to skarn and tuff intersections. Attempts also should be made to relate the presently isolated exposures of skarn and tuff in the underground workings to the postulated fold pattern. It is possibly significant that the alteration zone traced from the Cowichan grows weaker to the south as might be expected from a southerly plunging structure.

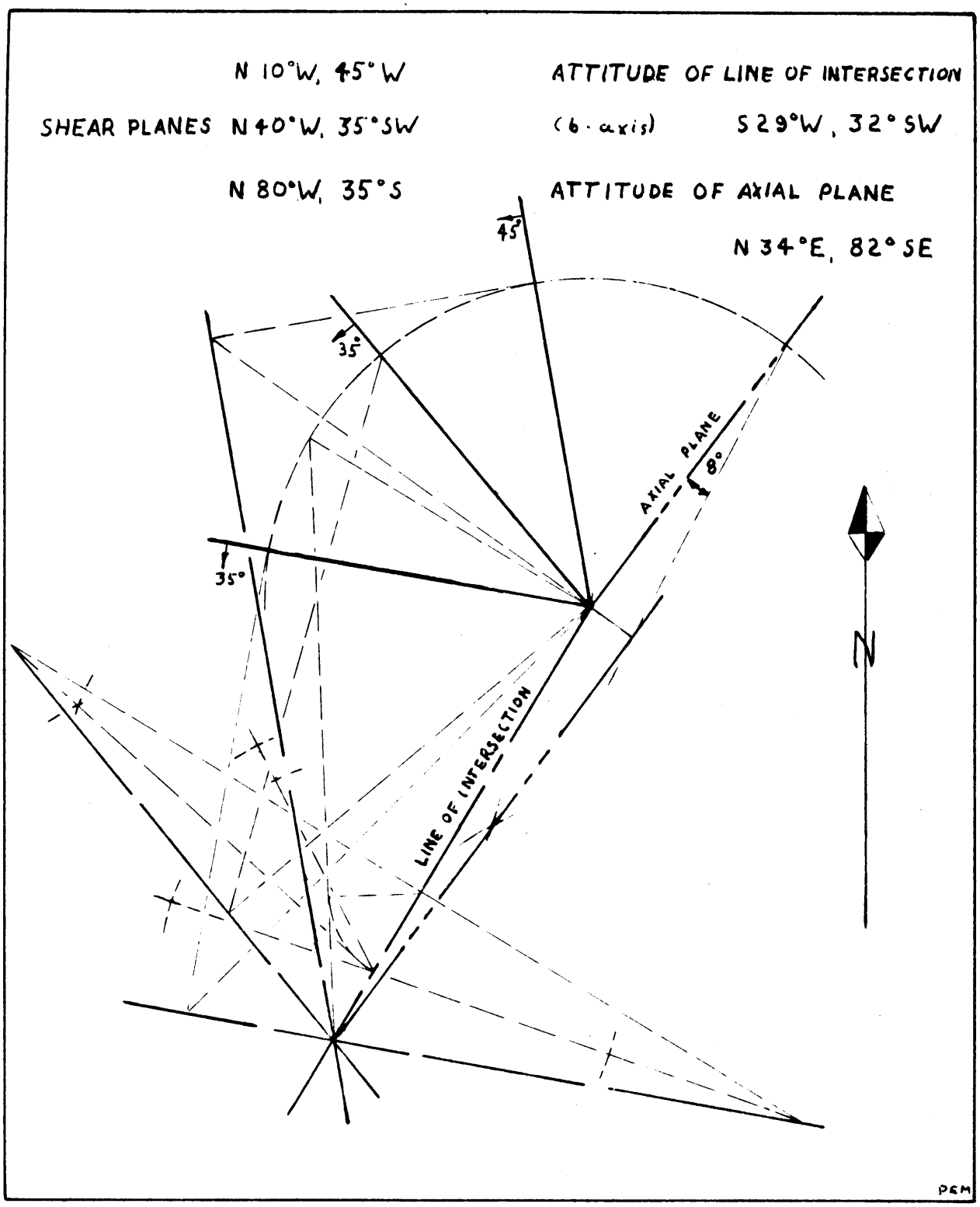
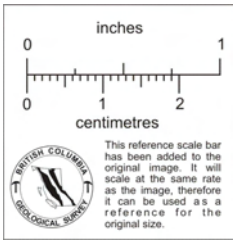

N 10°W, 45°W
SHEAR PLANES N 40°W, 35°SW
N 80°W, 35°S
ATTITUDE OF LINE OF INTERSECTION
(b-axis) S 29°W, 32°SW
ATTITUDE OF AXIAL PLANE
N 34°E, 82°SE
45°
35°
35°
AXIAL PLANE
8°
LINE OF INTERSECTION
N
PEM

FIG. 1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BRITISH COLUMBIA GEOLOGICAL SURVEY
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

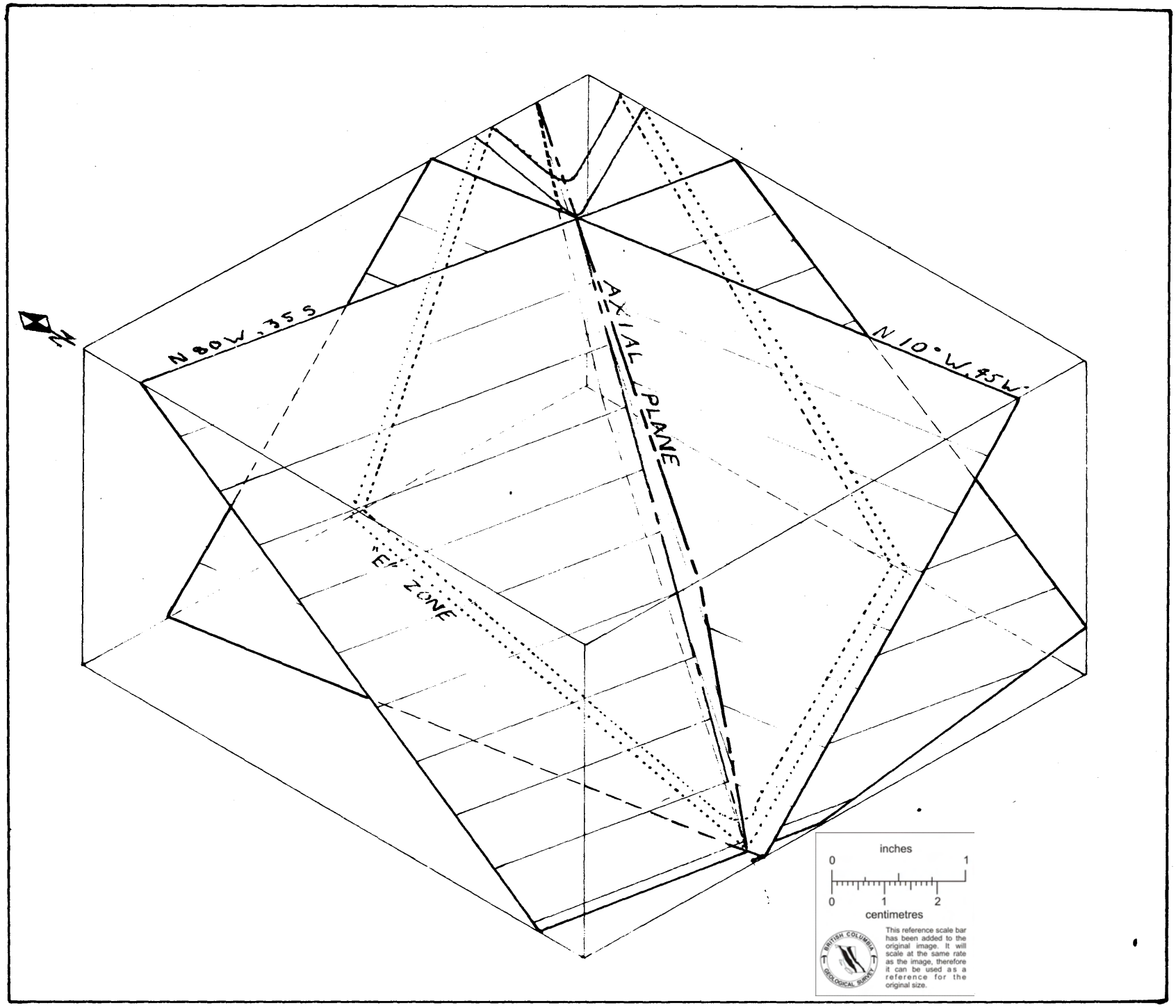

N
N 80 W, 35 S
AXIAL PLANE
N 10° W, 45 W
"E" ZONE
inches
0
1
0
1
2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

Fig. 2.

"E" ZONE & AXIAL PLANE

ATTITUDE OF LINE OF INTERSECTION S29°W, 34°SW

ATTITUDE OF LIMB COMPLEMENTARY TO "E" ZONE N63°E, 51°SE

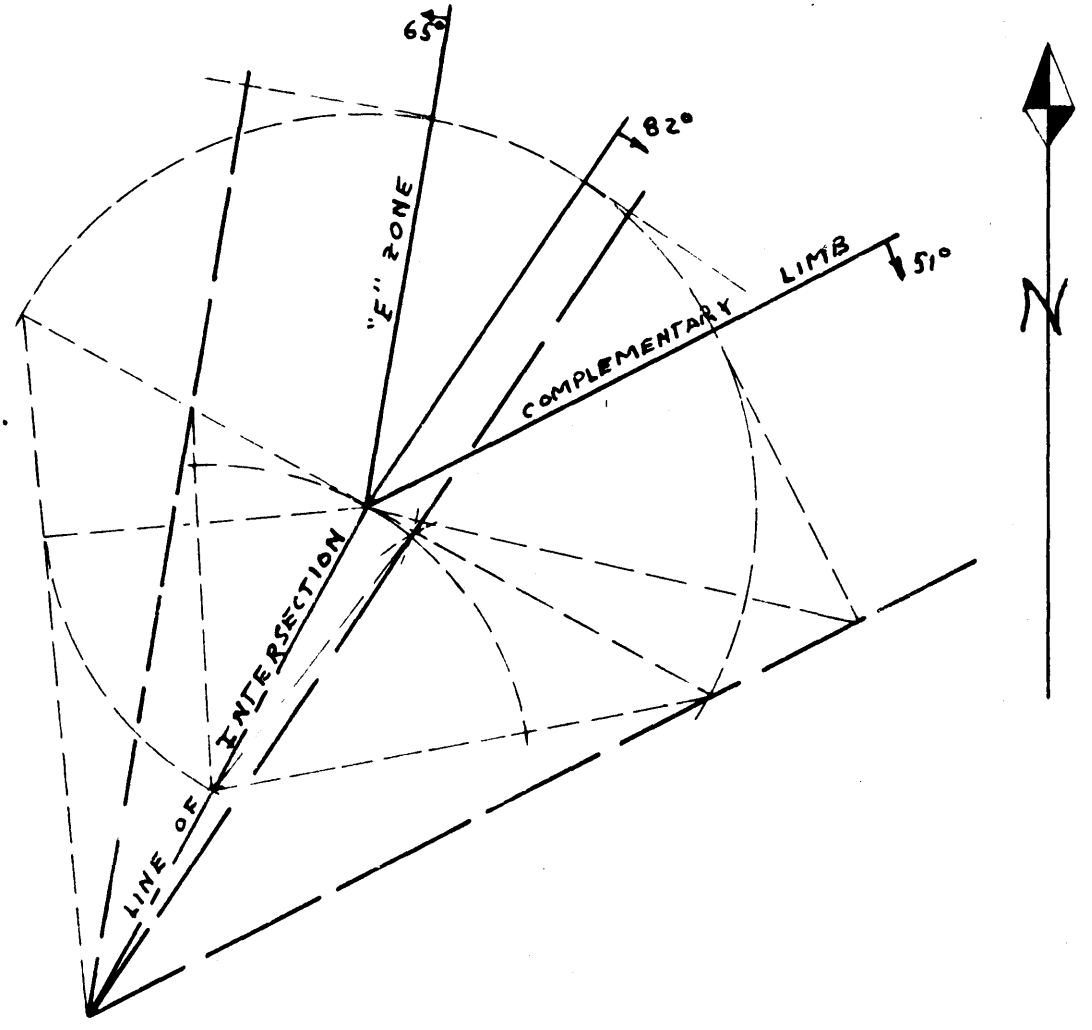
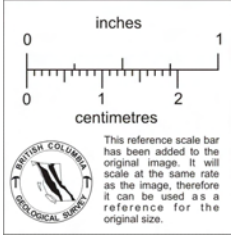


Fig. 3.



PEM