GEOLOGICAL REPORT
on
INDEPENDENCE GROUP 92H/10W

1/2 mi E. of Coquihalla 49° 120° NW

Similkameen M.D. B. C.

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July 26, 1950 - October 12, 1951

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G E O L O G I C A L   R E P O R T

on

INDEPENDENCE GROUP

COQUIHALLA, B. C.

by

Alexander Smith

Vancouver, B. C.
October 12th, 1951

R E P O R T

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I N D E X

MAPS: #1 1. Independence Group 1" = 40'

#2 2. Independence Group and adjacent area 1" = 1000'

R E P O R T

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INTRODUCTION:

The Independence Group is situated about 8000 feet ~~west~~ EAST of Coquihalla Station (Elv. 3750') on the Kettle Valley Railway. The property lies at an elevation of 5350-5600 feet on the drainage divide between a branch of the Coldwater River and a branch of Lawless Creek. It is readily accessible by a 2-1/2 mile steep horse trail from Coquihalla, or a 15 mile trail up Lawless Creek from Tulameen.

The property consists of four claims owned for years by the late John Holm of Coalmont, British Columbia. In 1948 it was purchased by the St. Eugene Mining Corporation Ltd. N.P.L. In 1950 the claims were surveyed and are now being Crown Granted. The deposits have been compared with the "Porphyry Copper" type common in the Southwest States.

Considerable surface trenching, 1000 feet of adits and drifts, and 265 feet of shafts and raises have been put in to test the showings. Most of the work was done about 1906 by Granby Consolidated Mining and Smelting Company. The Consolidated held an option on the ground in 1927 and 1928. Since then more surface trenching has been done by John Holm. The underground workings are not now accessible, but the portals of the adits could be reopened probably without undue expense. A map of the underground workings and sampling by the late Geo. Kilburn of C. M. & S., is to hand.

The property was reported on by Dr. Charles Camsell in 1913 (Geol. Survey, Canada, Memoir 26, p. 166-168), and more recently in 1947 by Dr. H. M. A. Rice (Geol. Survey, Canada, Memoir 243, p. 111-112). In the 1926 Annual Report of the B. C. Minister of Mines there is a description of the property and a sketch map.

Since acquisition by the St. Eugene Mining Corp., the showings were mapped on the scale 1" = 40', and to get the structural setting an area of about 7 sq. mi. was mapped on the scale 1" = 1000'. One of the principal problems was the relationship of the copper-bearing porphyry to the Eagle granodiorite and other intrusives. To study the problem, Dr. L. Dolar-Mantuani made a detailed petrographic study of a suite of 60 specimens. The principal results of field and microscopic work are included herein.

GEOLOGY:

Rock Types:

The deposits occur in and near a body of quartz-feldspar-biotite porphyry. This lies along the eastern margin of the Eagle granodiorite. The Eagle batholith intrudes Nicola greenstones of Upper Triassic Age. It is separated from the greenstones for a length of 3 miles along the contact by this body of porphyry. The maximum width of the porphyry is 1300 feet.

<u>Nicola Group:</u> The greenstones of the Independence area range from andesites to basalts. Most of these rocks are now altered to greenstone schists striking NW parallel to the contact with the Eagle granodiorite and dipping generally at high angles to the southwest. These pre-batholithic rocks are intruded by post batholith sill-like bodies, ranging from syenite to gabbro in composition.

<u>Eagle Granodiorite:</u> The Eagle batholith is an elongate body trending N30°W. At Coquihalla it is about 6 miles wide. It shows a gneissic structure or foliation paralleling the contact with the Nicola rocks. In the granodiorite a sequence of lighter and darker bands often 10' or so thick suggests that part at least of the granodiorite may have been formed by the metasomatism of older bedded rocks. However, Dr. Mantuani found that the zonal arrangement of the plagioclase in the thin sections examined indicated that the rock was magmatic and not metasomatic.

<u>Marginal Phase of Eagle Granodiorite:</u> At the Independence the Eagle granodiorite grades in appearance and composition on approaching the contact into a quartz-monzonitic rock. There is a marked increase in the percentage of K-feldspar, the rock loses its somewhat friable appearance and becomes dense and more leucocratic.

<u>Aplite:</u> Occurs also along the eastern margin of the batholith. Thin sections show some gradation between the marginal phase of the granodiorite and these aplites, but no gradation to the porphyries.

<u>Porphyries:</u> These rocks were subdivided in the field into feldspar porphyry and quartz feldspar porphyry, according to whether they did not or did show phenocrysts of quartz. All gradations between the two varieties occur. In general the feldspar porphyry tends to occur in narrower more dyke-like bodies and to be much less mineralized. It is a grey fresher rock. The quartz feldspar porphyry is the principal ore-host in the area. It is a true porphyry with well-developed plagioclase feldspar and quartz phenocrysts. It occurs along the eastern contact of the batholith for a distance of at least 3 miles. The greatest exposed width of about 1300 feet is at the Independence mine on the divide. Where mineralized it is generally more quartzose and cut by small quartz stringers. Sulphides, chalcopyrite and pyrite occur both disseminated in such porphyry and in the quartz stringers. By far the largest known area of such mineralization along the 3 mi zone is at the Independence where about 50% of an area about 1000 feet in diameter is mineralized. The mineralized portions of this area would average less than 0.2% Cu.

<u>Dykes & Sills:</u> Both the Nicola greenstones, the Eagle granodiorite and the quartz feldspar porphyry are cut by a series of dykes - generally quartz poor. One series appeared in the field to grade from syenitic to gabbroic. A few small lamprophyre (spessartite) dykes occur. Also sills of olivine basalt cut the Nicola rocks (or are less altered flows included in that series).

STRUCTURE:

The general trend of the formations is N35° - 40°W with dips nearly vertical, or at high angles to the southwest. There is a general parallelism between the bedding and schistosity in the Nicola rocks, the porphyry, the Eagle batholith contact, and the flow-layers in the granodiorite. In addition there are several strong shear zones in the greenstones parallel to this general N35°W trend. Also faulting and shearing along the contact zone occupied by the porphyry.

A major transverse fault passes through Coquihalla and continues N30°E from the pass up a creek which is one of the headwaters of the Coldwater River. It appears to be nearly vertical and to offset the Eagle-Nicola contact 3000 feet to the right. It is most probably the continuation of the fault shown on the Hope Sheet as extending N30°E up the Coquihalla Canyon for 8 miles to a point 5 miles SW of Coquihalla. We did not pick up the porphyry belt NW of this major fault. Several parallel N30°E fault zones cut the granodiorite and porphyry, and have been followed by dykes of the gabbro-syenite series.

In addition, several N-S faults cut the granodiorite, porphyry and greenstones; in general the offset is to the right. They, too, are followed by gabbro-syenite dykes. A fault of this type just west of the mine may have offset the granodiorite contact several thousand feet. The immediate area of the mine appears to be more cut up by small block faults than does the surrounding country.

MINERAL DEPOSITS:

As mentioned above there is at the Independence an area about 1000 feet in diameter of quartz feldspar porphyry of which about half carries low grade copper values (0.2% Cu-). The sulphides, chalcopyrite and pyrite occur disseminated in the light tan quartzose porphyry or in quartz stringers cutting it. As shown on the 40' scale map, considerable trenching has been done on such mineralization. The area is cut up by grey-green feldspar porphyry (syenite?) dykes which are themselves barren, although mineralization is generally of better than average grade on the walls of these dykes.

The higher grade mineralization (0.4 to 1% Cu) appears to be confined to shears or fault zones cutting the porphyry. Here the porphyry is softer due to development of carbonates, sericite and some clay minerals. On the surface a narrow N25°W mineralized fracture zone shows in a large cut NE of the shaft. Molybdenite occurs along with the chalcopyrite.

The dump of both the main adit and the shaft show that considerably larger bodies of this gougy type of ore were encountered underground. The underground map shows that much of this came from a N40°W shear zone which averaged 0.54% Cu across a 40' width. This was explored near its junction with a narrower N-S shear or fault. The latter was drifted on for an additional 250 feet southerly. In it were found sections of higher grade (2'-17%, etc.).

Copper mineralization was found at only two other places along the porphyry belt. About 7000 feet south-east of the Independence workings there is a 25' width of quartzose porphyry carrying very low copper values (0.1% Cu). 6000 feet NE of the mine there are two small patches of low grade in the marginal phase of the granodiorite and a gougy rusty zone without visible sulphides but similar in appearance to the kaolinized porphyry.

Vancouver, B. C.
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CONCLUSION: Petrographic Report by L. Dolar-Mantuani

Q 1. Is the Eagle granodiorite metasomatic in this area or not?

H. A. Rice (1947, p. 36) describes the Eagle granodiorite in part as follows:

> "There is evident conformity between the structures of the Nicola group and that of the granodiorite, and the writer feels that the intrusions have been introduced along the bedding of the Nicola, perhaps in large part by granitization. A possibility exists that the folding was accomplished after the introduction of the granodiorite, but there is no evidence of crushing to bear this out."

The writer had the opportunity to study only two thin sections of the "green schists" of the Nicola group (No. 15 and 25) and six of the Eagle granodiorite (No. 8, 9, 31, 34, 37). The two sections of the "greenstone schists" carry small typically non-porphyritic plagioclases without zoning. The feldspars in the granodiorite are large grains of plagioclase in many cases showing typically repeated zoning with excellent euhedral outlines in the zones. It is the writer's opinion that zoned euhedral crystals with such complicated crystal structure cannot develop by metasomatism. At the marginal greenstone schists do not show any zoned plagioclases it is hardly to be expected that the plagioclases of the granodiorite would be remnants of the greenstone schists.

Also supporting the hypothesis that the Eagle granodiorite of this area is not in the whole a product of metasomatism are -

1. The granodiorite does not show any striking

differences in its development, apart from the marginal monzonitic variety.

2. The two thin sections close to the Nicola formation show a decrease in the amount of mafics and less visible foliation.

On the other hand the borders between plagioclases and quartz indicate some later replacement and silicification. That the replacement is not more distinct can be caused by foliation seen in thin sections and hand specimens which would destroy the fine textural features which prove any replacement.

The specimens of granodiorite show clearly the results of stress and crushing in the bent form of grains and stretched aggregates of biotite and their alteration products which are lined up in roads (mostly wavy because of large plagioclase grains). In the specimens which are more leucocratic (No. 8 and 37) or contain more potash-feldspar (No.31) the foliation is less distinct. The sutured outlines of the quartz grains and their distinct wavy extinction suggest in the same way that the quartz grains, now forming aggregates of only this mineral, were originally larger and later crushed.

Q 2. <u>Is any gradation shown from the granodiorite through the marginal facies to the mineralized porphyritic rocks?</u>

Typical granodiorite is represented by specimens No. 29, 34 and 9. It is no doubt that a gradation exists over the Specimen No. 31 between the granodiorite and the marginal facies which may be best represented by No. 19.

The main difference between the marginal facies and the granodiorite is in the increased amount of potash feldspar in the former. The amount of potash feldspar therein is so large that the rock has to be classified as quartz monzonite. The second difference is that the marginal specimen does not show zoning of the plagioclase grains in spite of the fact that the dusty inclusions are less numerous than in some of the plagioclases of the granodiorite. But a greater number of specimens of the marginal facies should be used to prove this rule. The third difference is in the development of biotite in the form of aggregates instead of larger single grains as common in the granodiorites. This would indicate that the biotite is recrystallized or perhaps partly introduced into the marginal facies. But the form of the biotitic aggregates in the whole corresponds to that in the granodiorites. In the same way the development of quartz did not undergo any change. Therefore, in #19 it is not certain whether the biotitization is connected with the biotitization of the nearby syenite dyke, No. 20, or whether the biotitization is in the marginal facies.

The gradational specimen No. 31 shows characteristics of both the granodiorites and the quartz monzonite. This is an increase in the potash-feldspar towards a quartz monzonite, but at the same time the zoned plagioclases and large (chloritized) biotite grains are present as in the granodiorites.

As the quartz monzonite shows strong replacement phenomena it could represent a granitization product of non plutonic rocks which are now similar to the Eagle granodiorite. But this would involve such a change of the former texture, which is now so similar to that of the granodiorites that it seems to be more cautiously to interpret the quartz monzonites as originally plutonic rocks changed in the deuteric or later phase.

A gradation is indicated also from the granodiorites to aplitic rocks. The latter are best represented by specimens No. 12 and 45, which are characterized by an aplitic panallotriomorphic texture and by a large amount of potash feldspar. The gradations pass over specimens No. 8 and 37 of more leucocratic granodiorites and the sheared aplite No. 30 with a small amount of potash feldspar which is equal to that in the granodiorites. The occurrence of pure quartz aggregates in No. 30 is equal to that in the granodiorites but the amount of this mineral is increased so much that it is the highest not only of all plutonic but all rocks examined in this area. The aplitic specimen No. 38 shows an even better gradation to the granodiorite No. 31 in the amount of potash feldspar and other constituents whereas the difference in the texture which is typically aplitic in No. 38 is quite definite.

All aplites with abundant potash feldspar show a beginning of a monzonitic texture and clear phenomena of replacement of plagioclase by potash feldspar and both by quartz.

These all prove that the aplitic rocks and the marginal facies are closely related to the Eagle granodiorites. But it is impossible to give a time relation for the enrichment of the potash feldspar in the marginal facies and the generally observed silicification on the basis of specimens and thin sections examined.

A gradation from the plutonic to the porphyritic rocks is much less visible, almost absent. Some indications are given by a starting development of a kind of groundmass (5%) in the quartz monzonite No. 19 and in the occurrence of groups of plagioclase phenocrysts in some porphyritic rocks. The groups of the phenocrysts are of a similar size as that of plagioclases in the granodiorites; they have no euhedral outlines which are so characteristic in the other zoned phenocrysts in the porphyries. This kind of plagioclase groups occur in sections No. 22, 42 (less distinct), 50, 51, 52 and 55. Sections No. 22, 42 and 55 are from areas close to the granodiorite; sections No. 50, 51 and 52 are from one dyke which lies in the greenstone schists.

It should be mentioned that the few larger grains of feldspar in the aplites are of a different character indicating a porphyroblastic and not a porphyritic texture. Therefore, they do not permit to make any direct correlation between aplites and porphyritic rocks.

The occurrence of specimens No. 8 and 37 show that the area on the map designed as mineralized porphyry for No. 8 is formed by a slightly leucocratic granodiorite, and that the occurrence of the sample No. 37 must be moved into the reddish area but assigned as a slightly leucocratic granodiorite. On the other hand the relatively large area represented by No. 40, 41 and 42 is not a marginal area but occupied by a clearly porphyritic rock No. 42 and 41. Specimen No. 40 is a felsite which petrological position is not clear.

Q 3. <u>How are the dykes related one to another?</u>

and

Q 4. <u>How are the porphyritic rocks related to the quartz feldspar porphyry of the mine?</u>

The answers of these two questions may be combined because of the similarity of the porphyritic rocks. But the nonporphyritic rocks should be mentioned first.

The relationship between the <u>aplitic rocks</u> was already described sufficiently.

The group of dyke rocks which are classified on the map as <u>"gabbro to syenites"</u> must be discussed more in detail. It is represented by specimens No. 2, 4, 20 and 24. Four other thin sections which are not directly related to them may be added; they are No. 3, 7, 5 and 46.

No. 3 and 24 are <u>basalts.</u> No. 3 is an altered (mainly chloritized, less epidotized and sericitized) pyroxene basalt of the Nicola group. No. 24 which forms a dyke between the Nicola rocks and a quartz feldspar porphyry is a fresh olivine basalt (a little serpentinized) with a typically ophitic texture. The freshness of the rock suggests that it is much later than the basalt mentioned above.

No. 7 is a lamprophyredyke - e spessartite with subhedral hornblende shreds. Such kind of dyke rocks is usually associated with granitic rocks.

The remaining three specimens of the "gabbro-syenite" group are related one to another by the almost complete absence of quartz. They seem to be of abyssal or hypabyssal origin as far as the texture is concerned but they differ very strongly in the composition.

No. 4 is a granular very basic rock with mainly amphiboles, less pyroxenes and no plagioclase. The rock is metamorphosed-amphibolitized - But it is believed that at least some of the pyroxenes are primary. The structure of the random oriented actinolite aggregates permits the interpretation that these aggregates could be former plagioclase. If this is the case the rock would be originally a melagabbro.

The specimens No. 2 and 20 seem to be more closely related. No. 2 is a diorite with subhedral hornblende and plagioclase ('oligoclase-andesine; the determination of the plagioclase was made only in few grains using the normal microscope) No. 20 is a syenite with lath-shaped oligoclase and aggregates of biotite scales indicating a replacement of original hornblende by biotite. A little quartz seems to be later introduced.

Two porphyritic specimens No. 5 and 46 may be added. They differ from other porphyritic rocks by the extremely low amount of quartz and a particular texture of the groundmass. Grains of alkali feldspars in the groundmass are equidimensional and have sutured outlines. The dusty inclusions of the non-lamellar grains do not permit to make a distinction between akali feldspars and albites. If the feldspar present is albite and not potash feldspar the connection to the syenite and diorite would be still better. It is interesting to note that specimen No. 5 is included in the Nicola group; Specimen No. 46 lies in the prolongation of the diorite No. 2 at a distance 2200 feet to the North.

Although these two thin sections are somewhat related in their composition and texture to the rest of the porphyritic rocks and therefore to the "mine porphyry" the differences as mentioned are sufficient to suppose for them a different connection in their origin. Only these two rocks show a definite development of epidote which is normally absent in other porphyries or if present in few thin sections is in very small and scarce grains.

All other rocks with more or less clear <u>porphyritic texture</u> are characterized by the fact that quartz occurs in the groundmass and that the plagioclases are clearly zoned with the exception of samples too altered. On the basis of the presence or absence of phenocrysts of quartz the rocks were divided into two main groups, feldspar porphyry and quartz feldspar porphyry. Complete gradation exists between these two groups. Quartz phenocrysts are in no case numerous.

A variation in the amount and type of mafics present is common for all porphyries. Specimens may contain only biotite, or only hornblende, or both minerals in different proportions; this regardless of other properties such as texture and composition. In the altered specimens the proportions between the mafics are naturally less clear but in no case is there a large amount of mafica.

A variation is noticeable also in the development of the porphyritic texture. In the group of feldspar porphyries the texture varies from a slightly developed one in specimens No. 14 and 22, being therefore microgranodiorites to specimens No. 18, 41 and 50 with a clear porphyritic texture and an average grain size of - 0.03 mm in the groundmass. The texture of the quartz feldspar porphyries is always clearly porphyritic. The average size of grains in the groundmass varies from 0.05 to 0.01 mm. in the specimens (No. 15, 52, 16, 51, 54, 53) which form a gradation between feldspar porphyries and quartz feldspar porphyries, and from 0.01 to 0.007 mm. in the typical quartz feldspar porphyries (No. 56, 55, 58, 42, 35, 32 listed in decreasing order of grain size of the groundmass).

The development of groups of plagioclase phenocrysts and their significance in the relation to the granodiorites nearby was already mentioned in the former chapter.

However the position of quartz must be discussed more in detail. Quartz is developed in relatively few specimens as distinct phenocrysts with signs of resorption by the groundmass. In the transitional specimens (No. 15, 16, 51 - 54) the quartz occurs in the form of quartz veins (No. 16 and 52), or quartz aggregates which have in the whole the shape of quartz phenocrysts (No. 15, 16 and 51), or quartz occurs only in relatively larger grains in the groundmass (No. 53, 54). All these specimens indicate a later silicification. However, the introduction of quartz is suggested also very definitely in the microgranodiorites (No. 14 and 22) and in the groundmass of some other porphyries.

The transition between the porphyries with and without quartz phenocrysts is so complete that the formation of some of the larger quartz grains as original phenocrysts may be questioned. On the other hand the quartz phenocrysts accompanied by an extremely fine-grained groundmass can be explained only as original phenocrysts or following F.Angel as parts of quartz-sandstones which were collected by the magma on its way upwards. No indication of a latter type of origin is given for these quartz phenocrysts in this area because no quartz sandstones are mentioned to occur in the neighbourhood.

As it can be concluded from the explanation above, a transition must occur from the porphyries to the "mine porphyry". However, the mine type of porphyry should be characterized a little more. If the four thin sections (No. 15, 16, 42 and 54) may be regarded as representative for the mineralized porphyry according to the descriptions of hand specimens by Dr. A. Smith, the most typical common feature is the presence of quartz; in specimens No. 42 and 54 as phenocryst, in No. 16 as quartz vein and aggregate, and in No. 15 as aggregate (in all porphyries quartz is present in the groundmass). The mafics are completely altered in No. 15

and 42, in the other two thin sections biotite and hornblende occurs in the same amount.

But a mineralization occurs also in the feldspar porphyry No. 18, in the sheared aplite No. 30 and in the leucogranodiorite No. 37.

October 11th, 1951

L. Dolar-Mantuani

ROCK SPECIMENS

INDEPENDENCE GROUP - COQUIHALLA, B. C.

No. Spec.	Ref. to Map	Field Description	Petrographic Classification	Qtz.	Plag	[illegible]	[illegible]	[illegible]et	Biot	Chl.	Ser.	Ca	Ep	Ti-Min	Ap	Mt	Sul	And	Gdn.
3	Ga	Basalt in Nicola Greenstone Fresh Amygdaloidal Olivine Basalt	Pyroxene Basalt		5 45					13	+D/2	+	7			6		27(?)	79 Ophitic
24	Ga	Gabbro	Olivine Basalt		1 50		10		+	Ser 6	D/10					Ilm 6		40-60	96 Ophitic
25	Ga	Greenstone Schist	Hornblende Schist - Amphibolite	27	30				5	<1/2	D/5			1	+	2		35	
13	Ga S	Greenstone Schist	Amphibolite	30	35				6	+	D/10			<1	+	4		56	
7	"	Green basic dyke in porphyry Like mine porphyry	Spessartite	Amyg. 5	25				5	8	D/2	3		Leuc 4	+	<1		ca 21	90
4	Ga	Gabbro on ridge in Nicola Greenstones	Amphibole pyroxenite (uralitized melagabbro)	1/2				10		4		4	+	<1/2			<1/2		
2	Sy-Ga	Gabbro syenite Along NE fault between 2 bands	(Syenite) diorite		35			2		10	D/2		2	2	+	Ilm 5	<1/2	28	
26	Ga	Gabbro	Oligoclase syenite	6	70			+	13	2	Ds/5	3		1	1	1	+lim. 3	25	
28	Gd	Eagle Granodiorite Biotite altered to chlorite	Granodiorite	20	(Zone) 65	3			4	2	+D/3	1	1½	<1/2	<1/2	+		50	
34	Gd	Eagle Granodio. Biotite altered to chlorite & Epidote	Granodiorite	25	(Zone) 56	4			5	1	1 D/5		5	1	+	+		21-35	
9	Gd	Eagle Granodio.	Granodiorite	20	(Zone) 61	3			7	2	+ D/4		7	+	+	+		8-48	
8	Mi-por.	Coarse grained syenite?porphyry Like mine porphyry	Leuco-Granodiorite	29	(Zone) 60	4			+	3	+D3/4	+	D +	+	+	<1		22-28	

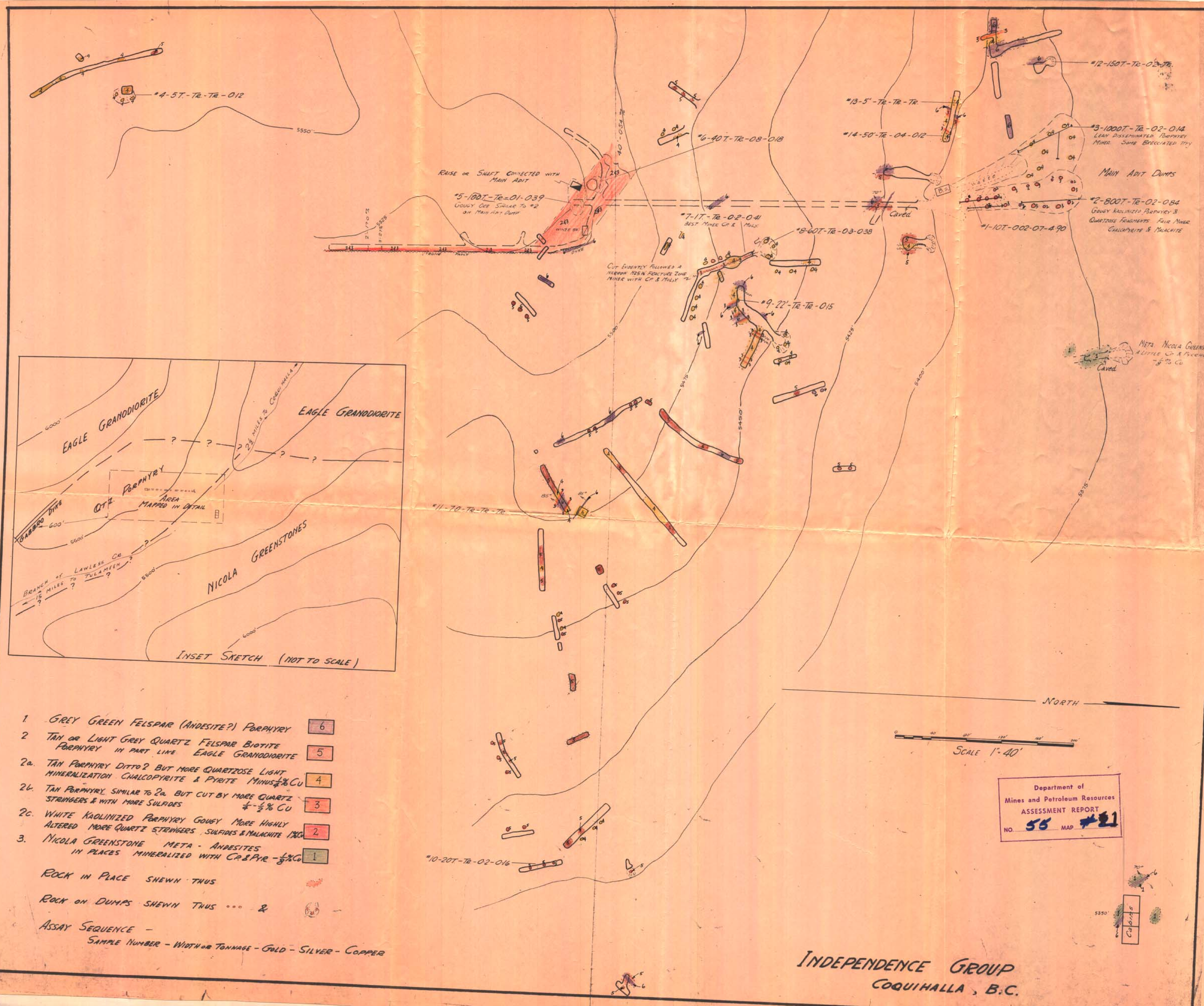
No. Sec.	Ref. to Map	Field Description	Petrographic Classification	Qtz.	Plag	K.F.	Ol	[illegible]	Biot.	Chl.	Ser.	Ca	Ep	Ti-Min	Ap	Mt	Sul	An%	Gdm
37	M	Dense type Eagle granodiorite? with molybdenite along a N25°E Fr.	Leuco-granodiorite	35	42	4			<1/2	2	2 D2/3	15		+	+	+		27	
51	Gd	Marginal dense type derived from Eagle granodiorite	Granodiorite - Qtz. Monzonite	38	(Zone) 50	10			1	6	1 D/2	+	2D	<1/2	<1/2	+		11-41	
19	M	Intermediate marginal type between Eagle granodiorite & mine porphyry	Qtz. Monzonite	25	38	20			5	1/2	D/4			+	+		1-1/2 cc	-21	5
38	Fp	Aplite	Aplite (porphyrobl.) (- Granodiorite Monzonite)	30	7 44	1 14				<1/2	3 D/3		<1/2	+		+	+ Lim <1	11-14	92
12	A	Aplite or felsite	(Aplite (-Perth)	25	2 41	3 [illegible]			+	1	1 D/4			+	+	<1/2		25	95
45	A	Aplite	Aplite(-Microcline) Garnet <1/2	25	30	5 [illegible]					4 D/4						<1/2	16	95
30	Rw Sch	Rusty weathering Qtz.-Carbonate-sericite zone in Eagle granodiorite mineralized with 1% pyrite, 1/10% chalcopyrite	Aplite, sheared	45	38	3			(+)	4	1 D/3	5			+	Lim 2	2	21	
14	Por	Hornblende-Biotite granodiorite or Syenite porphyry	(Porphyritic) micro granodiorite or silicif. syenodiorite	15	7(Zone) 63	9		2	2		D/5			1/2	<1/2	1/2		83	93
22	Por	Fresh syenite porphyry	(Porphyritic) granodiorite or silicif. syenodiorite monz. text.	14	15(Zone) 15	12		Q	1 3	+	D/5	<1		1-1/2	<1/2		<1	5-42	84
18	Por	Main tunnel dump. Fresh grey andesite with dissem. pyrite & chalcopyrite	Feldspar porphyry Syenite	20	50(Zone) 15	4			3 4	(4)	<1/2 D/3	D 1-1/2	<1/2	+	<1/2		2	23	47

No. Sec.	Ref. to Map	Field Description	Petrographic Classification	Qtz.	Plag	Kfd.	[illegible]	[illegible]et	Biot.	Chl.	Ser.	Cc	Ep	Ti-Min	Ap.	Mt.	Sul	An%	Gdm
50	Sy	Grey syenite	Feldspar Porphyry	10	55 (Zone) 20	2			3 10	(2)	D/6		(+)	+	+	+		25 13-44	42
41	M	Syenite dyke? Grading from grey Feld. Syn.Porphyry	Feldspar Porphyry	8	20 58(Zone)					(3)	D2/3	2	1	+<1	<1/2	+	+	31	77
46	Por	Float greenish porphyry with radiating clusters of a greenish mineral	Feldspar Porphyry Siderite & Orthite	2	48 48(Zone)					3	3 D2/3		3	2	<1		1-1/2	?	57
5	Ga-Sy	Sill. Syeno-Gabbro	Feldspar Porphyry	5	45 35(Zone)				(2)	6	D2/3	2	6	+	1	+			50
40	M	Aplite?	Slightly porphyrytic felsite (Feldspar porphyry) Garnet <1/2	2 v. 30	8 38	3 22				<1	2 D/10			+		+		28	95
15	Mi-Por	Ore type Porphyry Strong alterat.	Feldspar Porphyry - Q. aggregate changes %	5Grp. 10	45 9						15 D/5	12		2			2	11	25
52	Sy Mi-Por	5' syenite altered along fault to rusty weathered mine type porphyry	Feldspar Porphyry - Q.vein	5 v. 12	48 18	30			2 3	(4)	(D)	v.3D 3			1		+ Lim. 2	27	40
16	Por	Fresh mine type Porphyry	Feldspar-Porphyry - Q.Aggregate - vein.	3 v. Q.gr. 22	38(Zone) 38				1	(1)	D/3			<1/2	<1/2	1		23	55
51	Sy	Fresh grey syenite with minor pyrite & chalcopyrite	(Q) Feldspar Porphyry - Q.Aggregate	3 15	52(Zone) 10	5			4	3	D/4	4	v.<1/2	1	<1/2		<1/2	22-31	32
54	Por?	Fresh mine type Porphyry without quartz eyes, min.biotite hornblende	(Q) Feldspar Porphyry -	1 24	45(Zone) 24				2	(<1)	D/4			<1	<1/2	<1		22	50
53	Por	Porphyry Mine	(Q)Felds.Porphyry	4 18	42(Zone) 20				3	(5)	D/4	+		+	1		3	13-23	38

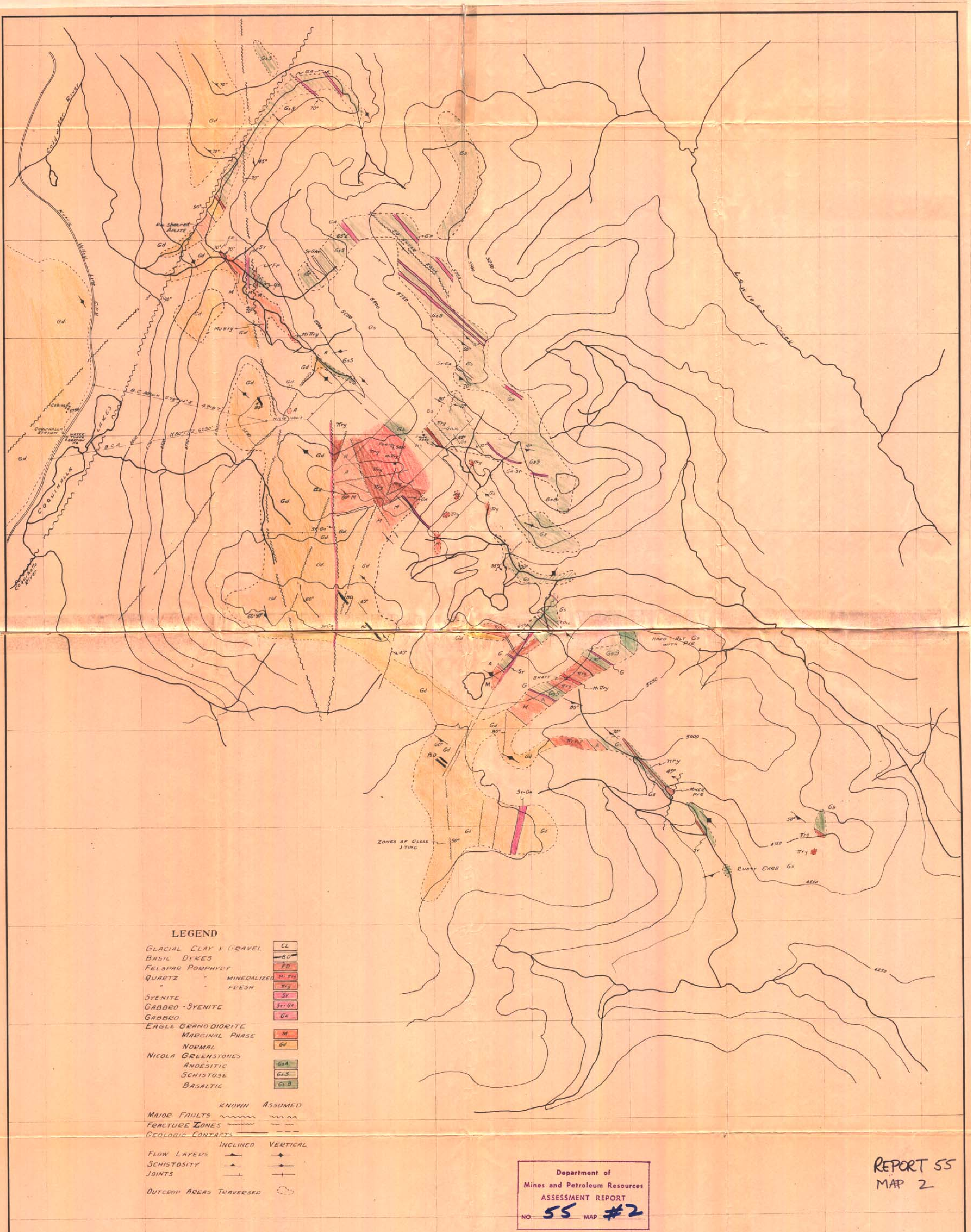
No. Sec.	Ref to Map	Field Description	Petrographic Classification	Qtz.	Plag	Kfd	Ol	[illegible]	[illegible]t	Biot	Chl.	Ser.	Cc	EP	Ti-Min	Ap	Mt	Sul
56	Por	Porphyry	Qtz.Feldspar Porphyry Kalinite? 15	5 16	36 30			[illegible]	[illegible]	(5)		4 D 3/4				<1/2	Lim 3	<1
55	Por?	Mineralized Porphyry or Min.Granodiorite	Q.Feldspar Porphyry	5 10	50(Zone) 20			[illegible]	[illegible]	6	(<1)	D/6			1/2		1	
58	Por	Grey Feldspar Porphyry with Quartz	Q.Feldspar Porphyry (Q. vein)	5+5 v. 12	32 38	8		[illegible]	[illegible]	3+2		D/3				+	Lim 2	1-1/2
42	M	Best miner.portion of outcrop of mine type porphyry	Q.Feldspar porphyry Q.Aggregate	3+1 ag. 15	30(Zone) 27	8		[illegible]	[illegible]		(3)	D/5	1		1			4
32	FP	Syenite? with quartz eyes	Q.Feldspar Porphyry	8 2	32(Zone) 31	15		[illegible]	[illegible]		2	D/3			1		3	
35	FP	Grey Feldspar Porphyry Dyke	Q.Feldspar Porphyry	8 2	41(Zone) 41			[illegible]	[illegible]	6	(3)	D/4			1	+	1	

Qtz. Plag Hb Biot - the first line are phenocrysts.
Mafics or Chlorite in brackets = already considered in
the other constituent (Hb, Biot or Chl.)

Headings: Qtz.- Quartz. Plag - Plagioclase. Kfd - Kali-fe[illegible]
Ol - Olivine. py - pyroxene. Hb - Hornblende.
Act - Actinolite. Biot - Biotite. Chl - Chlorit[illegible]
Ser - Sericite. D/x - Dusty inclusions, mostly s[illegible]
cite. Cc - Calcite. Ep - Epidote. Ti-Min - Sph[illegible]
Leucoxene. Ap - Aplite. Mt. - Magnetite.
Lim - Limonite. Sul - Sulphide. ∮An. Gdm - Gro[illegible]
mass.



#4-5T.-Tr-Tr-.012
#6-40T-Tr-08-.018
RAISE OR SHAFT CONNECTED WITH MAIN ADIT
#5-100T-Tr-.01-.039
GOUGY ORE SIMILAR TO #2 ON MAIN ADIT DUMP
WINZE
DYKE
#7-1T-Tr-0.2-0.41
BEST MINER CP & MOLY
#8-60T-Tr-03-.038
CUT EVIDENTLY FOLLOWED A NARROW N25W FRACTURE ZONE MINER WITH CP & MOLY
#9-22'-Tr-Tr-.015
#13-5'-Tr-Tr-Tr.
#14-50-Tr-.04-.012
#12-150T-Tr-.02-Tr.
#3-1000T-Tr-.02-.014
LEAN DISSEMINATED PORPHYRY MINER. SOME BRECCIATED PTY
MAIN ADIT DUMPS
#2-800T-Tr-.02-.084
GOUGY KAOLINIZED PORPHYRY & QUARTZOSE FRAGMENTS FAIR MINER CHALCOPYRITE & MALACHITE
#1-10T-.002-.07-4.90
Caved
META NICOLA GREENSTONE A LITTLE CP & PYRRHO
Caved
#11-70-Tr-Tr-Tr
#10-20T-Tr-.02-.016
5550'
5500
5475
5450
5425
5400
5375
5350'
EAGLE GRANODIORITE
EAGLE GRANODIORITE
QTZ PORPHYRY
AREA MAPPED IN DETAIL
GABBRO DYKE
NICOLA GREENSTONES
2½ MILES TO COQUIHALLA
BRANCH OF LAWLESS CR
15 MILES TO TULAMEEN
6000'
INSET SKETCH (NOT TO SCALE)
1. GREY GREEN FELSPAR (ANDESITE?) PORPHYRY — 6
2 TAN OR LIGHT GREY QUARTZ FELSPAR BIOTITE PORPHYRY IN PART LIKE EAGLE GRANODIORITE — 5
2a. TAN PORPHYRY DITTO? BUT MORE QUARTZOSE LIGHT MINERALIZATION CHALCOPYRITE & PYRITE MINUS ⅛% CU — 4
2b. TAN PORPHYRY SIMILAR TO 2a. BUT CUT BY MORE QUARTZ STRINGERS & WITH MORE SULFIDES ⅛-½% CU — 3
2c. WHITE KAOLINIZED PORPHYRY GOUGY MORE HIGHLY ALTERED MORE QUARTZ STRINGERS, SULFIDES & MALACHITE 1%CU — 2
3. NICOLA GREENSTONE META-ANDESITES IN PLACES MINERALIZED WITH CP. & PYR. -⅛% CU — 1
ROCK IN PLACE SHEWN THUS
ROCK ON DUMPS SHEWN THUS
ASSAY SEQUENCE -
SAMPLE NUMBER - WIDTH OR TONNAGE - GOLD - SILVER - COPPER
NORTH
SCALE 1"-40'
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 55 MAP #1
COPPERS
INDEPENDENCE GROUP
COQUIHALLA, B.C.



1000 0 1000 2000 3000 4000 5000 6000 7000

SCALE 1 INCH TO 1000 FT. ±

COMPANY ST EUGENE
PROPERTY INDEPENDENCE
LOCATION COQUIHALLA, B.C.

WORKING PLACE SURFACE (BASED ON AIRPHOTOS BC 345:93 & 345:64 x 2 DIAM)
TYPE OF MAP GEOLOGY & TOPOG.

DATE JAN. 1951
DRAWN BY A.S. & JAR
MAP NO. In. 9