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PRELIMINARY REPORT

SURFACE GEOLOGY OF AN AREA
INCLUDING THE ESTELLA MINE

BY

ALFRED R. ALLEN
GEOLOGICAL ENGINEER

APRIL, 1952.

82G/13E

GEOLOGICAL REPORT

THE ESTELLA PROPERTY 49' 115' N.W.

Alfred R. Allen R.P.E.

July 30, 1951 to October 31, 1951

Covering In Whole and In Part The Following Mineral Claims

Dot Fr.	Thorn 1	Monty 5	Estella
Dorothy	Thorn 2	Monty 6	Dog Star
Merilynn	Thorn 3	Monty 7Fr.	Skylark
Jennie	Thorn 4 Fr.	Monty 8 Fr.	Cashier
Alet	Thorn 5 Fr.	Blondie 1 Fr.	Morning
Jenet Fr.	Thorn 6 Fr.	Wilson 6	Mountain Daisy
Mona Fr.	Thorn 7	Wilson 7 Fr.	Alice
Jessie Fr.	Thorn 8	Wilson 8	Crescent
Peggy Fr.		Wilson 9	Rever.
Dolly Fr.			Viking
Mary			Rams Horn

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Accompanying Report in Envelope:

- #11. Plan showing geology.
- #22. Section A-A.
3. Description of 15 Rock Specimens
 taken and submitted with report.

PRELIMINARY REPORT ON THE
SURFACE GEOLOGY OF AN AREA
INCLUDING THE ESTELLA MINE

A. INTRODUCTION

Topographical and geological surveys were made of the area which includes the Estella Mine, Tracy basin, and surrounding ridges. The total area is about 1500 acres and covers in whole or in part 33 mineral claims. The work was started August 2, 1951, and stopped by winter weather October 14th, 1951. Closed stadia traverses were made, and from stations so located chain and Brunton and pace and Brunton traverses used to tie in important topographical and geological features.

Valuable assistance was rendered by R. Kretz and R. Moir until September, when unfortunately the former returned to attendance at the University of British Columbia, and the latter left employ of the company.

A small area, including the Estella Mine workings, had been mapped in 1927 by the Consolidated Mining and Smelting Company of Canada. This was most helpful as a basis upon which to build the surveys.

The survey is of a preliminary nature and not intended to be completed detailed topographical and geological surveys of the area.

B. GEOLOGY

Within the mapped area Pre Cambrian sediments, intruded

by dykes and sills of various igneous rocks, are highly folded and faulted, and host rocks for important base metal mineral deposits.

1. Stratigraphy

The area is underlain by Pre Cambrian sedimentary rocks of the Fort Steele and Aldridge formations, the lowest members of the Lower Purcell series. Dykes and sills of diorite known as Purcell Diorite, Pre Cambrian in age, have been interceded into the sedimentary strata. These ancient sedimentary and igneous rocks were later intruded by irregular plugs of syenitic porphyry, and later still by dykes of sodic monzonite.

(a) Fort Steele Formation.

The Fort Steele Formation is exposed on Tracy Creek, Grundy Creek, the west part of Tracy basin, and the ridges leading into the Rocky Mountain Trench. Only the upper section of the formation is exposed. The lowest of these exposed beds are light grey, thick bedded fine-to medium-grained quartzite showing distinct cross bedding. This quartzite is overlain by buff weathered grey limey argillite containing rounded grey-green inclusion of limestone. Overlying this is buff weathering, brown, platy, limey argillite which grades upward into grey and green banded argillaceous quartzite. This is overlain by grey and black banded limey quartzite with strata one to six feet thick. This grades into soft, sooty weathering, black and dark grey banded limey argillite, which is tentatively considered to be the top of the Fort Steele formation.

The last described strata, along with overlying reddish weathering interbedded argillaceous quartzite and quartzite, have been

previously mapped as transition zone between the Fort Steele and Aldridge formations. The writer has tentatively mapped the redish weathering strata as lower Aldridge.

(b) Aldridge Formation

The Aldridge formation overlies conformably the Fort Steele formation. In the map area it is made up of various purities of quartzites and argillites. Rusty to red weathering is characteristic of most of the strata in the Aldridge formation. In contrast to the Fort Steele it lacks limestone or limey argillites.

The lowest strata comprise interbedded quartzite and argillite in about equal proportion, light grey to green, a few inches to 3 feet thick, finely lined, and red weathered. The overlying strata are black to dark purplish brown, dark grey banded argillaceous quartzite, weathering rusty brown.

Because of faulting it is not possible to observe a continuous stratigraphic section of the formation. One long and nearly continuous section was observed, however, along the south flank of the big slide. This represents about 5000 feet of what appears to be middle and upper Aldridge. Commencing at the Estrella road level about a quarter mile northerly from the mine camp, and progressing easterly up the top of the ridge, the section is as follows:-

About 1000 feet of buff to light grey, brown weathering quartzite, fine and indistinctly banded parallel to bedding plane. The fracture of this massive quartzite is sub-conchoidal. Small pyrite cubes are disseminated sparsely throughout this rock and minute fractures are

filled with marcasite and cubic pyrites. See Specimen 1-A. Overlying this is about 1000 feet of brown, dark grey and black banded argillaceous quartzite, in the main thin bedded. This is overlain by about 1000 feet of gray, brown and green banded argillaceous quartzite, thin bedded and reddish brown weathered. See specimen 2-A. Overlying this are 30 to 100 foot zones of light grey-green argillite in 6 inch to 2 foot beds, as in specimen 5-A, and dark purplish grey, black banded, argillaceous quartzite weathering black. Overlying the above is about 300 feet of light grey siliceous quartzite. On top of the above described rock assemblage is about 800 feet of green and brown phyllite. Remnants of bedding are almost obliterated by shearing as demonstrated in specimen 7-A.

(c) Purcell Diorite

Sill-like bodies of Purcell Diorite occur in the Fort Steele and Aldridge formations. This dark green fine-to-medium-grained rock is composed of dark green hornblende, plagioclase feldspar, and quartz.

Being hard and brittle, the rock fractures and shears much the same as the quartzite. Much of the westerly side of Tracy Creek basin is underlain by a large diorite sill or composite sill, apparently about 500 feet thick.

(d) Syenitic Porphyry.

Irregular zones of light grey syenitic porphyry have been intruded into the Pre Cambrian rocks. The matrix is chiefly orthoclase and plagioclase feldspars, and the phenocrysts zoned

and twinned orthoclase feldspar. The texture is variable from medium- to coarse-grained, with and without large phenocrysts. Similar rocks in the Cranbrook area have been classed by Rice¹ as late Cretaceous to early Tertiary age.

(e) Sodic Monzonite Dykes

Light grey, fine-grained rock, in dykes from a few inches up to 20 feet thick, have been intruded into the Pre Cambrian rocks and syenitic porphyry. One long dyke of this rock outcrops along the eastern border of the map-area. Associated with it in places are one or more narrow dykes, but too small to indicate on the map. These dykes are younger than the syenitic bodies. They are similar megascopically to the sodic monzonite dykes which outcrop near the Sullivan Mine at Kimberley and elsewhere. They are believed to be a late phase of magmatic intrusion from the same source as the syenitic porphyry.

2. Structure

Folding has been intense throughout the map area. The strata trend northwesterly to northerly and dip northeasterly to easterly. The dip is medium to low southwest of the major fault and steep and irregular on the northwest^{en} of the fault. Minor folding is most prominent adjacent to the major fault zone and in the eastern part of the map-area.

A major fault cuts northwest-southeast across the map area. It has an irregular dip, but appears to average about 55 degrees

1. Rice, 1937, Geological Survey, Cranbrook Map-Area, B.C. Mem. 207.

to the southwest. The fault is well exposed on the ridge rising Tracy basin northwest of the mine workings, and on the knoll in which the workings are located. What may be the southeasterly extension of it is exposed on the narrow ridge at the southeast head of Tracy basin. This is on the projected location, and appears to be a strong fault zone with some sulphide mineralization associated in and close to it, but the strike is more easterly than northeasterly. Additional investigations, probably diamond drilling will be required to establish a correlation. In the vicinity of the mine workings the fault appears to be a thrust from the southwest. The hypothetical section A - A, through co-ordinate 7000 N is the interpretation given it by the writer with that data presently available. This major fault is pre-mineral. The mineralizing solutions appear to have passed along it, and where wall rock and other conditions were favorable, to have deposited the zinc-lead-silver mineralization. Branching off irregularly from the footwall of the main fault zone are many irregular mineralized shears which pinch out in a short distance. Parallel and cross post-mineral faulting is evident. Both types are of a minor nature with little displacement, but a tendency to weaken the ore zones and cause excessive overbreking. Some of the cross faults are quartz filled and some contain narrow irregular zones of gold-silver-copper-lead mineralization.

Minor faulting and shearing occurs elsewhere throughout the map-area, but show insufficient continuity to be of apparent

economic importance. Quartz veins and quartz-calcite veins containing little or no sulphides, are associated with many of these minor breaks.

3. Mineralogy

The main fault zone contains strong zinc-lead-silver mineralization. Sphalerite, galena, a little pyrite and probably chalcopyrite and pyrrhotite occur in a gangue of altered, sheared, and partly replaced wall rock, quartz and calcite. The sphalerite ranges from light brown to the dark brown marmatitic variety. The sphalerite and galena are fine to medium grained and closely intergrown. The accessory minerals are finely veined and disseminated throughout sulphides and gangue.

Cross veins which, cut the above described zone, contain along with quartz and calcite, minor amounts of tetrahedrite, pyrite, chalcopyrite, galena pyrrhotite, and sphalerite. To date none of these have been found to be of commercial importance.

4. Historical Geology

The history of the general area has been worked by Rice 1, and is as follows:

Late Pre Cambrian. Deposition, in an inland sea known as the Cordilleran geosyncline, of Lower Purcell sediments. The Fort Steele and Aldridge formations are the lowest of the sediments. Intrusion of Purcell dykes and sills in latter part of period.

Cambrian, Ordovician and Silurian. After uplift in late Pre Cambrian, the area was depressed and flooded by the sea. To the south and east the Cranbrook and Eager formations were deposited. The area was again raised above the sea with some foldings.

Devono-Carboniferous. General subsidence, and in parts of the country to the south the Jefferson and Wardner formations were laid down.

Triassic: Area elevated above sea level and erosional epoch followed.

Jurassic to Early Cretaceous: Mountain building - folding and faulting. Intrusion of granitic rocks, syenitic and monzonitic rocks. Deposition of ore - forming minerals in latter part of period.

Late Tertiary. Erosion towards present topography.

Pleistocene. Continental ice sheet, followed by alpine glaciation, and intense erosion in higher altitudes. Formation of Tracy basin as a cirque, and final deposition of moraine material in and around lip of basin.

Recent. Erosion, mainly by slides.

Alfred R. Allen

GEOLOGICAL ENGINEER

STATEMENT PERTAINING TO FIELD WORK

ON SURFACE GEOLOGICAL SURVEY

ESTELIA MINES LTD., N.P.L.

The following days were spent on the survey by Alfred R. Allan, R.P.E.,
R. Krets, 4th year Geological Engineering student, R. Moir, helper.

Date	Allen	Krets	Moir
1951			
July 30	1	1	
31	1	1	
Aug. 1	1	1	
2	1	1	
3	1	1	
4	1	1	
16	1	1	
17	1	1	
18	1	1	
19	1	1	
20	1	1	1
21	1	1	1
22	1	1	1
23	1	1	1
24	1	1	1
25	1	1	1
26	1	1	1
27	1	1	1
28	1	1	1
29	1	1	1
30	1	1	1
Oct. 9	1		
10	1		
11	1		
12	1		
13	1		
14	1		
31	1		
	28	21	11

Alfred R. Allen

GEOLOGICAL ENGINEER

Alfred R. Allen - 28 days @ \$35.00/day -	\$ 980.00
R. Krets - 21 days @ \$15.00/day -	315.00
R. Moir - 11 days @ \$12.50/day -	<u>137.50</u>
Total	\$ 1,432.50

DATED at Vancouver, B.C. this 25th day of April, 1952.

Alfred R. Allen.

Alfred R. Allen.

DOMINION OF CANADA)
PROVINCE OF BRITISH COLUMBIA)
TO WIT:)

I, ALFRED ROY ALLEN, of 815 West Hastings Street, in the City of Vancouver, Province of British Columbia, Geological Engineer, MAKE OATH and say:

1. That the facts and figures contained in this Statement pertaining to field work on surface geological Survey, Estella Mines Ltd. (M.P.L.), dated the 25th day of April, 1952, are true in substance and in fact.

SWORN BEFORE ME at the City of)
Vancouver, Province of British)
Columbia, this 25th day of April,)
1952.)

[Signature]

A Notary public in and for the Province of British Columbia.

Alfred R. Allen.

Specimen Number	Location	Description of Specimen	Formation
10A	High Ridge West of Mine Camp	Grey impure limey argillite. Coarse on weathered surface	Fort Steele
11A	High ridge south- west of mine camp	Grey limestone	Fort Steele
12A	High ridge south- west of mine camp	Grey-green banded limestone	Fort Steele
13A	High ridge south- west of mine camp	Grey, buff-weathering limestone	Fort Steele
14A	Ridge north of mine camp	Brown fine-grained black banded argillite	Aldridge
15A	East of mine camp on sidehill	Sodic monzonite dyke cutting syenitic plug	Dyke

Alfred R. Allen

GEOLOGICAL ENGINEER

Vancouver 1, B. C.

GOVERNMENT OFFICE
RECEIVED
MAY 1952

CRANBROOK, B. C.
MINING RECORDS

#121 - 815 W. Hastings St.,
April 25th - 1952

"Estella Mines Ltd N.P.L.",
916 "VANCOUVER BLOCK",
736 Granville Street,
Vancouver 2, B. C.

Dear Sirs:-

Herewith is my report on the surface
geology of an area including the Estella Mine.

Included is a statement of the direct
cost of the field work.

One plan map and one section are at-
tached.

Fifteen specimens of the various rock
types are submitted along with a description
of each.

Yours very truly,

.....*Alfred R. Allen*.....

Alfred R. Allen

ANA-r
Encls.

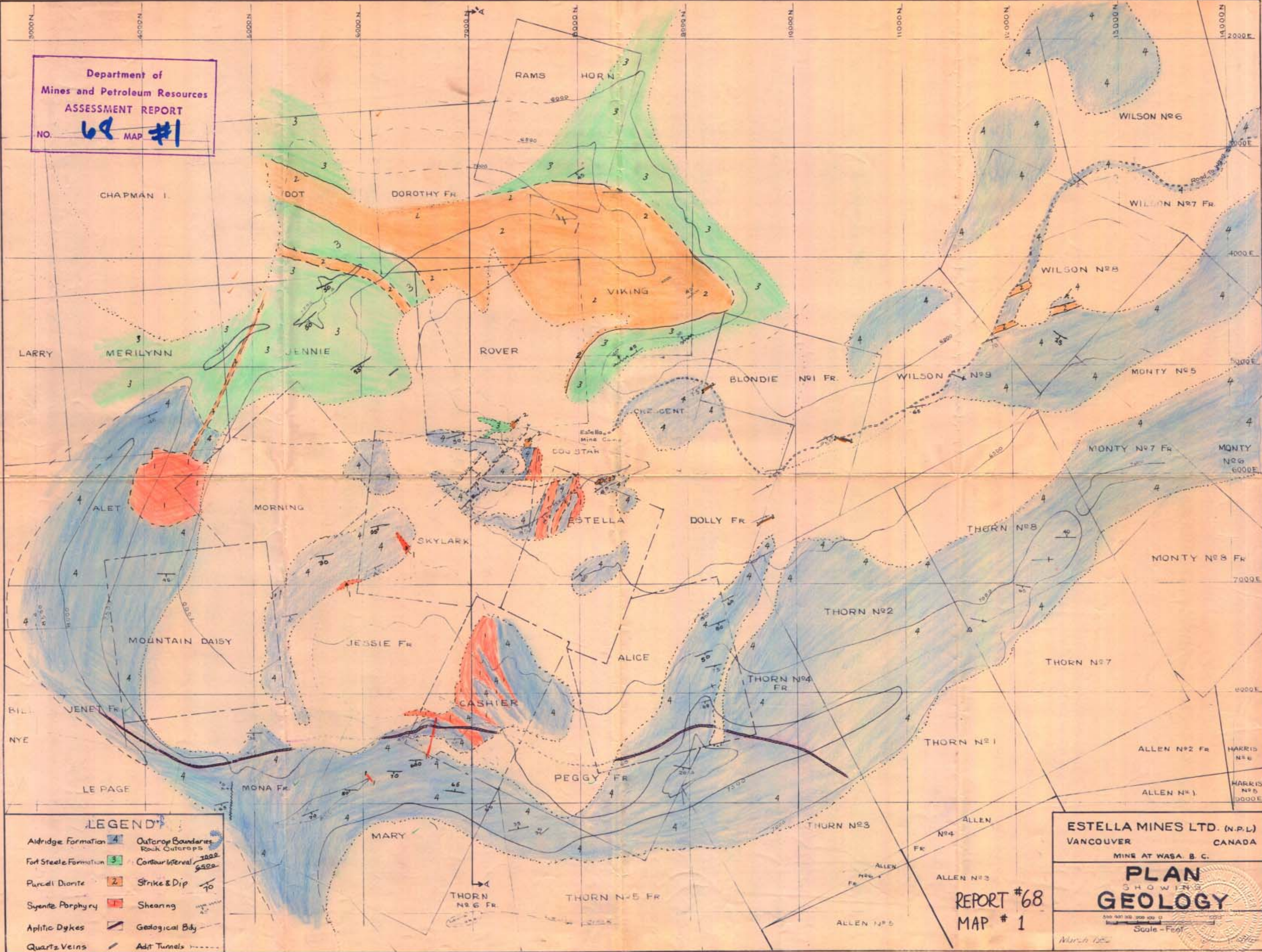
DESCRIPTION OF SPECIMENS TAKEN

DURING SURVEY OF AN AREA

INCLUDING ESTELLA MINE

Specimen Number	Location	Description of Specimen	Formation
1A	On road 1/4 mile northwest of mine camp	Light gray, fine-grained quartzite. Brown weathering. Pyrite in fine cubes, and modules. Beds up to 20 feet thick, finely banded. Fracture sub-conchoidal	Aldridge
2A	On ridge north of mine - south side of big slide, about elevation 6700	Banded gray argillaceous quartzite	Aldridge
3A	On sidehill north of mine camp	Light cream sodic monzonite	Dyke
4A	On high ridge north-east from mine camp	Brown fine-grained argillaceous quartzite. Weathers soft gray.	Aldridge
5A	On ridge above 4-A	Dark gray black banded argillaceous quartzite	Aldridge
6A	Above 5-A on ridge	Light gray sodic monzonite	Dyke
7A	On high peak east of mine	Brown and green phyllite pyrite cubes	Aldridge
8A	In saddle south-east of mine camp.	Brown to purplish brown argillaceous quartzite-banded	Aldridge
9A	Sidehill south-east of mine camp	Light gray sodic monzonite	Dyke

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **68** MAP **#1**



LEGEND

- | | | | |
|-----------------------|---|--------------------|-------------|
| Aldridge Formation | 4 | Outcrop Boundaries | — |
| Fort Steele Formation | 3 | Rock Outcrops | — |
| Purcell Diorite | 2 | Contour Interval | 1000
500 |
| Syenite Porphyry | 1 | Strike & Dip | 10 |
| Aplitic Dykes | — | Shearing | — |
| Quartz Veins | — | Geological Bdy | — |
| | | Adit Tunnels | — |

ESTELLA MINES LTD. (N.P.L.)
VANCOUVER CANADA
MINE AT WASA, B. C.

PLAN
SHOWING
GEOLOGY

REPORT #68
MAP #1

Scale - Feet
March 1955

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **68** MAP **#2**

ESTELLA MINES LTD.

SECTION A-A'
THROUGH 7400 N

March 1952

Robert C. Utter