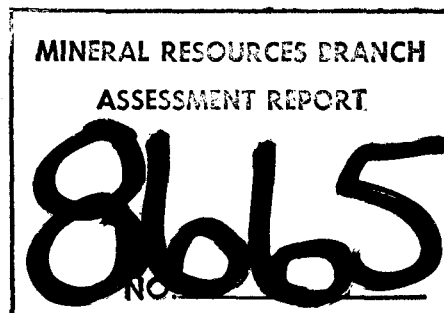


PETROGRAPHIC REPORT  
ANNETTE AND SLIDE GROUPS

GOLDEN M.D.                      N.T.S. 82K/9W & 82K/10E  
Lat. 50° 37' 35"                Long. 116° 29' 40"

OWNER:                            CANADIAN JOHNS-MANVILLE LIMITED  
                                         AND DENISON MINES LIMITED  
OPERATOR:                        DENISON MINES LIMITED  
AUTHOR:                            DALE A. SKETCHLEY

JANUARY, 1981



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<u>Name</u>	<u>Units</u>	<u>Record No.</u>	<u>Record Date</u>
<u>Annette Group</u>			
Annette 29	1	15853	August 4, 1970
Annette 30	1	15854	August 4, 1970
Annette 31	1	15855	August 4, 1970
Annette 32	1	15856	August 4, 1970
Slide 101	8	518	December 18, 1979
Slide 103	6	520	December 18, 1979
Slide 104	9	521	December 18, 1979

<u>Slide Group</u>			
Slide 100	6	42	February 12, 1976
Slide 102	16	519	December 18, 1979
Slide 1	1	15316	September 26, 1969
Slide 2	1	15317	September 26, 1969
Slide 31	1	15346	September 26, 1969
Slide 32	1	15347	September 26, 1969
Slide 39	1	15354	September 26, 1969
Slide 40	1	15355	September 26, 1969
Slide 41	1	15356	September 26, 1969
Slide 42	1	15357	September 26, 1969
Slide 43	1	15358	September 26, 1969
Slide 44	1	15359	September 26, 1969
Annette 1	1	15825	August 4, 1970
Annette 2	1	15826	August 4, 1970
Annette 27	1	15851	August 4, 1970
Annette 28	1	15852	August 4, 1970
Annette 33	1	15857	August 4, 1970
Annette 34	1	15858	August 4, 1970
Annette 51	1	16043	August 31, 1970
Annette 52	1	16044	August 31, 1970

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Title</u>	<u>Following Page No.</u>
1	Annette and Slide Groups 1980 Property Location	1
2	Annette and Slide Groups 1980 Claim Group Boundary	3
3	Annette and Slide Groups 1980 Claim Location	3
4	Annette and Slide Groups 1980 Rock Sample Location	(Map Pocket)

## 1. INTRODUCTION

### a) Work History

The area was first staked by Canadian Johns-Manville in 1970 following a regional reconnaissance program of geochemistry and prospecting that delineated molybdenite showings in the upper Welsh Creek area. Follow-up work in 1970 and 71 consisted of soil and biogeochemical sampling, geological mapping and an I.P. survey. In 1973 prospecting and soil geochemical surveys were again carried out in conjunction with rock chip sampling. The prospecting and mapping revealed numerous, spotty, wide spread occurrences of molybdenite in and around a younger, altered core of the Horsethief stock. Soil sampling has revealed anomalies roughly coincident with the alteration and mineralization. The I.P. survey has revealed a significant anomaly coincident with the younger core and alteration zone. The rock chip sampling results were not encouraging.

Work was continued in 1980 by Denison Mines under an option agreement with Canadian Johns-Manville. Initial efforts were aimed at continuing the alteration studies, to compliment the work done in this direction by Canadian Johns-Manville. Denison personnel completed detailed rock sampling over and around previously noted areas of alteration and submitted samples to Fox Geological Consultants for petrographic studies. This was intended to give further information on alteration patterns not readily discernible from megascopic examination.

### b) Location and Access

The claims are located on Welsh Creek, a tributary of Forster Creek, 33 kilometers west of Radium, in the East Kootenay Valley of southeast B.C. (Figure 1). Access is by logging road to the northern margin of the claims and then by foot or helicopter to the central and southern portions. Alternate access is by



helicopter from Fairmont Hotsprings, 55 kilometers to the southeast. Fairmont Hotsprings is 40 kilometers south-southeast of Radium by paved highway.

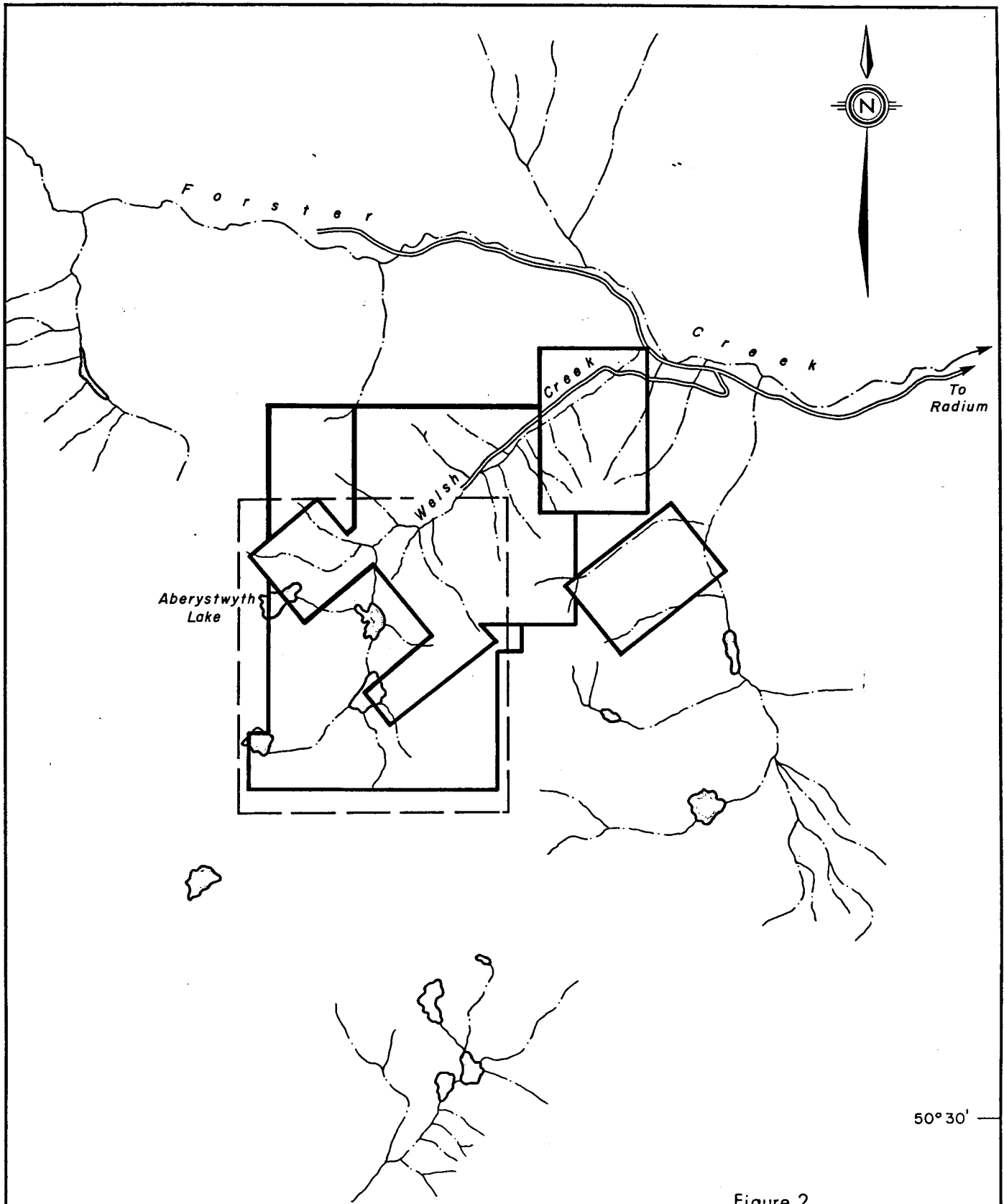
c) Topography, Vegetation and Climate

The claims occur in the Purcell Mountains subdivision of the Columbia Mountains. The country is extremely rugged with major valley bottoms at 1200 meters and surrounding peaks to 3000 meters. Local elevation within the claims is in the order of 900 meters. The area has been extensively glaciated by alpine glaciers with remnants surviving in the higher protected cirques.

Timberline occurs at the 2250 to 2450 meter level. Below this, open forests of alpine fir, alpine larch and mountain alder occur, with a transition to more closed forests of alpine fir, Englemann spruce and sitka alder at lower elevations. Above treeline, only occasional stunted trees of alpine larch occur, with sparse communities of grasses, herbs and heathers in moister meadow areas. Winters are lengthy, cold and wet, whereas summers are warm and dry.

(d) Claims

The claims consist of various numbers of the Slide and Annette claims of the Slide and Annette groups. These are described on the following page, with their exact location indicated in Figure 2.




**LEGEND**

- Location of Survey Area Map
- Property Boundary
- - - Stream
- ☞ Lake
- == Road

*Alvin*

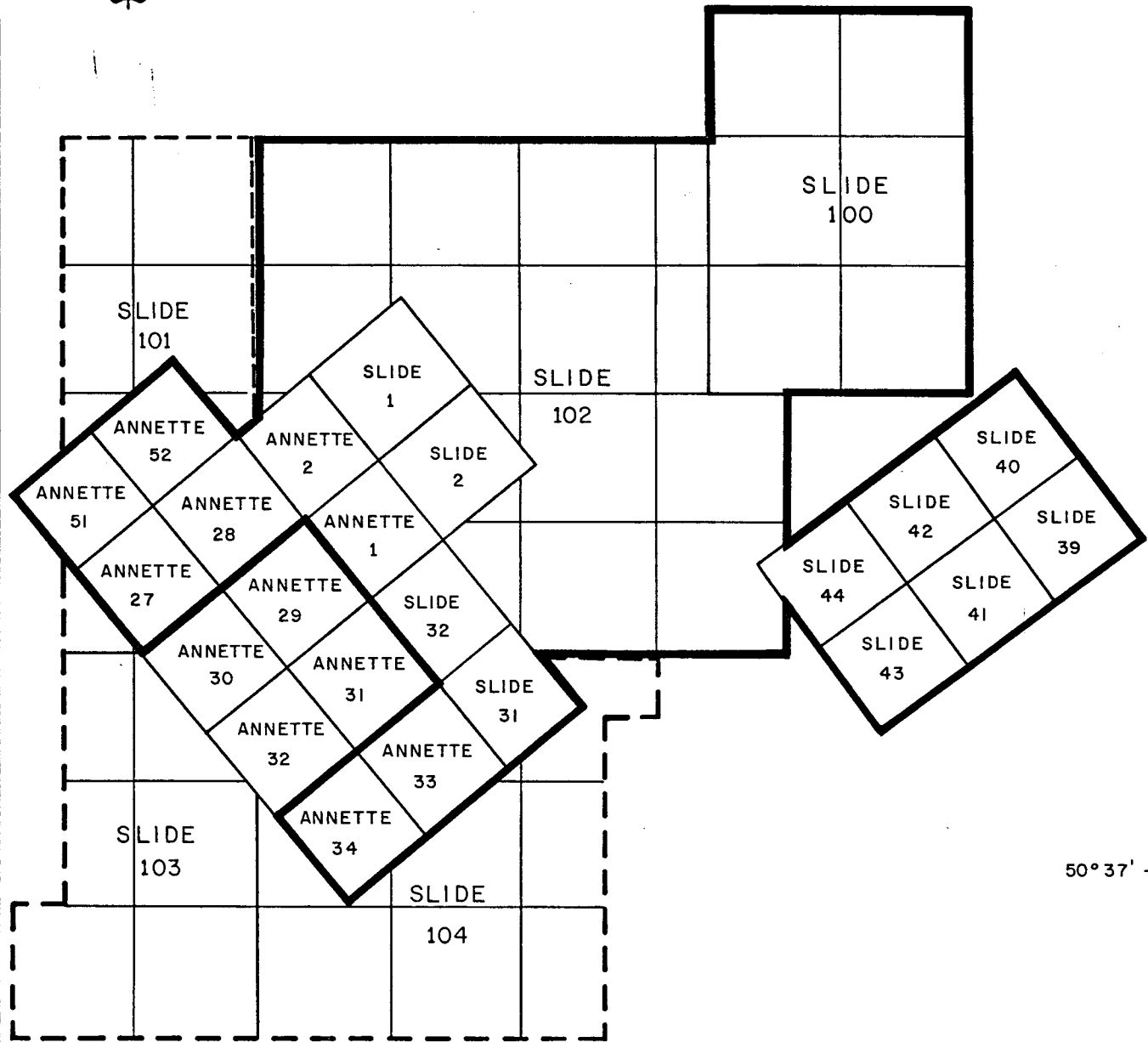
Figure 2

DENISON MINES LIMITED		
MINERAL EXPLORATION	WESTERN DIVISION	
ANNETTE AND SLIDE GROUPS 1980 CLAIM GROUP BOUNDARY		
Comp. By: R.R.H.	Date: NOV 1980	Scale: 1: 50,000
Draw No: 80-14	<i>David Skerchey</i> 82 K/9,10	

116°30'

50°30'





**LEGEND**

- ··· Claim Boundary
- ··· Unit Boundary
- - - Annette Group
- ··· Slide Group

*R.H.H.*

116° 30'

Figure 3

DENISON MINES LIMITED		
MINERAL EXPLORATION	WESTERN DIVISION	
ANNETTE AND SLIDE GROUPS 1980 CLAIM LOCATION		
Comp. By: R.R.H.	Date: NOV. 1980	Scale: 1:25,000
Draw. No.: 80-15	<i>Drawn by: D. Sleat</i>	NTS: 82 K/9,10

e) Summary of Work

In total, 157 rock samples were obtained at 50 meter intervals on 25 radial grid lines, totalling 7,750 meters in length. Nine of these samples were submitted to Fox Geological Consultants for petrographic studies. The petrographic reports are included in their entirety in the appendix.

2. GEOLOGICAL SETTING

The claims are located in the east central portion of the Cretaceous Horsethief stock, which has intruded Proterozoic Purcell and Windermere System metasediments. Three distinct types of granitoid rock form semi-concentric zones in the stock, circling the center of the claims on Welsh Creek. The outer portions of the stock are composed of purple, very coarse grained quartz monzonite. The center of the stock is composed of a light grey to white, fine grained granite. Occurring between and grading into these two rock types is a grey porphyritic, medium grained quartz monzonite. The coarse grained quartz monzonite comprises 85% of stock exposure whereas the fine grained granite comprises 1-1/2%. A poorly defined zone of alteration coincides with the inner portions of the fine grained granite. Numerous spotty, widespread occurrences of molybdenite associated with quartz veins, occur in and around the edges of the younger, fine grained core.

3. PETROGRAPHIC STUDIES

a) Field Work

Field work was initiated by measuring and marking 25 radial grid lines at 50 meter intervals over the area to be investigated (Figure 4). Lines varied from 150 meters to 750 meters in length. Samples taken were representative of the rock type occurring in the immediate area. A visual analysis of the rock was made at the

time of collection to facilitate selecting a suite of rocks for petrographic analysis.

The sample numbers included in the two suites are given below:

<u>Suite 1</u>	<u>Suite 2</u>
8002-176	8002- 74
8002-177	8002-103
8002-183	8002-144
8002-187	8002-201
8002-190	

All samples were prepared by Vancouver Petrographics for examination by Fox Geological Consultants. Preparation included making of thin sections for microscopic examination and sections for staining and megascopic examination. The staining was for potash feldspar using standard procedures. The petrographic reports are included in their entirety in the Appendix.

b) Office Studies

All rock samples were taken to Denison's Vancouver warehouse where they were re-examined and two suites (4 and 5 samples each) were selected for petrographic analysis. Each suite of samples was selected to obtain a set of rocks indicative of alterations occurring in a specific area. Two suites were selected to enable a comparison between the areas of alteration documented by the previous operators. Suite 1 was collected on the Annette 52 and Slide 101 claims, whereas Suite 2 was collected on the Annette 29, 30 and 32 claims. The location of these claims is indicated in Figures 2 and 3. The exact topographic location of the samples is indicated in Figure 4.

### c) Discussion

The rocks submitted for petrographic examination may be summarized as follows. They are classified as medium grained, equigranular, muscovite, muscovite-biotite or biotite granite. They consist of a granular mosaic of quartz, microcline, plagioclase, and/or biotite, chlorite, sericite, muscovite and clay minerals. Anhedral grains of quartz form 30% of the rock, whereas perthitic, anhedral, equant grains of microcline form 40%. Subhedral, tabular grains of plagioclase form 20% of the rock, with 10-15% being composed of biotite and/or chlorite, sericite and muscovite. Accessory minerals include epidote, apatite, rutile, leucoxene and opaque grains. Alterations affect plagioclase and biotite. The plagioclase may be weak to intensely altered to clay minerals or sericite, whereas the biotite may be weak to intensely altered to chlorite.

According to Dr. P.E. Fox of Fox Geological Consultants, "Samples range from unaltered biotite and muscovite-bearing granites to sericitized granitic rocks. The latter appear to be caused by late-forming, deuteric hydrothermal fluids derived from the granitic host rocks, rather than a deeply buried porphyry system - although it may well be difficult to distinguish the two systems. The lack of pyrite and the absence of a recognizable alteration patterns argue against a buried porphyry idea.

I would expect to see a larger pyritic zone with associated argillic and quartz-sericite assemblages."

### 4. CONCLUSIONS AND RECOMMENDATIONS

A rock sampling program has been carried out over previously noted areas of alteration occurring on the Annette and Slide Groups. Two suites of these rocks were submitted to Fox Geological Consultants for petrographic analysis. This was intended to determine if recognizable alteration patterns were present that may indicate a buried porphyry system.

The consultant's report concluded that alterations appear to be caused by late-forming, deuteritic hydrothermal fluids derived from the granitic host rocks rather than from a buried porphyry system. In light of this conclusion, no further work is recommended.

Dale A. Sketchley

Dale A. Sketchley, B.Sc.  
GEOLOGIST

*Hein*

5) REFERENCES

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1976: Landforms of British Columbia, B.C.D.O.M.  
Bulletin No. 48

Kerr, J.R.

1973: Geological and Geochemical Report on the Welsh Creek  
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Assessment Report No. 4559.

Reesor, J.E.

1973: Geology of the Lardeau Map Area,  
East - half, British Columbia; Geol. Survey Can.,  
Memoir 369

Robertshaw, P. and Klein, J.

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Slide Group of Claims, Golden Mining Division,  
British Columbia; on behalf of Canadian  
Johns-Manville Co. Ltd. by Seigel Associates Limited

Schrijver, K.

1971: Interim Geological Report on Horsethief Stock,  
B.C.D.O.M. Assessment Report No. 3805

6. ITEMIZED COST STATEMENT

Period - August 31 to September 6, 1980

Wages:

7 days, 2 men, \$120.00/man/day \$1680.00

Accommodation:

2 nights; 2 men; \$35.00/night 70.00

Food:

8 days; 2 men; \$20.00/man/day 320.00

Transportation:

1 4 x 4 pickup; 2 days; \$25.00/man/day 50.00

Helicopter; 3-1/2 hours; \$410.00/hr 1435.00

Period - July, 1980

Topographic Mapping Survey -

Pacific Survey Corporation 1356.00

Period - December, 1980

Map and Report Compilation

4 man days \$120/man/day 480.00

Petrographic Studies

Vancouver Petrographics Ltd.

(Preparation of 9 samples) 62.00

Fox Geological Consultants Ltd.

(Examination of 9 samples) 335.00

\$5788.00

COST ALLOTMENT

Annette Group - 62% of total = \$3590.00

Slide Group - 38% of total = \$2198.00  
\$5788.00



7. AUTHOR'S QUALIFICATIONS

I, Dale A. Sketchley of 651 Harrison Avenue, Coquitlam, B.C., do hereby certify that:

1. I graduated from the University of British Columbia, in 1975 with a B.Sc. (Hons. - First Class) in Geology and Geophysics.
2. I have practised my profession continuously since 1975 while being employed by the Geological Survey of Canada, Union Miniere Explorations and Mining Corporation Ltd., Chevron Standard Minerals Staff Ltd., and Denison Mines Ltd.

A handwritten signature in cursive script that reads "Dale A. Sketchley". The signature is written in dark ink and is positioned in the center-right of the page.

Dale A. Sketchley  
January 22, 1981  
Vancouver, B.C.

8. APPENDIX

CONSULTANT'S PETROGRAPHIC REPORTS

a) Suite 1

PETROGRAPHIC REPORT

Spec. No. 8002-176 .....

CLASSIFICATION

Muscovite granite.

MEGASCOPIIC DESCRIPTION

Medium grained equigranular muscovite granite consisting of equal amounts of quartz, feldspar, and 10% muscovite and chlorite.

MICROSCOPIC DESCRIPTION

Texture

Anhedral granular. Medium grained granular mosaic of quartz, microcline, plagioclase and tablets of medium grained subhedral muscovite. Plagioclase weakly altered to fine grained clay minerals and sericite.  
Interstitial biotite/chlorite and granules of epidote.

Minerals & Habits

Quartz (30%): anhedral grains  
Alkali feldspar (40%): equant, anhedral microcline.  
Perthitic.  
Plagioclase (20%): subhedral grains weakly altered to clay and sericite.  
Muscovite (8%): subhedral tablets.  
Biotite/chlorite (2%): interstitial tablets.  
Accessory minerals: epidote, opaque grains, rutile.

COMMENTS

Weak argillic alteration.  
Biotite partly altered to chlorite.

## PETROGRAPHIC REPORT

Spec. No. 8002-177.....

CLASSIFICATION

Muscovite granite

MEGASCOPIC DESCRIPTION

Equigranular, medium grained muscovite granite consisting of 10% subhedral muscovite, and equal amounts of quartz and pinkish feldspar.

MICROSCOPIC DESCRIPTIONTexture

Anhedral-granular. Medium grained mosaic of quartz, plagioclase, alkali feldspar and interstitial subhedral muscovite. Plagioclase weakly altered to fine grained clay minerals. Accessory chlorite, opaque grains epidote.

Minerals & Habits

Quartz (30%): anhedral grains  
Alkali feldspar (40%): perthitic microcline  
Plagioclase (20%): weakly altered to fine grained clays.  
Muscovite (15%): subhedral tablets up to 2mm.  
Accessory minerals: chlorite, opaque grains, apatite, epidote.

COMMENTS

Weak argillic alteration, biotite completely altered to chlorite.

## PETROGRAPHIC REPORT

Spec. No. ..8002-183.....

CLASSIFICATION

Biotite granite.

MEGASCOPIC DESCRIPTION

Medium grained, equigranular granite, consisting of 40% quartz, 30% pink alkali feldspar and 30% plagioclase.  
Trace amounts of anhedral biotite.

MICROSCOPIC DESCRIPTIONTexture

Anhedral-granular: medium grained (3mm), equigranular.  
Granular quartz, blocky anhedral perthitic microcline, tabular well twinned plagioclase. Small amounts of anhedral biotite intergrown with chlorite. Accessory amounts of apatite, zircon, rutile, epidote, leucoxene..

Minerals & Habits

Quartz (30%): anhedral aggregates.  
Microcline (40%): equant grains, perthitic microcline  
Plagioclase (20%): tabular well twinned grains. Weakly altered to masses of fine grained sericite (SAE = 1).  
Biotite anhedral tablets, intergrown with chlorite.

COMMENTS

Weakly altered to sericite (SAE = 1).  
Biotite weakly altered to chlorite, and small amounts of epidote.

## PETROGRAPHIC REPORT

Spec. No. 8002-187.....

CLASSIFICATION

Biotite granite

MEGASCOPIIC DESCRIPTION

Medium grained, equigranular biotite granite.  
30% quartz, 40% blocky pink coloured alkali feldspar,  
30% plagioclase and trace amounts of biotite.

MICROSCOPIC DESCRIPTIONTexture

Anhedral-granular: mosaic of granular quartz, anhedral microcline, tabular plagioclase. Interstitial biotite weakly altered to chlorite, plagioclase tablets contain minor sericite, accessory sericite, epidote, zircon, apatite.

Minerals & Habits

Quartz (30%): anhedral grains (3mm).  
Microcline (40%): perthitic microcline, anhedral.  
Plagioclase (20%): tabular grains, weakly altered to sericite (SAE =1) well twinned.  
Biotite (10%): anhedral grains, weakly altered to chlorite.

COMMENTS

Plagioclase weakly altered to sericite (SAE = 1) biotite altered to chlorite and rutile.

## PETROGRAPHIC REPORT

Spec. No. 8002-190.....

CLASSIFICATION

Biotite granite

MEGASCOPIC DESCRIPTION

Medium grained, equigranular biotite granite consisting of 30% anhedral quartz, 40% anhedral pinkish alkali feldspar, 30% tabular plagioclase and trace amounts of biotite.

MICROSCOPIC DESCRIPTIONTexture

Anhedral-granular: granular mosaic of quartz, tabular plagioclase, and anhedral perthitic microcline.  
Feldspars intensely altered to fine grained clay minerals.  
Ragged biotite flakes intensely altered to pale green chlorite and radiating rutile grains.

Minerals & Habits

Quartz (30%): anhedral aggregates.  
Microcline (40%): anhedral perthitic microcline.  
Plagioclase (20%): tabular grains, altered to clay minerals  
Biotite/chlorite (10%): mainly chlorite pseudomorphs after biotite  
Accessory minerals: sericite, apatite, rutile.

COMMENTS

Moderate argillic alteration, biotite largely altered to chlorite and radiating bundles of rutile.

8. APPENDIX

CONSULTANT'S PETROGRAPHIC REPORTS

b) Suite 2



## PETROGRAPHIC REPORT

Spec. No. 8002-74.....

CLASSIFICATION

Biotite - muscovite granite

MEGASCOPIIC DESCRIPTION

Medium grained, equigranular muscovite granite consisting of quartz, pink alkali feldspar, plagioclase, and muscovite. Occasional large anhedral phenocryst of alkali feldspar. Coarse sericite common on fractures.

MICROSCOPIC DESCRIPTIONTexture

Anhedral - granular. Granular mosaic of quartz, perthitic microcline, tabular plagioclase, and interstitial muscovite and chlorite.  
Feldspars intensely altered to clay minerals.  
Accessory amounts of epidote, opaque grains, apatite.

Minerals & Habits

Quartz (30%): anhedral grains.  
Microcline (40%): anhedral equant grains, perthitic.  
Plagioclase (20%): subhedral blocky crystals, weakly altered to sericite (SAE = 1).  
Chlorite/biotite (5%): chlorite pseudomorphs after biotite.  
Sericite (10%): subhedral tablets  
Accessory epidote, opaque minerals, apatite.

COMMENTS

Moderate argillic alteration, chlorite after biotite.  
Plagioclase weakly altered to sericite (SAE = 1)

FOX GEOLOGICAL CONSULTANTS LTD

PETROGRAPHIC REPORT

CLASSIFICATION

Spec. No. 8002-201.....

Biotite-muscovite granite.

MEGASCOPIC DESCRIPTION

Anhedral-granular, equigranular. Consists of equal amounts of anhedral quartz, pink alkali feldspar, plagioclase, and trace amounts of biotite and muscovite.

MICROSCOPIC DESCRIPTION

Texture

Anhedral-granular. Interlocking mosaic of anhedral quartz, microcline, blocky plagioclase, tablets of sericite, and ragged flakes of chlorite/biotite.  
Feldspars intensely altered to clay minerals.  
Accessory amounts of epidote, opaque grains, apatite.

Minerals & Habits

Quartz (30%). Anhedral grains.  
Microcline (40%): Perthitic, anhedral equant grains.  
Plagioclase (20%): subhedral blocky grains, altered to clay minerals and sericite (SAE = 1).  
Sericite (5%): subhedral tablets.  
Biotite/chlorite (10%): (ragged flakes of intergrown biotite and chlorite).  
Accessory minerals: epidote, opaque grains, leucoxene.

COMMENTS

Moderate argillic alteration, plagioclase altered to sericite. (SAE = 1).  
Biotite intensely altered to chlorite.

PETROGRAPHIC REPORT

Spec. No. ....8002-103.....

CLASSIFICATION

Muscovite granite.

MEGASCOPIIC DESCRIPTION

Medium grained, equigranular mixture of quartz, feldspar, sericite and accessory amounts of chlorite.

MICROSCOPIC DESCRIPTION

Texture

Anhedral-granular. Equigranular mosaic of anhedral quartz, microcline, blocky plagioclase, tabular muscovite and interstitial amounts of fine grained sericite and chlorite.  
Feldspars weakly altered to fine grained clay minerals.

Minerals & Habits

Quartz (30%): anhedral aggregates.  
Alkali feldspar (40%): perthitic microcline.  
Plagioclase (20%): subhedral grains weakly altered to clay minerals.  
Muscovite (10%): subhedral tablets.  
Chlorite (5%): ragged grains, pseudomorphs after biotite.  
Accessory minerals: opaque grains, epidote, apatite.

COMMENTS

Weak argillic alteration, chlorite pseudomorphs after biotite.

## PETROGRAPHIC REPORT

Spec. No. ..8002-144.....

CLASSIFICATION

Muscovite granite

MEGASCOPIC DESCRIPTION

Medium grained, equigranular muscovite granite.  
Consists of equal amounts of quartz, feldspar, and 10%  
muscovite/biotite.

MICROSCOPIC DESCRIPTIONTexture

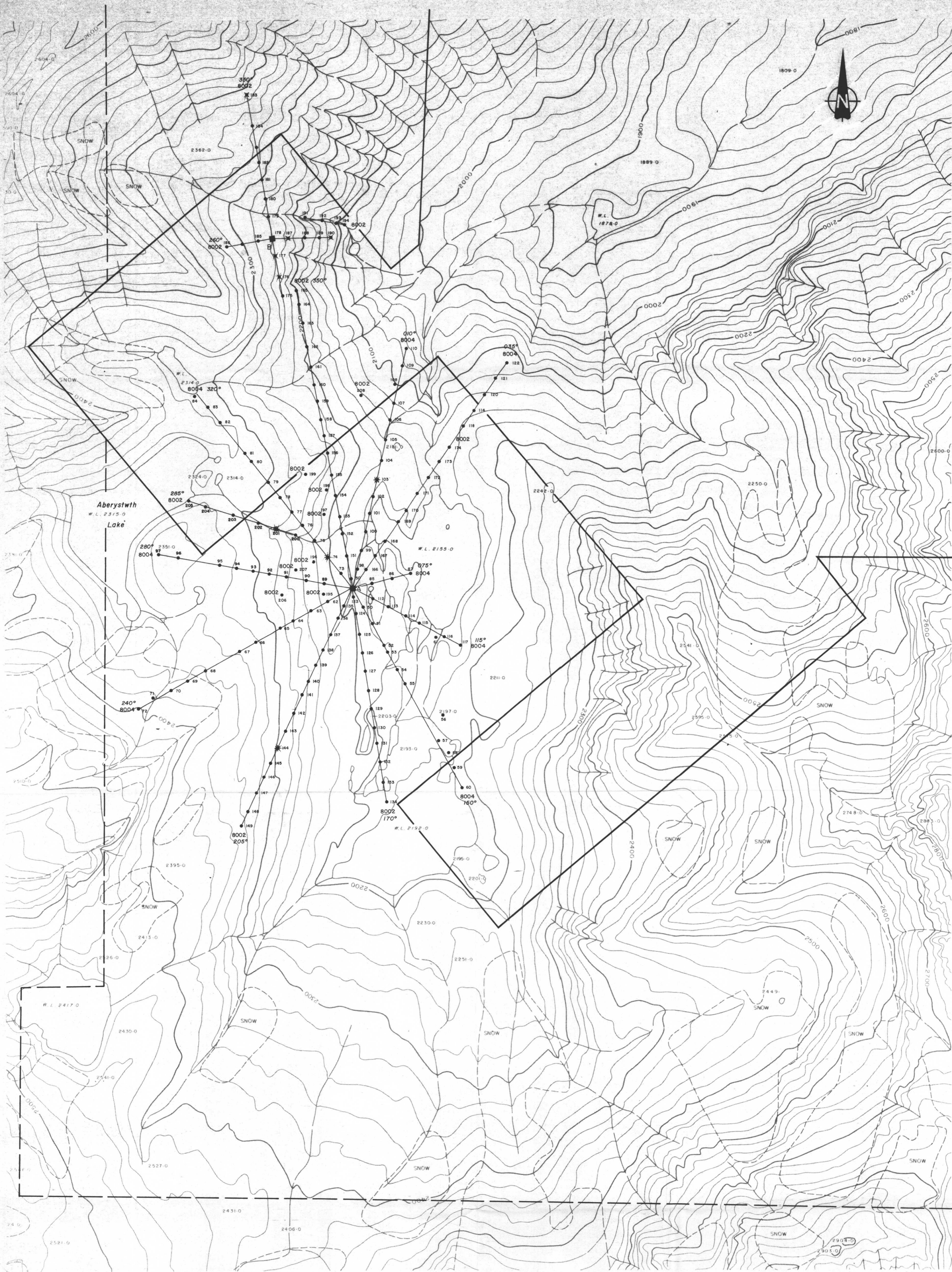
Anhedral-granular. Medium grained mosaic of intergrown quartz, microcline, plagioclase, and muscovite. Plagioclase tablets weakly altered to felty sericite, minor clay minerals. Accessory opaque grains and apatite.

Minerals & Habits

Quartz (30%): Anhedral grains  
Alkali feldspar (40%): perthitic grains  
Plagioclase (20%): subhedral tablets moderately altered to sericite (SAE = 3)  
Sericite (15%): subhedral tablets and radiating intergrowths.  
Accessory minerals: opaque grains, apatite.

COMMENTS

Plagioclase grains altered to sericite (SAE = 5).



50° 37'

MINERAL RESOURCES BRANCH  
ASSESSMENT REPORT  
**8665**

*M. Min.*

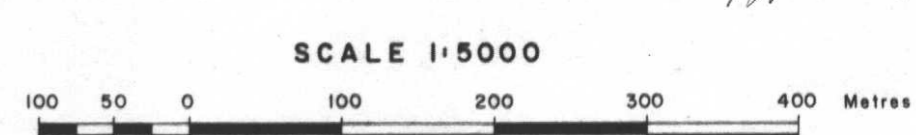


Figure 4

- LEGEND**
- Annette Group
  - Slide Group
  - Grid Line
  - 8002 Prefix to Rock Sample Number
  - 123 Rock Sample Number
  - Rock Sample Location
  - 240° Azimuth of Grid Line
  - 2300 Contour Level (Interval 20 Metres)
  - Lake and Stream
  - W.L. 2155.0 Water Level of Lake
  - Radial Grid Origin
  - ▲ A - Grid F. A.
  - B - Grid F. B.
  - Rock Samples Submitted for Petrographic Analysis
  - x Suite 1
  - \* Suite 2

DENISON MINES LIMITED		
MINERAL EXPLORATION WESTERN DIVISION		
ANNETTE AND SLIDE GROUPS 1980		
ROCK SAMPLE LOCATION MAP		
Comp. By: R. R. H.	Date: NOV. 1980	Scale: 1:5000
Drwg. No: 80 - 21	<i>Dale S. Stewart</i>	NTS: 82 K / 9, 10

116° 30'