



**GEOLOGY OF THE DOME MOUNTAIN GOLD CAMP  
(93L/10, 15)**

**By D. G. MacIntyre**

**INTRODUCTION**

This report summarizes preliminary results of a mapping project initiated in the Dome Mountain gold camp during the 1984 field season. A two person crew spent 20 field days on this project. This work was the first stage of a multi-year mapping project which ultimately will include all of the Babine Range. The objective of this project is to develop a metallogenic model for the wide variety of mineral deposit types present in the Babine Range. The initial phase of this project is concerned with gold-bearing quartz veins like those of the Dome Mountain gold camp.

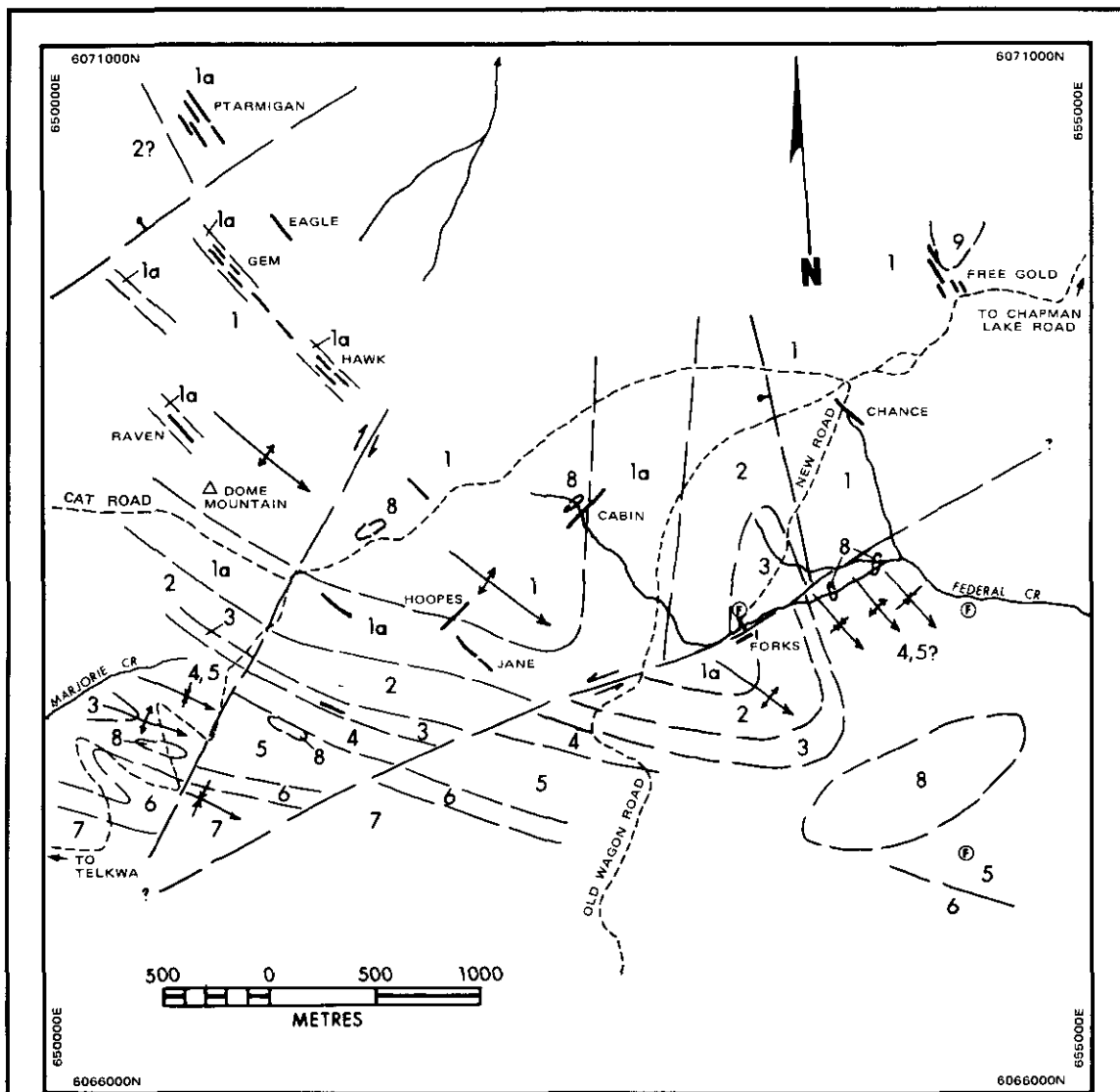
**LOCATION AND TOPOGRAPHY**

Dome Mountain, which rises to 1 753 metres elevation, is 38 kilometres east of Smithers within the northwest-trending Babine Range. There is abundant vegetation and a general lack of outcrop on the lower slopes of Dome Mountain. The best outcrop occurs in creek beds and on the rounded crest of the mountain. The area is accessible either via the rough Deception Lake forest road from Telkwa or the Chapman Lake logging road, which is located east of the Babine Range. Although both routes ultimately lead to the top of Dome Mountain, neither route is passable during periods of wet weather.

**EXPLORATION HISTORY**

Prospectors first staked claims on Dome Mountain in about 1914 and these claims were actively explored until 1924. In 1923 and 1924, the Dome Mountain Mining Company, a newly formed subsidiary of the New York based Federal Mining and Smelting Company started underground workings on the Forks, Cabin, Jane and Ptarmigan veins. Of these, the Forks was considered the most favourable and a wagon road was constructed, a permanent camp established, and a steam-boiler plant for pumping and hoisting moved onto the property to aid in the underground development. However, in 1924, apparently discouraged by the lenticular nature of the ore veins and excessive water in the underground workings, all work was halted and the boiler-plant dismantled and removed from the property.

In 1932, Babine Gold Mines Limited optioned the Free Gold property, which is located 2 kilometres northeast of the Forks, and started underground workings to cross cut several small gold-bearing quartz veins. Bulk shipments were made in 1938 and 1940; in 1949 title was transferred to



LEGEND	
<b>9</b> QUARTZ MONZONITE	<b>4</b> RUSTY ARGILLITE
<b>8</b> DIORITE OR DIABASE	<b>3</b> WACKE, CONGLOMERATE FELSIC TUFF
<b>HAZELTON GROUP</b>	<b>2</b> RED VOLCANICLASTIC ROCKS AND GREEN AMYGDALOIDAL FLOWS
<b>NILKITKWA FORMATION</b>	<b>TELKWA FORMATION</b>
<b>7</b> THICK-BEDDED GREEN VOLCANICLASTIC ROCKS, MINOR LIMESTONE	<b>1</b> FRAGMENTAL VOLCANIC ROCKS, ANDESITE FLOWS
<b>6</b> THIN-BEDDED LIMESTONE, SILTSTONE, WACKE	<b>1a</b> FOLIATED TUFF
<b>5</b> THICK-BEDDED SILTSTONE	

SYMBOLS	
QUARTZ VEIN . . . . .	PLUNGING ANTICLINE, SYNCLINE . . . . .
FAULT, BALL ON DOWNTHEOWN SIDE . . . . .	FOSSIL LOCALITY . . . . .

Figure 65. Preliminary geology of the Dome Mountain gold camp.

Ingray Yellowknife Mines Limited and in 1951 Lake Surprise Mines Limited reopened the underground workings. In 1967 to 1969 and 1972 to 1973, Cordilleran Engineering and Amoco Canada Petroleum Company respectively examined the Free Gold property as a possible porphyry copper prospect. In 1979 and 1980, E. Messich and M. Kryger built a road connecting the Free Gold property to the Chapman Lake logging road and extended the underground workings. From 1981 to 1983, Reako Explorations Limited and Panther Mines Limited completed additional underground development and surface trenching. During the 1984 field season, all the properties on Dome Mountain with the exception of the Free Gold were under option to Noranda Exploration Company, Limited. Noranda did soil sampling on a newly cut grid and constructed a road to the Forks showing. Drill sites were established but no drilling was done.

### REGIONAL GEOLOGIC SETTING

The Dome Mountain area is underlain by subaerial to submarine volcanic, volcanoclastic and sedimentary rocks of the Hazelton Group (Fig. 64). The Hazelton Group is an island-arc assemblage that was deposited in the northwest trending Hazelton Trough between Early Jurassic and Middle Jurassic time. Tipper and Richards (1976) divide the Hazelton Group into three major formations in the Smithers map-area (93L). These are the Late Sinemurian to Early Pliensbachian Telkwa Formation, the Early Pliensbachian to Middle Toarcian Nilkitkwa Formation, and the Middle Toarcian to Lower Callovian Smithers Formation.

The Telkwa Formation, which is comprised of subaerial and submarine pyroclastic and flow rocks with lesser intercalated sedimentary rocks, is the thickest and most extensive formation of the Hazelton Group. The mixed subaerial to submarine Babine Shelf facies of the Telkwa Formation, which separates the subaerial Howson facies to the west and the submarine Kotsine facies to the east, underlies the Babine Range (Tipper and Richards, 1976).

The Nilkitkwa Formation conformably to disconformably overlies the Telkwa Formation. West of Dome Mountain it is comprised of predominantly Toarcian red pyroclastic rocks; to the east it includes Early Pliensbachian to Middle Toarcian marine sedimentary rocks with intercalated rhyolite to basalt flows.

In the Babine Range, the Smithers Formation disconformably overlies the Nilkitkwa Formation; it is predominantly Bajocian in age. It is comprised of fossiliferous sandstone and siltstone with lesser intercalated felsic tuff. As far as is known, the Smithers Formation does not occur within the area of Figure 65.

### DOME MOUNTAIN GEOLOGY

The core of Dome Mountain is underlain by a large southwest-verging, southeast-plunging anticlinal structure that has been cut by northeast

# PRELIMINARY STRATIGRAPHIC COLUMN DOME MOUNTAIN

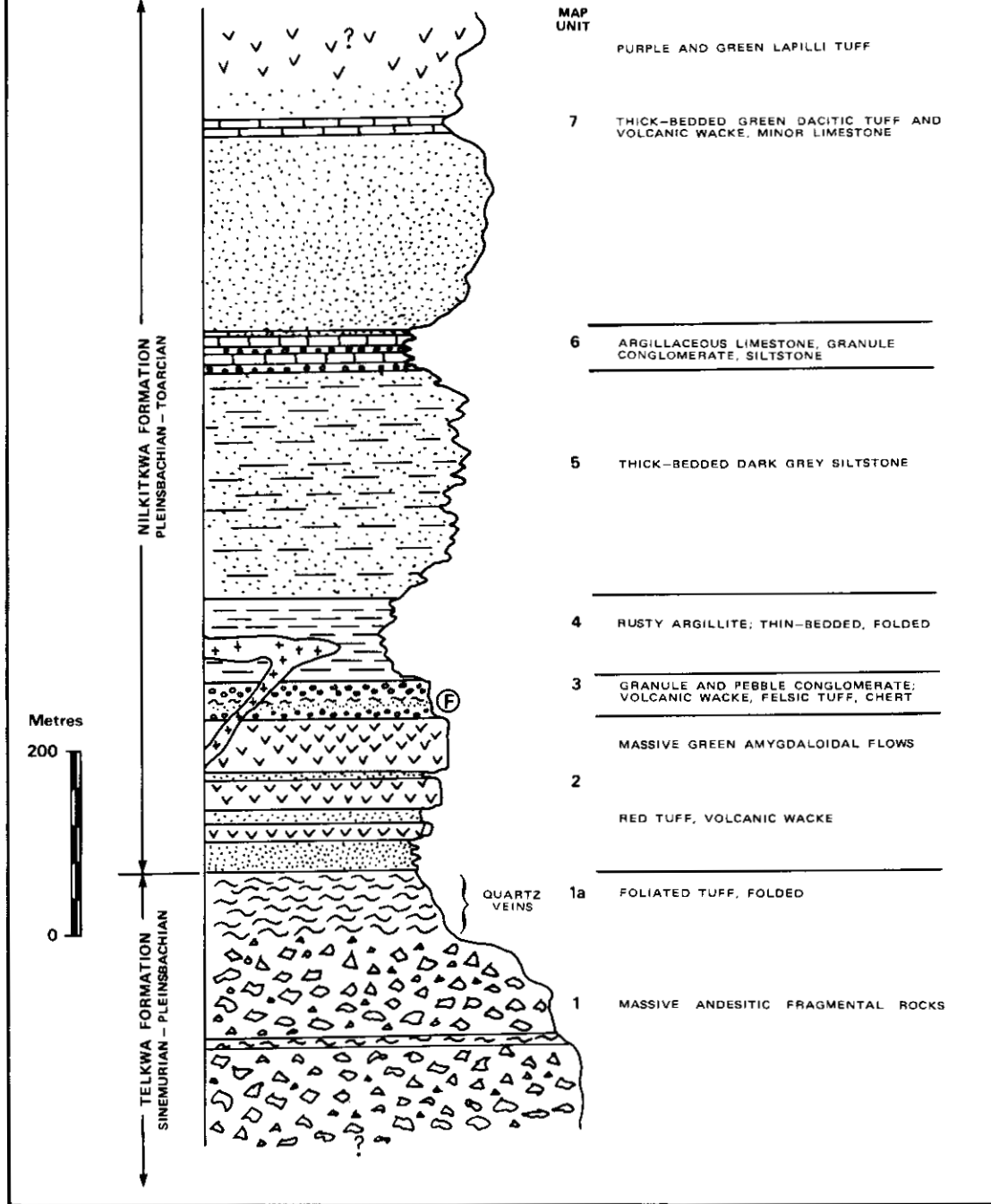


Figure 66. Preliminary stratigraphic column, Dome Mountain gold camp.

and northwest-trending high angle faults (Fig. 65). The oldest rocks are well exposed on the crest of the mountain and a good stratigraphic section is exposed on the south slope. A preliminary stratigraphic column (Fig. 66) has been established on the basis of this section. Seven major map units are recognized. Going up section these are: (1) fragmental volcanic unit (+1000 metres?); (2) red volcanoclastic-green flow unit (150-200 metres); (3) volcanic wacke-conglomerate-felsic tuff unit (20-50 metres); (4) rusty argillite or shale unit (50-100 metres); (5) dark grey siltstone unit (250-300 metres); (6) thin-bedded limestone-siltstone-wacke unit (50-100 metres); and (7) greenish grey massive volcanoclastic unit (+500 metres). The ages of these units and their correlations with Hazelton Group formations are not well established. Limestone samples are currently being processed for microfossils.

Several small plugs or dykes of diabase or diorite intrude the Hazelton Group on Dome Mountain; a stock of quartz porphyry or quartz monzonite is exposed near the Free-gold showing.

## HAZELTON GROUP

### **Telkwa Formation**

#### Fragmental volcanic unit (1)

A chaotic assemblage of coarse-grained agglomerate, tuff-breccia and lapilli tuff with lesser intercalations of lithic, crystal and ash tuff, and volcanic derived sedimentary rocks crops out on Dome Mountain. These rocks are purple, mauve, green and grey in colour. Clasts range from less than 1 centimetre to 40 centimetres in diameter and are typically comprised of porphyritic andesite or crystal tuff. The matrix also contains abundant crystal and lithic fragments. In places the clasts are flattened parallel to bedding. Beds comprised of large rounded bombs up to 30 centimetres in diameter floating in a fine-grained ash matrix are common. Finer grained tuff beds within the unit are strongly foliated subparallel to bedding. The fragmental volcanic unit is believed to correlate with the Babine shelf facies of the Telkwa Formation as described by Tipper and Richards (1976).

### **Nilkitkwa Formation**

#### Red volcanoclastic - green flow unit (2)

A distinctive unit of red volcanoclastic rocks and green to mauve amygdaloidal flows overlies the fragmental volcanic unit that forms the core of Dome Mountain. This unit is well exposed on the south slope of Dome Mountain and in Federal Creek above and below the Forks showing. Near the crest of Dome Mountain the basal part of the unit is comprised of thin-bedded brick red lithic tuff, crystal tuff, volcanic wacke, and granule conglomerate that is locally cross-bedded. Interlayered lime green, amygdaloidal basalt or andesite increases in abundance up section

and comprises the upper part of the unit. Outcrops of this unit in Federal Creek are thicker bedded and have less reworked volcanic detritus than those near the crest of Dome Mountain, suggesting a facies variation to the east. Here the volcanic part of the unit varies from mauve to green in colour but still contains conspicuous chlorite-filled amygdules and vesicles.

The red volcanoclastic-green flow unit is probably the basal member of the Nilkitkwa Formation on Dome Mountain. It represents a period of exposure and erosion of the Telkwa Formation and deposition of subaerial pyroclastic rocks. This apparently was followed by a marine transgression and deposition of green submarine basaltic flows.

Tipper and Richards (1976) describe a red tuff member of the Nilkitkwa Formation which is lithologically similar to the basal part of the red volcanoclastic-green flow unit on Dome Mountain. However this red tuff member is Toarcian in age and overlies a marine sedimentary unit of the Nilkitkwa Formation. If this relationship is correct then the red volcanoclastic-green flow unit occurs lower down in the section and does not correlate with the red tuff member. Additional evidence supporting this conclusion is the fact that sedimentary rocks that apparently overlie the red volcanoclastic-green flow unit near the Forks showing are reported to contain a Late Pliensbachian pelecypod (Myers, personal communication).

#### Volcanic wacke - conglomerate - felsic tuff unit (3)

A thin unit of brown to buff weathering volcanic wacke, siltstone, granule to pebble conglomerate and fine-grained felsic tuffs or flows overlies green amygdaloidal flows of the red volcanoclastic-green flow unit. The finer-grained clastic rocks typically have a slaty cleavage and contain small angular clasts in a silty matrix. As mentioned above, the unit contains poorly preserved Pliensbachian pelecypods. Adjacent to the Forks shaft on the south slope of Dome Mountain and the north bank of Federal Creek, this unit is pervasively altered and has disseminated pyrite and broken quartz stringers suggestive of an early hydrothermal (exhalative?) event.

#### Rusty argillite unit (4)

A recessive, poorly exposed unit of thin-bedded, rusty weathering silty argillite occupies a small depression between the main part of Dome Mountain and its southern spur. The unit typically has a well-developed slaty cleavage and tight small scale fold structures; it lacks carbonate and contains ubiquitous disseminated pyrite. Exploration companies have dug several bulldozer trenches across the unit near the crest of the Dome Mountain ridge but no significant economic mineral concentration has been discovered.

#### Thick-bedded siltstone unit (5)

Up to 300 metres of monotonous, medium to thick-bedded, dark grey siltstone overlies the rusty argillite unit. This unit, which is relatively resistant forms the backbone of the south spur of Dome Mountain. The siltstone has a slaty cleavage in places. Lithologically similar rocks that crop out in Federal Creek, below the Forks showing, are probably part of this unit.

#### Thin-bedded limestone-siltstone-wacke unit (6)

The thick-bedded siltstone unit grades up section into a relatively thin unit of well-bedded dark grey argillaceous limestone, limy siltstone, and wacke with lesser intercalations of pebble conglomerate and chert. These rocks crop out near the southeast end of Dome Mountain ridge, and in the lower road cuts on the southwest slope above Marjorie Creek. The limestone beds weather in positive relief producing a ribbed appearance on weathered surfaces. Lithologically similar rocks crop out in the lower part of Federal Creek. However, L'Orsa (1982) reports that these rocks contain a poorly preserved ammonite that Tipper identified as probably Sinemurian in age. Therefore, correlation of these rocks with the Nilkitkwa Formation is suspect; they may be a sedimentary member of the Telkwa Formation. A small outcrop of similar lithology occurs in the clear cut southeast of Dome Mountain.

#### Green thick-bedded volcaniclastic unit (7)

The south slope of Dome Mountain is underlain by massive, light green, calcareous crystal tuff or volcanic wacke with rare intercalations of argillaceous limestone and shaly siltstone. The unit, which is estimated to be at least 500 metres thick, grades up section into a mixed assemblage of mauve, red, and green lithic, crystal and lapilli tuffs. These rocks may correlate with the red tuff member of the Nilkitkwa Formation. Tipper and Richards (1976) describe similar rocks in the upper part of the Nilkitkwa Formation northeast of Dome Mountain. As far as is known, these are the youngest rocks in the Dome Mountain gold camp.

#### INTRUSIVE ROCKS

Several small elongate plugs or dykes of fine to medium-grained diorite or diabase intrude the Telkwa and Nilkitkwa Formations on Dome Mountain. The largest intrusion is exposed on the lower southeast slope, just south of Federal Creek. These mafic-rich intrusions cause the prominent aeromagnetic anomaly that is centred on Dome Mountain. The dioritic intrusions are probably Jurassic in age and, therefore, members of the Topley Intrusions.

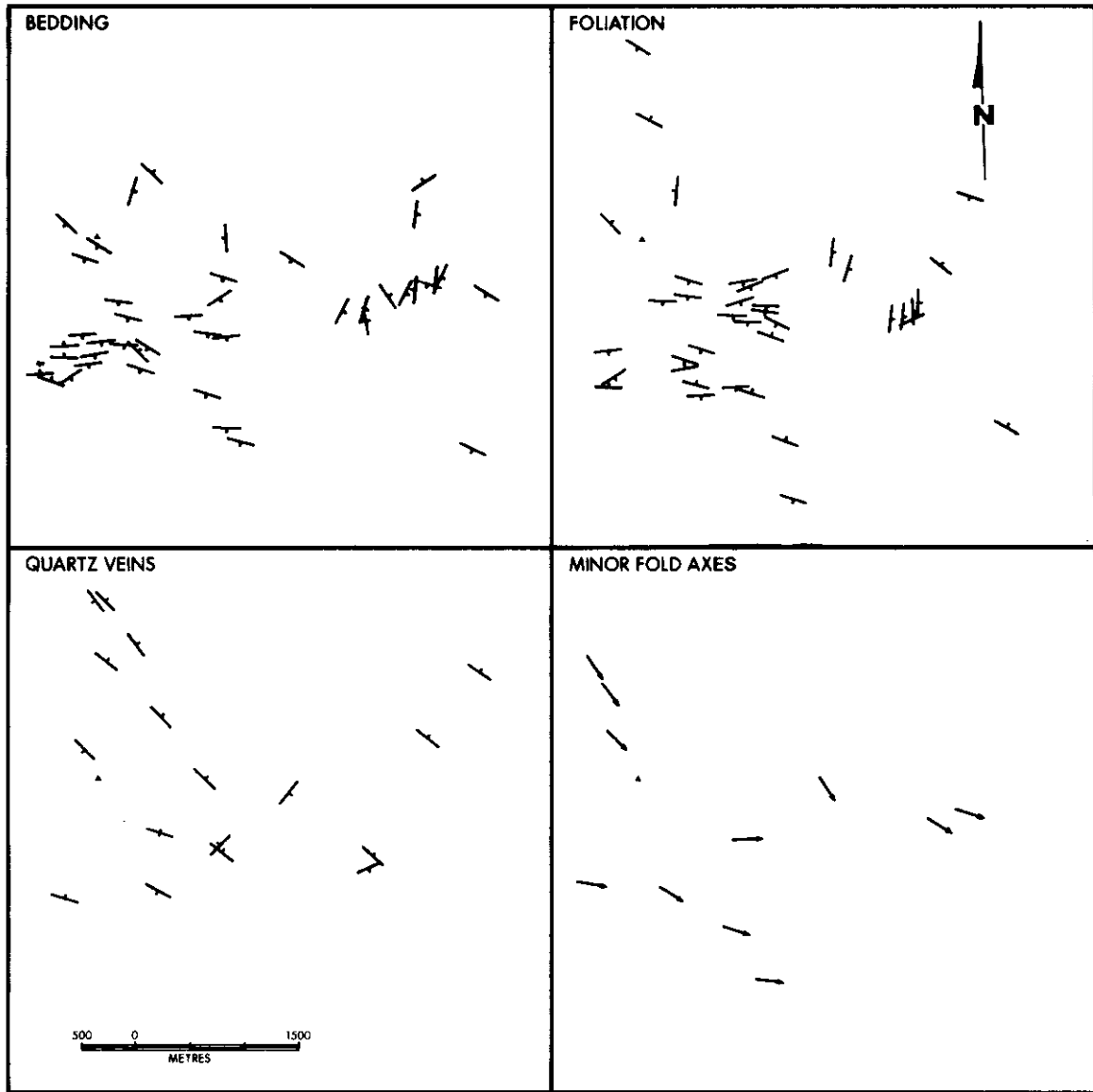


Figure 67. Bedding, foliation, quartz vein, and fold axis trends, Dome Mountain gold camp. The triangular symbol marks the location of Dome Mountain.



Outcrops of altered quartz porphyry and porphyritic quartz monzonite contain quartz vein stockworks that occur east of the Free Gold veins. These intrusive rocks were the target of porphyry copper exploration between 1967 and 1972.

## STRUCTURE

Dome Mountain is underlain by a large anticlinal structure that plunges to the southeast (Fig. 65). Evidence supporting this conclusion includes the repetition of stratigraphic units on either side of Dome Mountain, the attitude of minor fold axes which plunge gently to the southeast and east (Fig. 67), and the general change from southwest to southeast of dips for bedding and foliation about a southeast-trending axial trace (Fig. 67). The southwest limbs of minor folds generally dip steeply to the southwest or northeast; the northeast limbs typically dip gently to the northeast. This suggests the large scale fold structures are asymmetric and verge to the southwest.

Fine-grained tuffaceous and sedimentary rocks on Dome Mountain have a well-developed, early slaty cleavage (S1). This cleavage, which is subparallel to bedding, is locally folded and cut by a weak crenulation cleavage (S2) that is axial planar to the major fold structures. Early quartz veins, which both parallel and cross-cut the slaty cleavage, have been broken and offset by the crenulation cleavage (Plate VII). Locally quartz veins, that parallel the slaty cleavage, are folded (Plate VIII); contained sulphides are broken and recrystallized as a result of this folding. Massive fragmental rocks of the Telkwa Formation generally have a poorly defined fracture cleavage that roughly parallels the crenulation cleavage.

Joint trends on Dome Mountain are shown on Figures 67 and 68. The most prominent joint set dips steeply to the northwest. This trend is roughly perpendicular to the major fold axes. These joints also parallel prominent airphoto linears and several major high angle faults which offset the stratigraphy (Fig. 65).

## MINERAL OCCURRENCES

The location of quartz veins on Dome Mountain is shown on Figures 65 and 67. Characteristics of the veins are summarized in Table 1. Most of the veins trend northwest and dip steeply to the northeast or southwest; the Hoopes and Cabin veins trend northeast. The majority of veins are in foliated and altered tuff, near the upper contact of the Telkwa Formation. The Free Gold veins are a notable exception; they are hosted by massive andesite. The stratigraphic position of these rocks is uncertain. These veins both parallel and cut the foliation. The quartz veins vary from a few centimetres up to 3 metres in width. Some veins are lenticular and locally folded and brecciated; others have

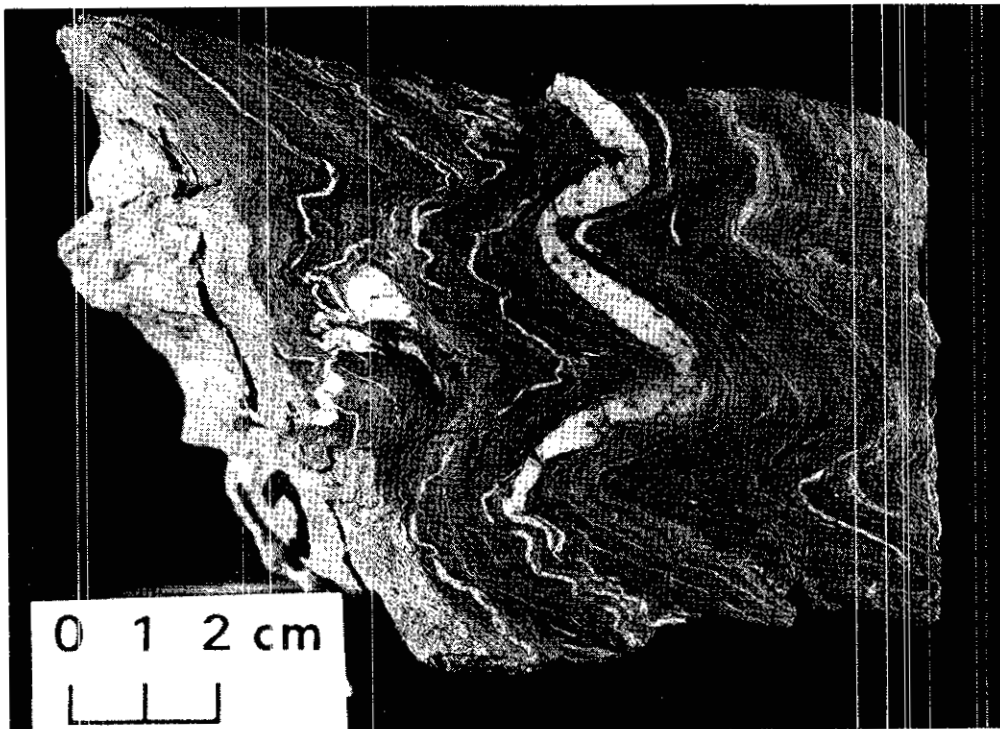


Plate VII. Foliated and folded quartz veins in the wallrock of the Cabin vein.

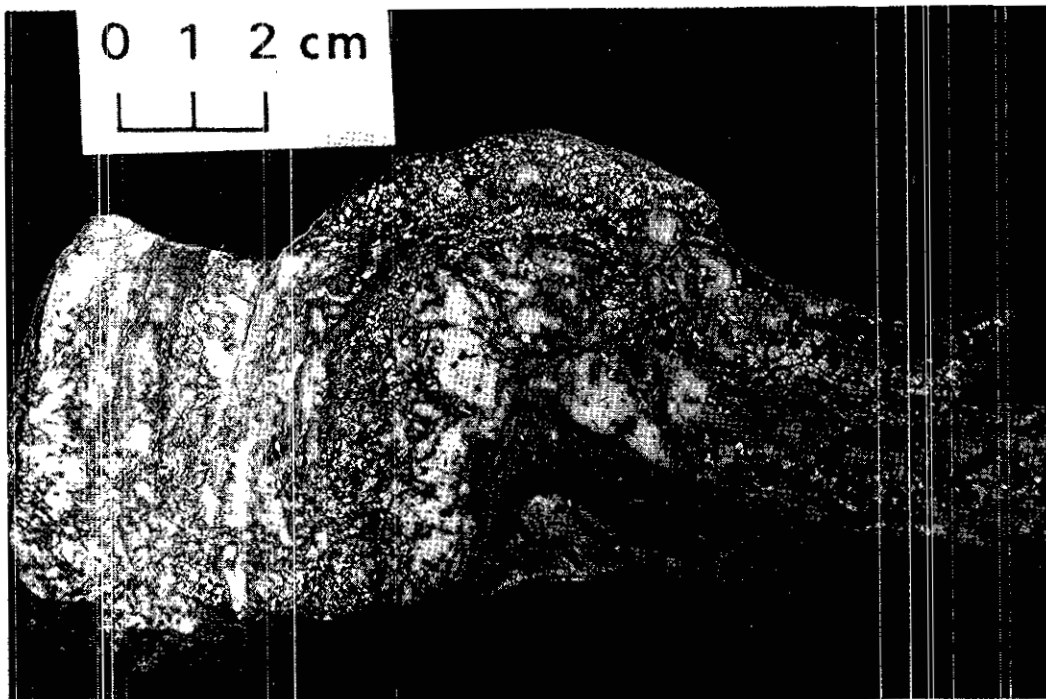


Plate VIII. Folded and brecciated quartz, Raven vein.

considerable lateral continuity with little variation in attitude and do not appear to be deformed. Intensity of wallrock alteration is variable; it is most intense near the Forks and Cabin veins but almost non-existent near the Free Gold veins. Sulphide mineralogy is also variable; pyrite, pyrite-chalcocopyrite, pyrite-chalcocopyrite-galena, pyrite-galena-sphalerite, and pyrite-arsenopyrite assemblages are present (Table 1).

TABLE 1  
 DOME MOUNTAIN QUARTZ VEINS

No.	Name	Mineralogy	Host Rocks	Alteration
1.	Forks	Py, Gl, Sp, (As)	Foliated tuffs	Intense
2.	Free Gold	Py, Sp, Gl, (Cp)	Green andesite	None or minor
3.	Cabin	Py, Gl, (Cp, As)	Foliated tuffs	Moderate
4.	Jane	Py, Cp, (Sp, Gl)	Foliated tuffs	Weak to moderate
5.	Hoopes	Py, Cp	Foliated tuffs	Moderate
6.	Hawk	Py	Foliated tuffs	Weak to moderate
7.	Gem	Py, Cp, As, Sp, Gl	Foliated tuffs	Weak to moderate
8.	Eagle	Py	Tuffs	Weak
9.	Ptarmigan	Py, As, Sp, Gl	Foliated tuffs	Weak to moderate
10.	Raven	Py, Cp	Foliated folded tuffs	Weak to moderate
11.	Chance	Py	Foliated tuffs	Moderate to intense

Py = pyrite; Cp = chalcocopyrite; Gl = galena; Sp = sphalerite; As = arsenopyrite  
 minor components in brackets

#### Forks (Mineral Inventory 93L-22)

Stream deposits now cover the original Forks showing, which is reported to occur in the bed of Federal Creek just below its confluence with a small southern tributary (Minister of Mines, Annual Reports, 1922, 1923, 1924). Tuff outcrops on the banks of Federal Creek, above and below the showing, are pervasively sericite-carbonate-fuchsite altered and foliated, and cut by quartz stringers (Fig. 69). Several short adits were driven into this zone in the early days of exploration but these failed to intersect any major quartz veins. However, subsequent underground development by the Dome Mountain Mining Company in 1923 and 1924 intersected two major quartz veins, one trending northwest and dipping northeast, the other trending northeast (Fig. 69).

In 1923, a three-compartment shaft was sunk to a depth of 32 metres and a 45-metre tunnel driven to the northwest. A 12-metre crosscut intersected a northeast-dipping quartz vein which was then drifted on for approximately 45 metres going southeast. Dome Mountain Mining Company sampled the vein at 1.5-metre intervals over a strike length of 33.5 metres. The sample width, and presumably the vein width, varied from 30 to 150 centimetres. Precious metal values ranged from 1.4 to 75.5 grams per tonne (0.04 to 2.20 ounces per ton) gold and 10.3 to 120 grams per tonne (0.3 to 3.5 ounces per ton) silver. The weighted average of these assays is 15.3 grams per tonne (0.447 ounce per ton) gold and 59.0 grams per tonne (1.72 ounces per ton) silver.

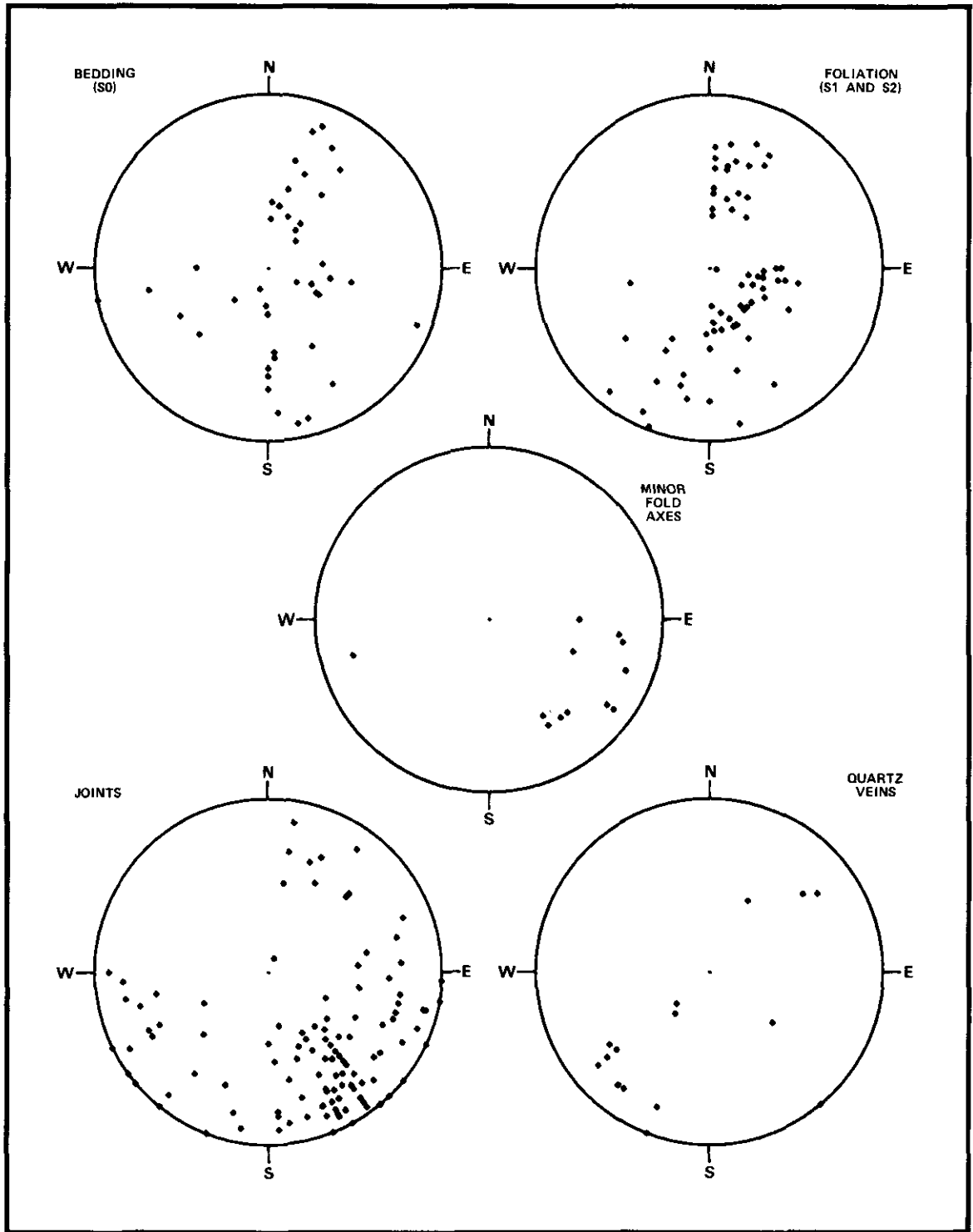


Figure 68. Stereonet plots for bedding, foliation, quartz veins, and fold axes.

The caved portal and winze for a 27-metre-long, southeast-trending adit is located approximately 23 metres west of the Forks shaft (Fig. 69). Approximately 12 metres of drifting and a short winze follow a quartz vein northeast from the end of the adit. Dome Mountain Mining Company sampled the quartz vein at 1.5-metre intervals along the drift and winze. The weighted average for these samples was 42.1 grams per tonne (1.23 ounces per ton) gold and 85.4 grams per tonne (2.49 ounces per ton) silver over approximately 12 metres.

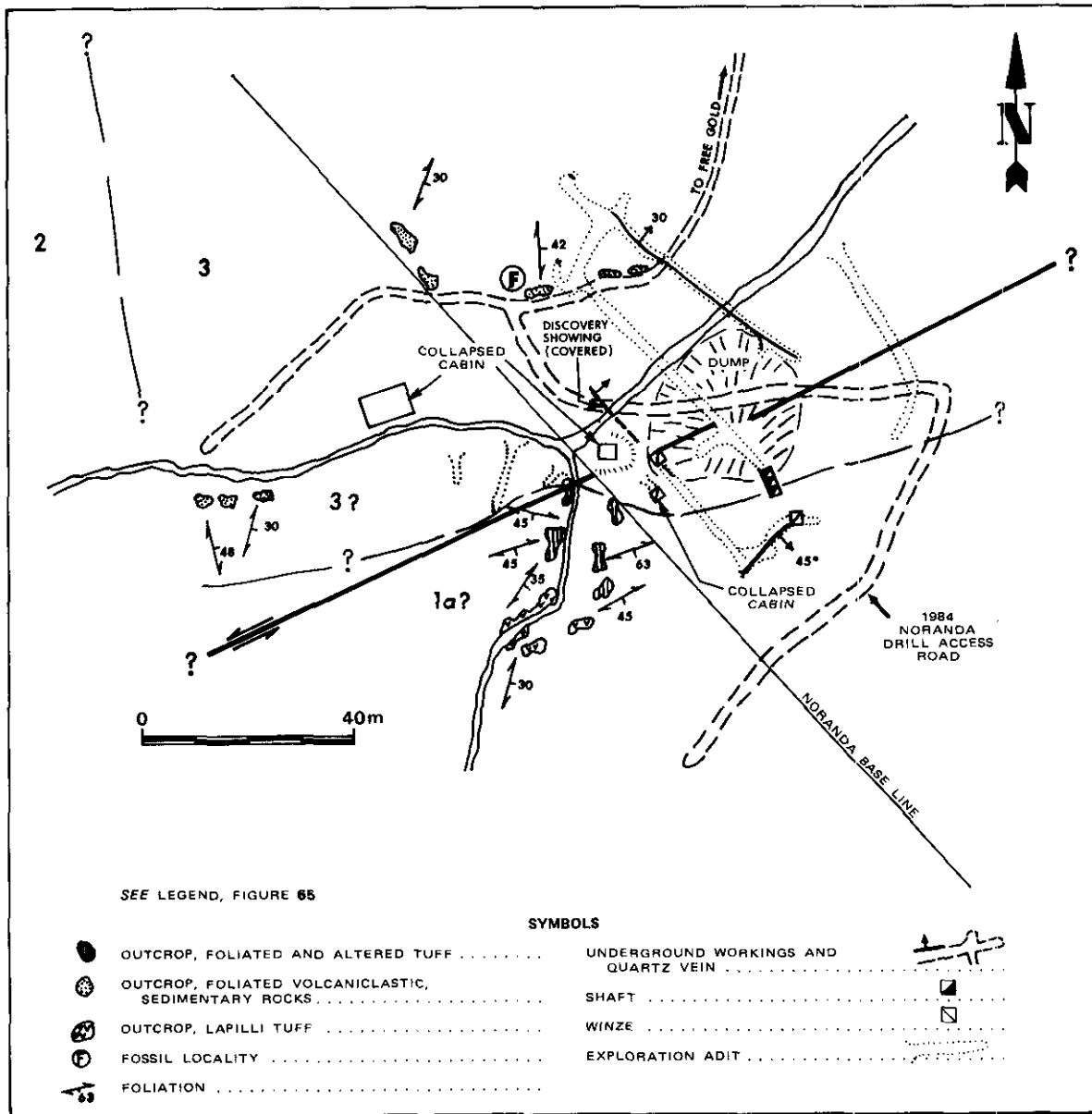


Figure 69. Detailed geology of the Forks vein.

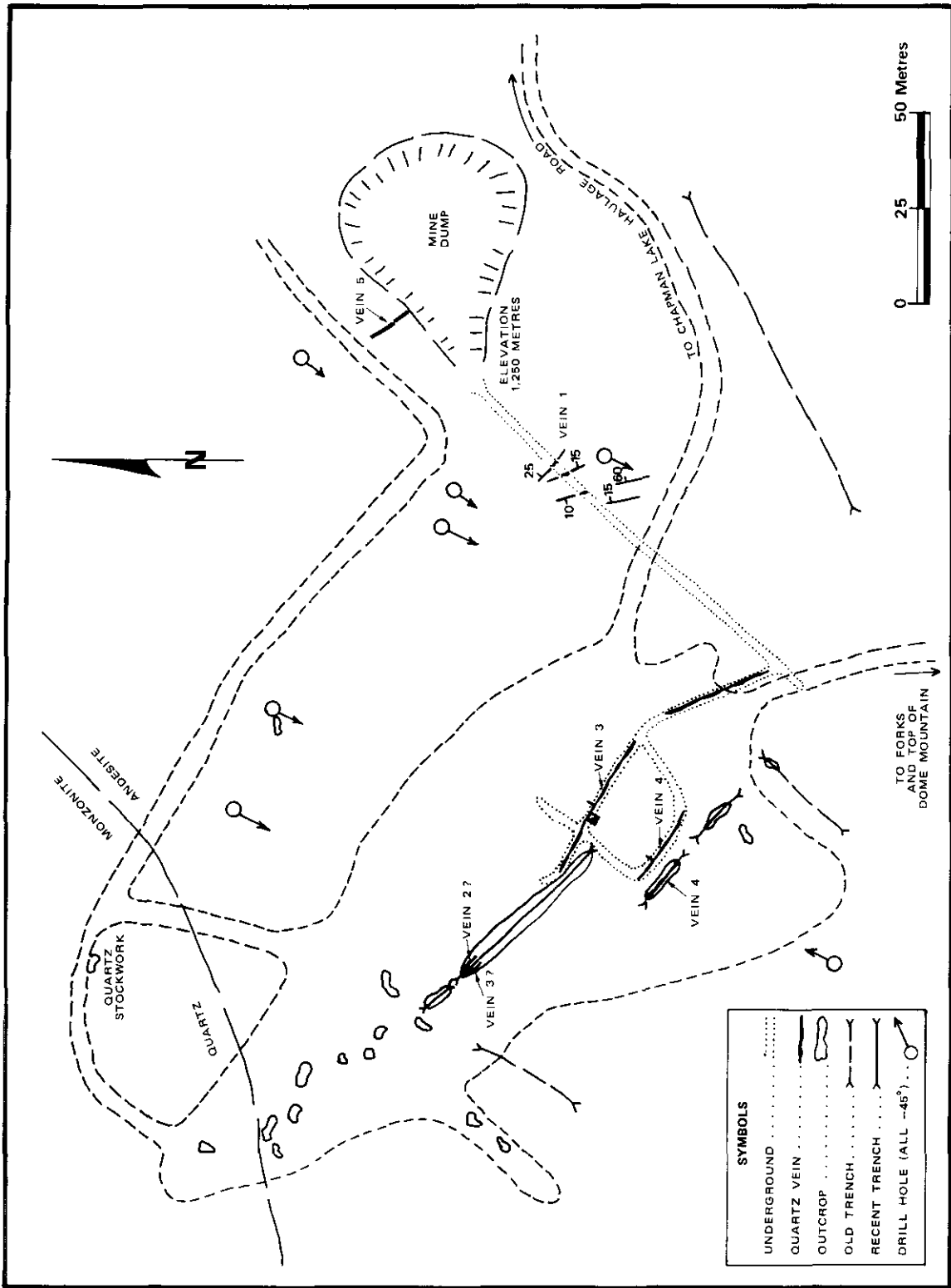


Figure 70. Detailed geology of the Free Gold vein.

### Free Gold (Mineral Inventory 93L-23)

The Free Gold showings are located on the heavily timbered northeast slope of Dome Mountain, at approximately 1 250 metres elevation. Access is via a good gravel road which leaves the Chapman Lake haulage road at kilometre 69.

Babine Gold Mines Limited was incorporated in 1932 to explore the Free Gold property. Early exploration included hand trenching, surface stripping, and sinking of shallow shafts and pits. In 1933 and 1934, a crosscut adit was driven approximately 110 metres southwest. The number 3 vein was intersected and a 42-metre drift was driven to the northwest (Fig. 70). A crosscut was then driven southwest and approximately 23 metres of drifting was done on the number 4 vein. Additional drifting was done on the number 3 vein from the end of a northeast crosscut (Fig. 70).

Exploration work on the Free Gold property has discovered five major (1 to 5) and many smaller quartz veins. These veins vary from a few centimetres to 2 metres in width. Most of the veins dip steeply northeast; some shallow-dipping veins are also present east of the main showings (Fig. 70). Some of the veins may merge at depth as indicated by converging strike and dip directions.

The Free Gold quartz veins typically contain pyrite with lesser amounts of sphalerite, galena, tetrahedrite, and chalcopyrite. Native gold is rare. Late fault movement along some of the veins has shattered the quartz and attendant sulphide grains. The host andesite is only slightly altered; it does not have the well-defined foliation typical of host rocks for veins higher up on Dome Mountain.

Canada Department of Mines and Resources processed a bulk shipment of 680 pounds in 1938 (*Minister of Mines, B.C., Ann. Rept., 1938*). This shipment averaged 61 grams per tonne (1.78 ounces per ton) gold, 75 grams per tonne (2.18 ounces per ton) silver, 1.54 per cent lead, 5.97 per cent zinc, 0.15 per cent copper, 0.02 per cent arsenic, and 10.38 per cent sulphur. Polished sections of the ore showed that shattered pyrite grains were veined by successively later sphalerite, tetrahedrite, chalcopyrite, and galena. Minute grains of native gold occur in galena and chalcopyrite microveinlets that cut and heal shattered pyrite. Babine Gold Mines Limited made a further shipment of 2 715 tonnes of high-grade ore to the Prince Rupert smelter in 1940 (*Minister of Mines, B.C., Ann. Rept., 1940*).

In 1951, Lake Surprise Mines Limited optioned the Free Gold group and did a comprehensive sampling of quartz veins both on the surface and underground. The weighted average of 31 samples collected over 24 metres on the northeast drift of vein number 3 was 27.2 grams per tonne (0.79 ounce per ton) gold, 28.3 grams per tonne (0.83 ounce per ton) silver, and 1.35 per cent zinc; the southwest drift averaged 58.7 grams per tonne

(1.71 ounces per ton) gold, 80.1 grams per tonne (2.35 ounces per ton) silver, 6.1 per cent zinc, and 2.08 per cent lead for 13 samples collected over 12 metres. This vein was also sampled on surface. The average of 40 samples collected over 61 metres was 70.5 grams per tonne (2.07 ounces per ton) gold, 94.1 grams per tonne (2.76 ounces per ton) silver, and 0.81 per cent zinc. Recent operators have apparently mined this part of the vein by an open cut (Fig. 70). Twenty-four samples collected over 27 metres in the drift on the number 4 vein averaged 20 grams per tonne (0.58 ounce per ton) gold, 62.9 grams per tonne (1.8 ounces per ton) silver, and 1.67 per cent zinc. This work showed the erratic nature of metal concentrations within the quartz veins. Gold assays ranged from 391 grams per tonne (11.4 ounces per ton) to trace.

The Free Gold property was reexamined by Cordilleran Engineering and Amoco Canada Petroleum Company in 1967-1969 and 1972-1973 respectively. This work focused on a possible porphyry copper deposit associated with the quartz monzonite intrusion located north of the main quartz vein occurrences.

Panther Mines Limited optioned the Free Gold property from Lorne Warren in 1980 and subsequently entered into a joint venture with Reako Explorations Limited. The property was drilled in 1981. Drill hole locations and quartz vein intersections are shown on Figure 70. It is difficult to correlate the drill intersections with known surface and underground vein occurrences further illustrating the unpredictable nature of quartz veins on the property. This complexity is probably due to faulting.

### **Cabin**

The Cabin vein crops out near the head waters of Federal Creek. Here it is approximately 3 metres wide and strikes northeast. The vein contains abundant pyrite with lesser arsenopyrite and galena. Gold values are reported to be relatively low (*Minister of Mines, B.C., Ann. Rept., 1922*). The quartz vein is bounded by a narrow zone of strongly altered and foliated rock that cuts the regional foliation. In 1923, Dome Mountain Mining Company drove a crosscut north; it intersected the vein at 107 metres. The vein was followed by short drifts to the northeast and southwest. Gold values along the drifts ranged from 0.68 to 20.9 grams per tonne (0.02 to 0.61 ounce per ton) with up to 181.8 grams per tonne (5.3 ounces per ton) silver (Hilchey, 1963).

### **Jane**

The Jane vein is located on the southwest slope of Dome Mountain ridge (Fig. 65). Several short crosscut trenches expose this narrow, northwest-trending vein over a strike length of approximately 150 metres. The quartz vein occurs within a zone of strongly foliated tuffs of the Telkwa



Formation. There is a narrow zone of sericite alteration along the vein margins. The vein contains variable amounts of shattered pyrite and chalcopyrite.

In 1924, the Dome Mountain Mining Company drove a 75-metre-long drift adit on the Jane vein. Company plans show that the vein varies from 30 to 130 centimetres in width; it dips steeply southwest at the portal and moderately northeast at the end of the drift. The best grade material occurs near the portal where the vein averages 68.6 grams per tonne (2.0 ounces per ton) gold and 140.6 grams per tonne (4.1 ounces per ton) silver over a distance of 1.5 metres. From 26 to 41 metres in from the portal the vein averages 6.2 grams per tonne (0.18 ounce per ton) gold with low silver values. Ten samples collected over the last 14.6 metres of the drift had gold and silver values ranging from 1.0 to 16.0 grams per tonne (0.02 to 0.47 ounce per ton) and 27.3 to 1 374.2 grams per tonne (0.8 to 40.3 ounces per ton) respectively. Sample from the remainder of the drift returned low gold and silver values.

The Dome Mountain Mining Company also sunk a shaft a short distance southeast of the portal of the Jane vein. The vein in this shaft is reported to be relatively wide and high grade (*Minister of Mines, B.C., Ann. Rept., 1922*); it is probably an extension of the Jane vein.

### **Hoopes**

The Hoopes vein is located approximately 215 metres northwest of the portal of the Jane vein. Several trenches have been cut across the vein which appears to trend northeast. The vein is not well enough exposed to determine its exact attitude and thickness. In one trench a steeply dipping quartz vein with abundant pyrite and lesser chalcopyrite is exposed. An adjacent trench exposes a 20-metre-wide zone of pyrite, with lesser sphalerite and galena, in a quartz and albite-healed breccia that may be relatively flat lying. The Hoopes vein, like the Jane vein, occurs within a zone of strongly foliated tuff that overlies massive agglomerate. The vein and breccia zone appear to crosscut the foliation.

A sample collected across 1 metre of the vein is reported to have contained gold and silver values of 43.6 and 171.5 grams per tonne (1.28 and 5.0 ounces per ton) respectively (*Minister of Mines, B.C., Ann. Rept., 1922*).

### **Hawk**

Trenches on the east slope of Dome Mountain cut across several 20 to 30-centimetre-wide, steeply northeast-dipping quartz veins. Here, the host rocks have a well-developed foliation or slaty cleavage which dips moderately to the northeast. The Hawk veins contain mainly shattered

pyrite. Gaul (1922) reports that a well-mineralized sample collected from one of the veins contained 44.6 grams per tonne (1.3 ounces per ton) gold and 343 grams per tonne (10 ounces per ton) silver.

### **Gem**

Prospectors have exposed up to four parallel quartz veins in hand-dug pits and trenches. These workings are located approximately 750 metres along strike from the Hawk veins. The Gem veins dip moderately to the northeast to steeply southwest. The host rocks are medium to thick-bedded tuffs of the Telkwa Formation that dip moderately northeast. There is only weak to moderate foliation and wallrock alteration associated with the Gem veins. The veins contain shattered pyrite and lesser chalcopyrite, arsenopyrite, sphalerite, and galena. Gaul (1922) reports a sample collected across 61 centimetres of the main vein assayed 87.8 grams per tonne (2.56 ounces per ton) gold and 190.7 grams per tonne (5.56 ounces per ton) silver.

### **Eagle**

The Eagle vein is located approximately 275 metres northeast of the Gem veins. A small trench has been dug on the poorly exposed quartz vein. The vein is approximately 20 centimetres wide and dips steeply northeast. A sample collected by Gaul (1922) across 20 centimetres assayed 38.4 grams per tonne (1.12 ounces per ton) gold and 24 grams per tonne (0.7 ounce per ton) silver.

### **Ptarmigan**

The Ptarmigan veins are located 500 metres northwest of the Eagle vein, on the forest-covered north slope of Dome Mountain. Prospectors have dug several pits and crosscutting trenches in the shallow overburden, exposing at least four parallel quartz veins. The veins are up to 75 centimetres wide; they dip steeply southwest or northeast. On surface they contain pyrite and arsenopyrite-rich bands. Underground, the No. 2 vein is reported to contain lenses of galena, pyrite, and sphalerite. The host rocks are strongly foliated adjacent to the veins but not strongly altered.

In 1924, the Dome Mountain Mining Company drove a 115-metre tunnel to explore the Ptarmigan No. 2 vein. Underground sampling showed the vein to be relatively low grade; the maximum assay reported was 13.7 grams per tonne (0.4 ounce per ton) gold. These results were disappointing because samples from trenches along the vein contained good gold and silver values.

## Raven

The Raven vein is located on a northwest-facing slope near the top of Dome Mountain (Fig. 65). Early prospectors drove two short adits on the vein. The vein is well exposed at the back of the upper adit, where it is 20 centimetres wide and contains abundant shattered pyrite and chalcopyrite. The host rocks are strongly foliated tuffs that have subsequently been folded. The vein is conformable to the foliation and has also been folded (Plate VIII). Gold values are reported to be around 34 grams per tonne (1 ounce per ton) (*Minister of Mines, B.C., Ann. Rept., 1922*).

## Chance

The Chance vein is located in the bed of Camp creek, a small southeast-flowing tributary of Federal Creek. It is approximately 750 metres southwest of the Free Gold veins. The quartz vein is approximately 120 centimetres wide and dips steeply northeast; it contains coarse-grained pyrite. The wallrocks are foliated and altered tuffs. The vein is reported to contain "fair" gold values (*Minister of Mines, B.C., Ann. Rept., 1923*).

## DISCUSSION

All of the quartz veins on Dome Mountain, with the exception of the Free Gold veins, are hosted by foliated, fine-grained volcaniclastic rocks. The foliation is essentially a slaty cleavage that probably developed by movement along these less competent beds during the early stages of folding. Many of the quartz veins were probably formed at this time, then were folded and broken as the host rocks were further deformed. This conclusion is supported by the folded nature of many of the quartz veins and the shattered nature of their contained sulphide minerals. Some remobilization of earlier quartz veins may also have taken place during the folding. Post-folding quartz veins are also present but these are usually narrow and barren.

What was the source of the fluids that produced the gold and silver-bearing veins of the Dome Mountain gold camp? Two possibilities are:

- (1) The veins are related to buried intrusive bodies which were emplaced during the early stages of folding. The magmatic fluids preferentially moved along the more permeable foliated tuff beds.
- (2) The veins were produced by heating and remobilization of low temperature components of a thick volcanic pile during folding. The fluids migrated upward into foliated tuff beds near the top of the volcanic pile.

The first possibility is favoured because of the strong aeromagnetic anomaly associated with Dome Mountain. This anomaly suggests that a buried intrusive body occupies the core of the mountain. This postulated intrusive may be dioritic in composition, as indicated by several small plugs and dykes that occur about the mountain. Also, the intensity of hydrothermal alteration associated with some of the veins suggests the fluids were quite hot and reactive, which is consistent with a magmatic source. Variations in sulphide assemblages in the veins are probably related to depth of exposure and distance from the inferred heat source. In terms of the epithermal model, the veins on Dome Mountain would be fairly deep and at the overlap between the precious metal and base metal zones. A genetic model for the Dome Mountain gold camp is presented on Figure 71.

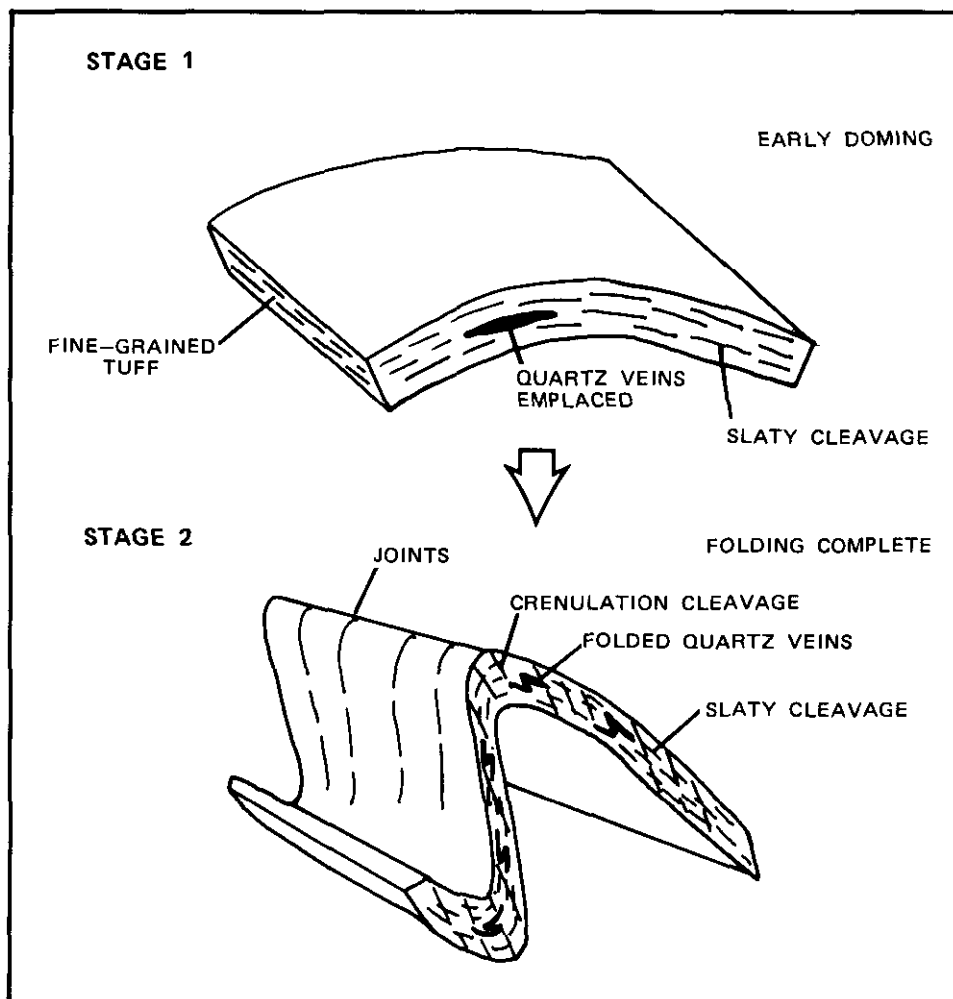


Figure 71. Structural model, Dome Mountain gold camp.

## ACKNOWLEDGMENTS

The author would like to thank Noranda Exploration Company, Limited for permission to work on their Dome Mountain properties. Discussions with Del Myers of Noranda were most helpful and his assistance is most gratefully acknowledged. The author was ably assisted in the field by Gary White, district geologist in Smithers, and Kurt Foellmer, a summer contract employee.

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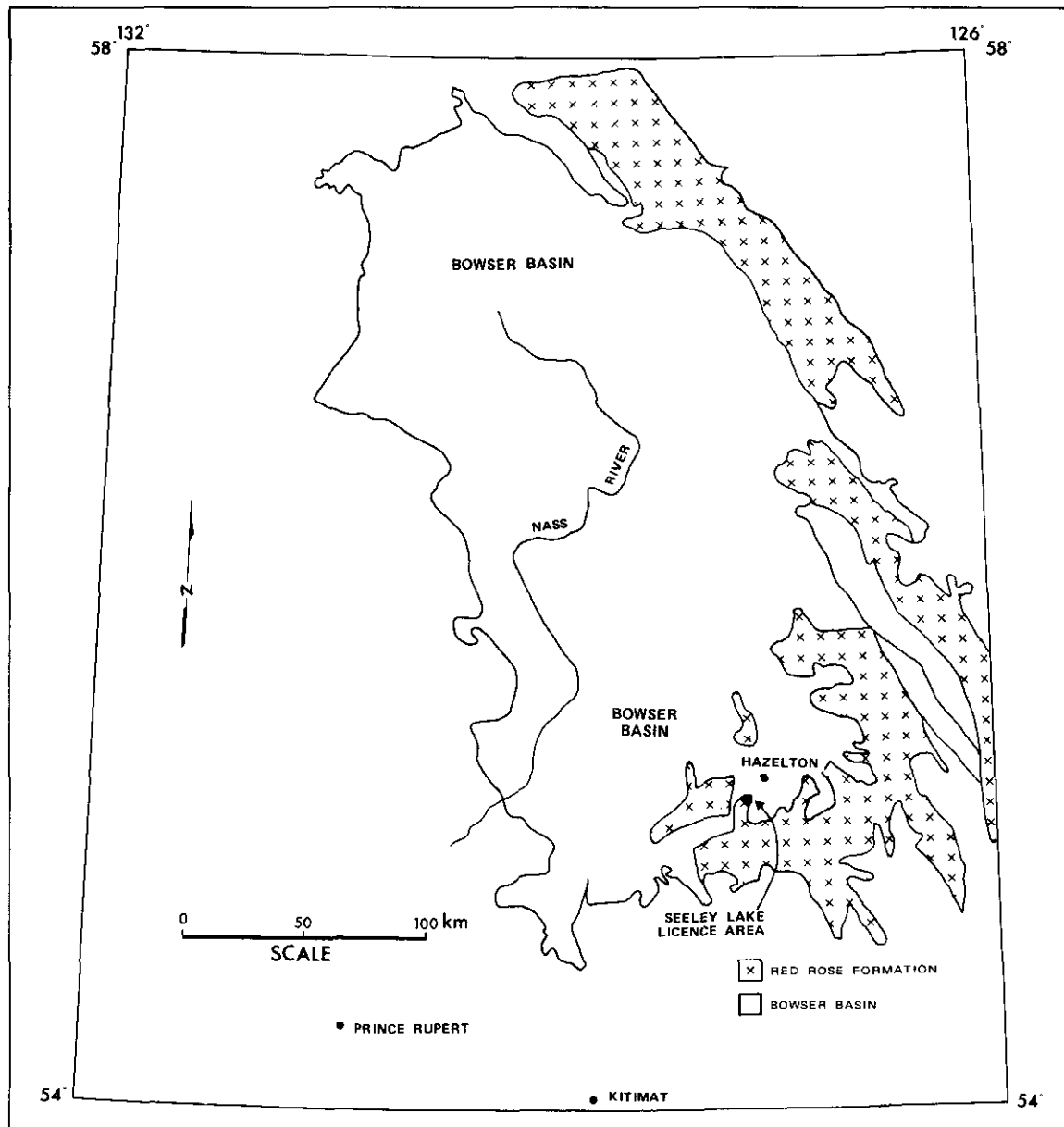


Figure 72. Geological setting of the Seeley Lake area in the Bowser Basin.