British Columbia Geological Survey
Geological Fieldwork 1985

BLACKDOME DEPOSIT (92O/7E, 8W)

By E. L. Faulkner

INTRODUCTION

This report is an update on progress at the property since the reviews by B. N. Church (1980 and 1982). Exploration and development at this gold and silver property (Mineral Inventory 92O-053) has led to a production decision and the start of construction. This report is based largely on company reports, plus some stratigraphic information not previously available and personal observations from property visits and fieldwork during 1984 and 1985.

LOCATION AND ACCESS

The mine is approximately 70 kilometres northwest of Clinton on the southwest spur of Blackdome Mountain and is reached from either Clinton or Williams Lake via the Empire Valley road. Most of the present workings are at an elevation of more than 1 900 metres.

EXPLORATION

Trenching, diamond drilling, and underground exploration and development since 1980 has concentrated on two persistent vein systems, the No. 1 and No. 2 veins, which parallel the southwest spur of Blackdome Mountain (Fig. 13-1). The northeast portion of the No. 1 vein, referred to as the North Mine zone, was explored under an option agreement to Heath Steele Mines Ltd. from an adit at elevation 1 960 metres. Blackdome Exploration Ltd. explored the southwest parts of both veins, referred to as the Ridge zone, from a second adit at 1 960 metres and a third adit at 1 920 metres. Favourable results led to a production decision and the start of construction during the summer of 1985. The first production from stockpiled development ore is expected in mid-1986.

GEOLOGY

The area is underlain by Cretaceous and Tertiary volcanic and volcaniclastic rocks and related feeder dykes. The strata can be grouped into seven units (from oldest to youngest): greenstone, dacite, lower andesite, rhyolite, dacitic andesite, dacitic domes, and basalt (Figs. 13-1 and 13-2).

Greenstone: The oldest rocks in the mine area are chloritic andesite flows, tuffs, and agglomerate exposed in some of the lower creek valleys and also intersected in drill holes.

Dacite: Lying unconformably above the greenstone is a sequence of porphyritic dacite flows with some discontinuous tuff horizons. The dacite is fine grained, greenish grey, and porphyritic. It weathers to a medium grey or brownish grey.

Lower Andesite: An irregular and patchy sequence of mostly pyroclastic rocks occurs at the base of the rhyolite and parts of the dacitic andesite. It consists of welded tuffs, lapilli tuffs, and volcanic breccias of andesite composition. The breccia is particularly coarse in places with closely spaced bombs and blocks indicating proximity to a vent.

Rhyolite: In the southwest part of the mine area is a sequence of pale, flow-banded rhyolite, welded tuff, and lapilli tuff. Irregularly interspersed is coarse to very coarse polymictic breccia. Lack of sorting and limited lateral extent suggest a localized slump or lahar origin.

Dacitic Andesite: Underlying much of Blackdome Mountain is a sequence of grey-weathering, dark grey to greenish grey dacitic andesite flows. These are frequently porphyritic with pale plagioclase laths up to 5 millimetres long. Dyke-like bodies of similar composition occur in the southwest part of the map-area.

Dacitic Domes: Dacitic andesite underlies part of the Ridge Zone and forms thin dome-shaped outliers further southwest. Dacitic andesite in the domes has a lower total iron content than the underlying dacitic andesite unit and weathers to a distinctive pale grey colour. These two rock units are probably comagmatic. A sample taken from one of the domes yielded a K/Ar age of 51.5 ± 1.9 Ma (Church, personal communication).

Basalt: Dark brown to black basalt and weakly porphyritic olivine basalt flows form the peak of Blackdome Mountain and occur extensively further northwest. A conspicuous but thin brick red agglomerate occurs at the base of the basalt wherever it is exposed. Basalt from Blackdome Mountain yielded a K/Ar age of 24 ± 0.8 Ma (Church, personal communication).

STRUCTURE

A northeasterly trend dominates the structure of veins and host rocks in the mine area as a result of tensional forces in a northwest-southeast direction during Eocene time. Blackdome Mountain and the dacitic domes form a northeasterly line of eruptive centres along the axis of a broad anticline with a shallow northeasterly plunge. Feeder dykes strike northeast. Flows generally strike northeast also, with gentle dips to the northwest or southeast seldom exceeding 20 degrees. The dips are not entirely depositional; in the Ridge zone, the direction of flow lineations and the direction of dip differ by up to 30 degrees, indicating that the ridge zone has been uplifted relative to the summit area.

There are at least 12 quartz veins or vein systems within the map-area. Although the surface trace of some of the veins is sinuous, they generally strike north 40 degrees east, with moderate to steep northwesterly dips. The veins commonly follow shear zones. The veins occupy tensional openings; where movement on the faults has been determined, it is normal.

ECONOMIC GEOLOGY

The gold and silver mineralization occurs in typical epithermal quartz veins, most of which are hosted by rhyolite and dacitic andesite. Above tree line the veins either outcrop or occur beneath areas containing quartz float. Below tree line they have been found by trenching precious metal soil geochemical anomalies.

The veins vary from a few centimetres to a few metres in width and from weak stringer zones to sheeted, vuggy veins composed almost entirely of quartz. The best precious metal values occur only in veins with a high percentage of quartz, but abundant quartz does not guarantee precious metal values.

The most persistent and best mineralized veins identified to date are the No. 1 and No. 2 veins, which parallel the Ridge zone and extend up to the southwest spur of Blackdome Mountain. Both veins are characterized by a gouge and breccia-filled shear zone from a few centimetres to 1.5 metres thick with brecciated or sheeted and sometime vuggy white to grey quartz on one or both sides of the

British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork, 1985, Paper 1986-1.

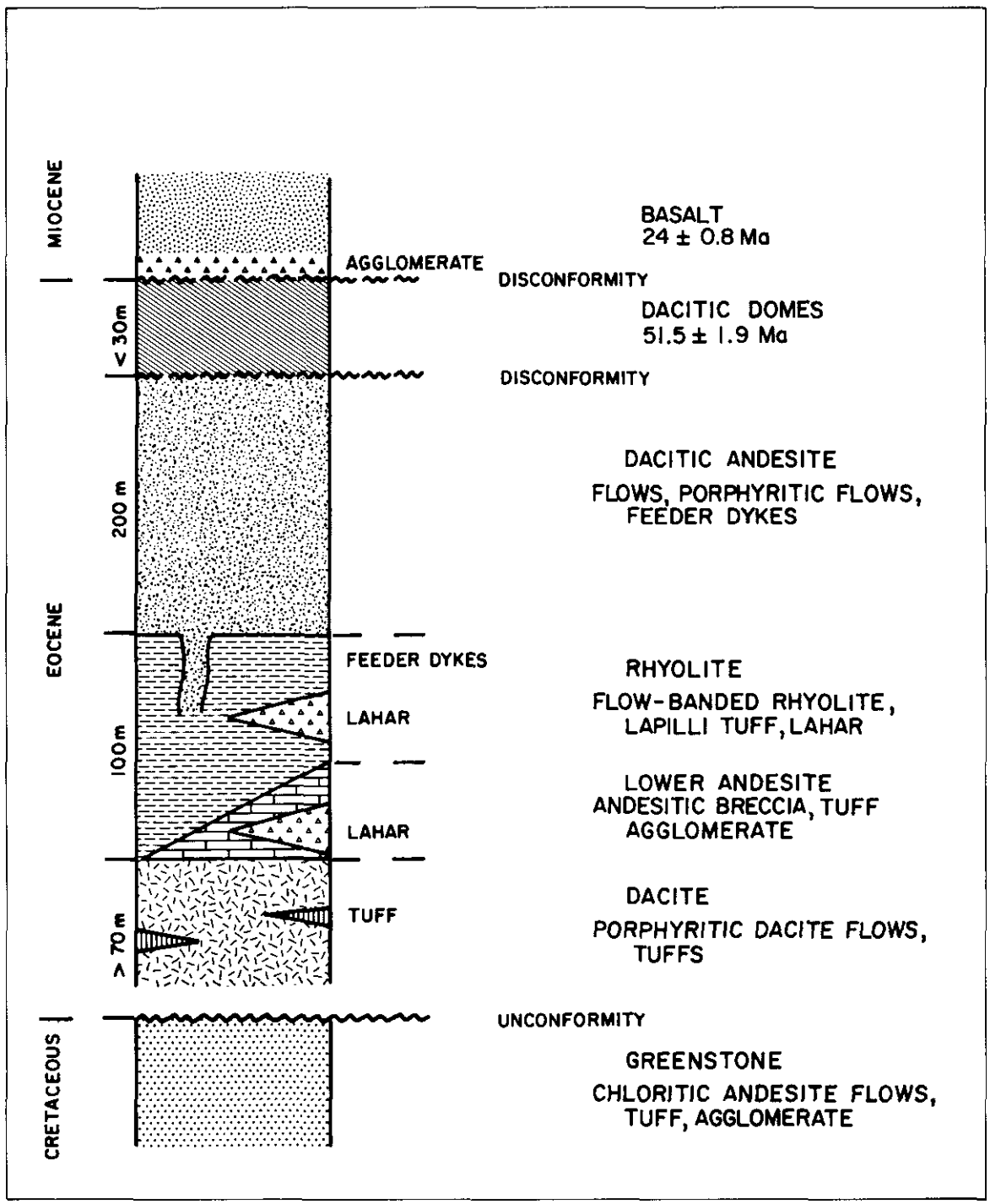

Figure 13-2. Generalized stratigraphic column for rocks in the vicinity of the Blackdome gold deposit.

shear zone. Total vein width exceeds 3 metres in places. Movement was normal, typically with a displacement of 20 to 30 metres across both veins. The No. 2 vein has a steeper dip in the Ridge zone than the No. 1 vein (75 degrees versus 60 degrees) so they converge at depth and to the southwest. From surface trenches and on the 1 920-metre level, it appears that the No. 1 vein branches off the No. 2 vein. Diamond drilling has shown that the vein system and mineralization continue below the 1 920-metre level; the system is considered open at depth.

Metallic minerals are sparse, seldom exceeding 0.5 per cent. Ore minerals are very fine-grained native gold and silver, electrum, acanthite, or argentite and freibergite. The gold to silver ratio is 0.17-0.27:1. Minor amounts of pyrite, pyrrhotite, chalcopyrite, sphalerite, and galena are present; marcasite, digenite, bornite, covellite, chalcocite, and arsenopyrite have also been identified.

Despite local assays of a few tens of grams of gold per tonne, visible gold is rare. A few colours and sulphide grains were panned from gouge taken from the No. 2 vein. Coupled with the sheeted vein structure, this suggests that movement on the shear zone occurred during as well as after mineralization.

Wallrock alteration typically occurs only within approximately 1 metre of the vein and takes the form of bleaching, silicification, and, locally, extensive argillic alteration.

Ore grades occur in the most silicified parts of the veins and generally form steeply plunging 'bonanza-type' shoots with a strike length seldom exceeding 30 metres; as defined by assay cutoffs, there is no obvious shape or pattern. Ore grades have been cut by approximately 30 per cent below raw average grades, using a running-average method to cut high gold assays. Proven and probable ore reserves are 185 000 tonnes grading 27.23 grams per tonne gold and 128.9 grams per tonne silver (undiluted).

MINING

The ground is poor in parts of the vein systems. Mining plans are for trackless, cut-and-fill mining, with a planned dilution of 21 per cent. If sufficient time can be allowed to drain the ore, it should be possible to keep dilution well below this figure in most parts of the veins seen to date. The ore is mostly free milling, with the remainder of the precious metals recoverable by flotation. A trommel and gravity circuit is planned to handle clay-bearing gouge in the ore.

CONCLUSION

Mineralization at the Blackdome mine is similar to many epithermal precious metal-quartz vein deposits of the 'bonanza' type occurring in the western United States and Mexico. Typically these deposits are tensional vein systems in felsic to intermediate calc-alkaline flows and pyroclastic rocks of Tertiary age.

ACKNOWLEDGMENTS

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REFERENCES

B.C. Ministry of Energy, Mines & Pet. Res., Assessment Reports Nos. 7 161 and 11 046.

Church, B. N. (1980): Exploration for Gold in the Black Dome Mountain Area, *B.C. Ministry of Energy, Mines & Pet. Res.*, Geological Fieldwork, 1979. Paper 1980-1, pp. 52-54.

——— (1982): The Black Dome Mountain Gold-Silver Prospect, *B.C. Ministry of Energy, Mines & Pet. Res.*, Geological Fieldwork, 1981. Paper 1982-1, pp. 106-108.

BRITISH COLUMBIA REGIONAL GEOCHEMICAL SURVEY (RGS) RELEASE PRELIMINARY RESULTS (93G/E1/2, 93H/W1/2, plus parts of 93H/E1/2)

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INTRODUCTION

Data from the joint Canada/British Columbia reconnaissance Regional Geochemical Survey completed in the summer of 1984 were released at 0830 hours PDT on 27th June 1985 in Prince George, Vancouver, and Victoria as province of British Columbia open file BC-RGS-12-1984 and Geological Survey of Canada Open File 1107.

The survey covers approximately 14 800 square kilometres with an average sample density of one sample per 13 square kilometres. Stream sediment samples were analysed for zinc, copper, lead, nickel, cobalt, silver, manganese, arsenic, molybdenum, iron, mercury, uranium, vanadium, cadmium, antimony, tungsten, barium, and loss-on-ignition. Stream waters were analysed for uranium, fluorine, and pH.

Each open file package contains a sample location map, British Columbia Ministry of Energy, Mines and Petroleum Resources Mineral Inventory Maps, 21 geochemical maps, and a text of field, analytical, and statistical data. Packages are available at a cost of *$50.00 each from: Publications Distribution, 552 Michigan Street*, Victoria, B.C. V8V 1X4.

Information in this year's release, which was not available in the 1984 release, includes analyses for vanadium, cadmium, barium, and loss-on-ignition, the Mineral Inventory maps, surficial geological information, and histograms and regional trend maps for each element.

RESULTS

Number of packages sold:

Prince George	17
Vancouver	20
Victoria	3
TOTAL	40

An additional 19 packages were sold after the release date for a total of 59 to October 8, 1985.

A count of mineral claims in good standing in the release area (excluding Crown-granted leases) was made before the field season, the day before the release, and after the field season. The results are as follows:

Date:	26 April 1985	26 June 1985	8 October 1985
Claim units:	5685	5853	6924
2-post claims:	326	346	432

There was only modest staking prior to the release (168 claim units and twenty 2 post claims) but a total of 1 071 claim units and eighty-six 2 post claims were staked on or after the release date.

Three areas accounted for much of the activity:

(1) 93G/7E and 93G/8 — this is a much faulted area of the Quesnel Trough southwest of Hixon with a number of coincident high contrast antimony, arsenic, and mercury anomalies.

(2) 93H/3W and 93H/12E — these two areas are both in the Bowron River valley on the faulted eastern edge of the Slide Mountain terrane. They show coincident high contrast barium anomalies and moderate contrast mercury anomalies with some spot high arsenic values.

COMMENTS

(1) The inclusion of histograms and regional trend maps in this release was particularly well received.

(2) The addition of barium to the list of elements analysed for led to significant staking in two areas.

(3) The turnout on the release date was below average but the activity generated was much higher than anticipated. This was especially so as the area includes a major urban centre, is almost entirely accessible by vehicle, and has been well prospected and heavily staked in the past.

(4) This release also generated interest that is not reflected in the preceding figures; there was a moderate amount of 'anticipation' or 'pre-emptive' staking in the area during the 1984 field season. One major company and two juniors indicated that announcement of the Regional Geochemical Survey was a factor in the staking and location of their 1984 field programs.

(5) Although it is too early to assess the results of this year's staking, one major company traced an anomalous area to mineralization in place.

British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork, 1985, Paper 1986-1.