Spark + Joy

GEOLOGICAL REPORT
DAVID MINERALS PROPERTY
MORRISON LAKE, B.C.

February, 1971. Gregg Jilson

93 m

A Geological Report on the David Minerals Property for Palisade Exploration Corporation Limited

covering Spark 1-72 and Joy 1-60 Claims

MORRISON LAKE, B.C.

Omineca Mining District

Survey conducted August 17th, 1970 - October 9th, 1970

by Gregg Jilson

C O N T E N T S

INTRODUCTION

A geological survey was carried out over the Spark and Joy claims at Morrison Lake, B.C. on behalf of Palisade Exploration Corporation, during the months of August, September and October 1970. The survey consisted of geologic mapping on air photographs of nominal scale 1" = 1,320' and compilation on a base map of scale 1' = 800' photographically enlarged from published topographic mapping (1:50,000).

LOCATION AND ACCESS

The David Minerals property is located along the northeast shore of Morrison Lake extending an average of two miles inland. Morrison Lake is approximately 50 miles northwest of Smithers in the Omineca Mining District.

Access is by float plane from McLure Lake near Telkwa or by helicopter from Smithers or Houston.

TOPOGRAPHY AND DRAINAGE

Relief in the map area amounts to 1,000 feet; most slopes are fairly gentle. Forest cover is extensive and outcrop is poor. The slopes are well drained, but the lowlands are commonly very swampy. The drainage within the area is complex, but eventually all drainage is into Morrison Lake.

CLAIMS

The claims are held by Palisade Exploration Corporation Limited and consist of 132 full-sized mineral claims.

Group Name	Claim Name	Record Number	Expiry Date
Spark	Spark 5-19 incl.	57749-57763 incl.	January 25, 1971
	Spark 21	57765	January 25, 1971
	Spark 37-46 incl.	59571-59580 incl.	May 31, 1971
	Spark 65-72 incl.	94045-94052 incl.	October 21, 1971
David #1	Spark 20	57764	January 25, 1971
	Spark 22-36 incl.	57766-57788 incl.	January 25, 1971
	Spark 47-56 incl.	59581-59590 incl.	May 31, 1971
	Spark 56-64 incl.	94037-94044 incl.	October 21, 1971
David #2	Joy 1	57685	January 25, 1971
	Joy 2	57744	January 25, 1971
	Joy 3-8 incl.	57686-57691 incl.	January 25, 1971
	Joy 17-24 incl.	57700-57707 incl.	January 25, 1971
	Joy 35-42 incl.	57718-57725 incl.	January 25, 1971
	Joy 51-58 incl.	57734-57741 incl.	January 25, 1971

Group Name	Claim Name	Record Number	Expiry Date
David #3	Joy 9-19 incl.	57692-57699 incl.	January 25, 1971
	Joy 25-34 incl.	57708-57717 incl.	January 25, 1971
	Joy 43-50 incl.	57726-57733 incl.	January 25, 1971
	Joy 59	57742	January 25, 1971
	Joy 60	57743	January 25, 1971
	Spark 1-4 incl.	57745-57748	January 25, 1971

G E O L O G Y

LITHOLOGY

Jurassic Rocks

Tuff

Poorly sorted angular fragments in a very fine-grained grey to buff matrix. Fragments consist of broken feldspars, rock, a few bits of charcoal and rare glass shards (?). Fossiliferous in some localities. Mostly massive with only very rare bedding. Does not outcrop well.

Mudstone

Grey to buff - very fine-grained - generally massive with rare, poorly defined bedding. Locally highly fossiliferous. Contains a few rounded to angular sand grains in some outcrops. Calcareous in part. Appears somewhat silicified in places (probably diagenetic). Carries traces of pyrite in southwestern part of the area; pyrite is confined to one wide horizon and is probably sedimentary.

Greywacke

Very poorly sorted with rounded to angular fragments in a very fine-grained grey matrix. Locally highly fossiliferous. Mostly massive with rare bedding. Interbedded with conglomerate of similar composition and mudstone similar to matrix material. Difficult to distinguish from tuffs; the distinction being made primarily on fossil content, rounding and abundance of clasts and lithologic associations.

Flows

Purple-green or brown weathering brownish-green. Intermediate to mafic in composition. Very fine grained, non-porphyritic. Irregular calcite-filled vesicles in some outcrops. Weathers readily and outcrops poorly.

Conglomerate

Rounded to sub-rounded pebbles in very fine grey matrix. Matrix may contain some sand sized grains. Fragments consist mainly of mudstone and volcanics, and range in size up to about 3/4 inch. Probably intra-

formational. Usually interbedded with finer clastic sediments. Breaks through pebbles. Contains a few fossils. Forms good outcrops.

Limestone

Grey to buff, weathering dark grey with a rough surface. Possible fossil fragments in a very finely crystalline matrix. Appears broken and re-cemented particularly near a hornblende diorite sill. The beds are lenticular and no thicker than 20 feet. Forms good outcrops and supports sparse vegetation.

Chert

A few thin beds of very fine-grained buff chert interbedded with cherty breccia.

Cretaceous-Tertiary (Sustut) Rocks

Arkose

Off-white to cream, "speckled", weathers grey. Medium-grained, moderately sorted. Grains are sub-rounded to rounded and consist mainly of feldspar with minor quartz and lithic fragments. In part with ferruginous cement, but mostly with silica cement. Generally massive with a few cross-bedded horizons. Cross-bedding suggests transport directions mainly from west when unit is restored to horizontal position (derived from coast batholith?). Only one poorly preserved fossil noted. Forms fair outcrops and leaves abundant rubble.

Conglomerate

Quartzose pebbles with minor metamorphic rocks in matrix similar to the arkose. There is a complete gradation between the two rock types with decrease in pebble content. Pebbles are well rounded and up to three inches in diameter. Crudely bedded with much cross-bedding. Some graded beds. As with arkose, the rock is not strongly lithified. Breaks around pebbles. Forms good outcrops.

Tuff

Porphyritic crystal tuff (welded tuff?). Euhedral biotite and feldspar with minor hornblende in buff to cream, very fine-grained siliceous matrix. Characterized by wavy flow(?) foliation forming lenticular layers about 1/4" thick. Crude alignment of crystals along foliation. Forms good outcrops.

Quartzite

Very fine-grained buff siliceous rock, slightly sucrose texture. May be a siliceous tuff.

Intrusive Rock

Hornblende Diorite

Medium-grained hornblende diorite - slight chloritization of mafics and epidote alteration of plagioclase - small amount disseminated magnetite and very rare pyrite. In sills up to about 400' thick. Forms good outcrops.

Alluvium

Glacial drift and some lacustrine deposits mainly in the northern part of the area. Small thin patches of glacial drift elsewhere. Several cobbles from the glacial drift contained copper mineralization in interesting concentration.

STRUCTURE

The structure of the map area is complex due to extensive folding and faulting. The faults cut all rock units, but the folding of regional extent seems to be restricted to the Jurassic rocks. For the purpose of discussing the structure, the area will be divided into three blocks; Eastern, Central and Western. The Western block lies to the west of the major north-northwest trending fault and consists mainly of Cretaceous-Tertiary rocks. The Eastern block lies to the east of a fault probably originally parallel or sub-parallel to the above fault, but now cut by several cross faults. The rocks in this block are of Jurassic age (mainly Unit #2). The Central block lies between the two faults and consists of both Jurassic and Cretaceous-Tertiary rocks.

The Western block is a broadly homoclinal sequence striking north-northwest and dipping 45-60^{o} to the east. Although there are several areas where the air photographs suggest a fold axis may be present, the ground geology is not consistent with this interpretation.

The rocks of the Eastern block are folded into open concentric folds with easterly trending and plunging axes. The folds have a wave length of about 6,000' and an amplitude on the order of 3,500'. At the north end of the block is a striking change in the texture and tone of the air photographs. The curving trend of the lineation parallels the bedding measured to the east suggesting that it may be an unconformity or a thrust parallel to the bedding of the rocks in the upper plate. The structure of the rocks to the west is not known, but there are several features on the photographs that suggest the structures are discordant on opposite sides of the lineation. This feature may be actually another cross fault discussed below, but its parallelism to bedding seems to strongly suggest it is indeed an unconformity. If this is true, then the deposition of the Jurassic rocks was interrupted by a period of uplift and erosion. If folding also occurred then the discordance in the axes of gentle folds between Units 1 and 2 may be due to this earlier deformation. Although the evidence is very poor, my feeling is that Units 1 and 2 are indeed unconformable, although mainly separated by later faults.

The structure of the Central block is far more complex than either of the other two blocks. Both tight and gentle folds are present. Four tight folds are mapped, two in the northern area and two in the southern area. There is good ground geologic control for the two northern ones, but the southern two are based mainly on evidence from the air photographs and weakly supported by the ground geology. Evidence for gentle folding is in the southern part of the area, but the axis of this fold is uncertain. The direction seems to be more southerly than easterly as in the Eastern block. The plunge is southerly. Part of the Central block is made up of rocks correlated with the Cretaceous-Tertiary unit and it is in these rocks that one of the tight folds is mapped. The spatial relationship of the folds to the faults, the fact that all the folds are only in the Central block and the fact that the Cretaceous-Tertiary rock in this block is tightly folded, but not folded in the Western block, all seem to suggest that the tight folds were caused by movement on the faults.

The whole area was probably tilted to the east before the north-northwest faults were formed since the Cretaceous-Tertiary rocks dip to the east about the same amount as the fold axes plunge to the east in the Eastern block.

The faults mapped are nowhere identifiable on the ground as shear zones, but are mapped on the basis of topographic lineaments and discordances in the ground geology. The dominant north-northwest fault is felt to be quite certain as there is such a striking change in the rock type coincident with a strong topographic lineation. This fault was also mapped by Carter and Kirkham (1969) and it is interesting to note that they extend it to the vicinity of the eastern edge of Noranda's potential orebody at the south end of Morrison Lake. It will be referred to as the main fault.

There is also a system of north to northwesterly trending faults east of the main fault. I feel that this was originally a fault sub-parallel to the main fault that has been offset by several cross faults. The cross faults do not offset the main fault and my feeling is that they are all related. The easterly of the north-northwest trending faults may have been an earlier fracture whose movement has since been taken up by the main fault which remained active till the end of faulting. The folding in the Central block would be caused when both were active. The cross faults are probably related to the main fault in some unknown way similar in principle to the feathering out of a strike slip fault into thrusts. Sub-parallel faults in the Western block are probably also related to the main fault.

In summary, the overall structural picture is dominated by a wide fault zone of long and complex history. The fault zone is the central block and separates two areas of relatively simple structure. Such a fault zone is an ideal area in which to find the highly shattered intrusive characteristic of porphyry copper deposits. Such an intrusive however must occur under overburden or barren cap rock.

MINERALIZATION AND ALTERATION

Pyrite was identified in six outcrops and chalcopyrite in one. All but two of the pyrite-bearing outcrops were of mudstone showing no alteration except a slight silicification typical of the Jurassic rocks. I doubt this silicification is hydrothermal in the usual sense of the word, but feel it is diagenetic or the result of incipient metamorphism. The pyrite-bearing rocks follow roughly one stratigraphic horizon and are dark grey. This pyrite is probably sedimentary with slight diagenetic or very low grade metamorphic remobilization. The remaining two outcrops are of conglomerate. The southern one is near the pyrite-bearing mudstones and is probably the result of remobilization. It shows no alteration.

The last of the pyrite-bearing outcrops is in a strongly silicified conglomerate of the Cretaceous-Tertiary sequence. The matrix is completely altered to a very fine-grained buff siliceous material from the usual arkosic matrix. The pyrite occurs in the matrix and selectively replacing layers in the metamorphic cobbles. The outcrop is near a small fault and shows some shearing. The pyrite and alteration are probably related to this fault. Although the outcrop was carefully studied, no copper mineralization was found.

The chalcopyrite-bearing outcrop was in conglomerate belonging to the Jurassic rocks. The rock showed no obvious alteration, but there may be some clay alteration as the rocks in this area seemed slightly softer and more readily weathered than elsewhere. The chalcopyrite was very sparse so that the rock would probably not assay appreciably higher in copper than other rocks in the area. No pyrite is present. This outcrop is also near an inferred fault and the mineralization may be related to it.

The surface geology does not point to a deposit of copper or molybdenum anywhere on the property, but of course, outcrop is so poor that the possibility cannot be completely ruled out. The alteration and mineralization along faults probably point to more extensive activity at depth possibly too great to be economical.

Respectfully Submitted,

February, 1971

126° 20'

SPARK GROUP

DAVID NO. 1 GROUP

DAVID NO. 3 GROUP

DAVID NO. 2 GROUP

SPARK

DAVID #1

DAVID #2

DAVID #3

MORRISON

LAKE

55° 15'

126° 20'

inches
centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

PALISADE EXPLORATION CORPORATION, LTD.

DAVID MINERALS PROJECT

CLAIM MAP

DESIGNED		SCALE HOR.	1" = 800'
DRAWN	C·L·C·	VERT.	
CHECKED		DWG. No.	
DATE	JAN. 1971		

considerable shale, some red in this stream suggests some complex structure at north end

126° 20'

55° 15'

MORRISON LAKE

Explanation

Lithology

- 5 — Glacial alluvium and minor lacustrine sediments
- 4a / 4 / 4b — Arkose, conglomerate, siliceous crystal tuff, quartzite? Predominantly arkose. 4a = conglomerate. 4b = siliceous tuff
- 3 — Hornblende diorite. Intrudes 1 and 2 as sills
- 2a / 2 — Mudstone, tuff, greywacke(?), limestone, conglomerate. Predominantly mudstone. May lie unconformably on 1. 2a = limestone
- 1a / 1 / 1b — Mudstone, tuff, greywacke(?), conglomerate, amygdaloidal mafic lava, limestone. Predominantly tuff & mudstone. Locally highly fossiliferous. 1a = limestone. 1b = lava

Symbols

bedding: inclined (60), vertical, tops known by graded bedding

joints & fracture: inclined (60), vertical

flow foliation in tuff or lava: inclined (60), vertical

contact; covered contact; fault; covered fault; outcrop boundry; X isolated outcrop

fold axis: synformal; antiformal

lineation from air photographs (mostly assumed to be bedding)

lineation showing assumed dip

Ⓕ fossil location

PY / CPY pyrite or chalcopyrite in outcrop (only trace amounts)

glacial striation

Abbreviations

ss =	sandstone
ps =	very poorly sorted
ark =	arkosic
mdstn =	mudstone
flt =	float
hbl and =	hornblende andesite
qtzite =	quartzite
cong =	conglomerate

inches 0 1 2 / 0 1 2 3 4 5 centimetres

This reference scale bar has been added to the original image. It will scale at the same ratio as the image, therefore it can be used as a reference for the original size.

PALISADE EXPLORATION CORPORATION, LTD.

DAVID MINERALS PROJECT

GEOLOGY

DESIGNED	SCALE HOR. 1" = 800'
DRAWN C·L·C·	VERT.
CHECKED	DWG. No.
DATE APRIL 1971	