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Columbia Gold Mines Ltd. Vancouver, B.C.

Exploration Proposal

for the

SPECTRUM PROJECT

Mt. Edziza Recreation Area Liard Mining Division, British Columbia

N.T.S.: 104G/9W,10E

15 June, 1994

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Vancouver, Canada

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SUMMARY

Columbia Gold Mines Ltd. holds an option to acquire the Spectrum gold property located in the Mount Edziza Recreation Area near Kinaskan Lake, northwestern British Columbia. The company retained Orcan Mineral Associates Ltd. to review the results of all exploration to date and to propose, if warranted, the next logical stage of exploration.

The property, which comprises 125 claim units, has been intermittently explored by several operators since 1957, but it was not recognized as having significant gold potential until about 1990 when Columbia discovered three important gold zones. Further work in 1991 and 1992 resulted in outlining approximately 500,000 tonnes of geological reserves grading 11.72 grams per tonne gold in two of the zones.

The Spectrum property lies within the Stikine Arch of British Columbia, a regional geologic terrane well known for its high mineral potential. The Spectrum mineral occurrences are hosted in Triassic Stuhini Group volcanic rocks intruded by Jurassic monzonite plugs and dykes. Mineralization consisting of free gold, chalcopyrite, pyrite and scheelite is structurally controlled and the two principal gold zones, called the QC and Porphyry, occur near and parallel to a steep dipping 800-metre long, 100-metre wide north-south body of monzonite. The gold veins which vary in width from one to 10 metres occur within a strongly silicified fracture zone adjacent to the monzonite body in potassically altered volcanics. In addition to the two principal gold zones, there are 10 other mineral occurrences on the property.

Based on the results of work to date and the favourable geologic setting, further exploration on the Spectrum property is clearly justified. The project has advanced to the reserves definition stage and additional surface drilling is required to fill in some gaps and to expand reserves. This would be followed by an underground exploration program contingent on encouraging results from the drilling program. ĥ

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The following work is recommended:

Phase I Surface diamond drilling; 4,440 metres in 20 holes

Phase II Underground work; about 820 metres of drifting on QC Vein and crosscuts through Porphyry Vein

NOTE: If Phase II work is warranted, it would include building an access road by extending the planned Willow Creek Forestry road approximately 16 kilometres north along the eastern boundary of Mount Edziza Provincial Park.

Estimated costs are:

Phase I	\$ 1,332,000
Phase II	<u>2,270,000</u>
TOTAL	\$ <u>3,602,000</u>

INTRODUCTION

In late May, 1994, Mr. John Brock, President of Columbia Gold Mines Ltd., commissioned Orcan Mineral Associates Ltd. to review the results of all previous exploration on the Spectrum gold property and, if justified, to lay out a work program for the 1994 season. The company provided Orcan with all relevant technical data which formed the basis of the authors' conclusions and recommendations incorporated herein. Also, Orcan personnel were already familiar with the property having previously conducted an economic appraisal and calculated geological reserves in 1991.

LOCATION AND ACCESS

The Spectrum property is located in northwestern B.C. approximately 25 kilometres west of Highway 37 at Kinaskan Lake on the east boundary of Mount Edziza Provincial Park (Figure 1). Although the mineral claims comprising the property are almost completely surrounded by the Park, the area occupied by the claims has been officially designated as the Mount Edziza Recreation Area in order to permit exploration and development.

Access to the claims is by air or by water across Nuttlude Lake. Air access can be achieved either by helicopter or by small fixed wing aircraft to a 550-metre airstrip located in the extreme northeast corner of the property or via float plane to the lake itself. Road access for development would probably follow the Willow Creek forestry access road which leaves Highway 37 just south of Kinaskan Lake and runs northerly along the east boundary of the Park to Mowdade Lake. Plans are to ultimately extend this road to the southeast corner of Kakiddi Lake which would bring it to within 10 kilometres of Nuttlude Lake but unless the Park boundary is slightly adjusted to accommodate a road corridor around the south end of the Nuttlude Lake, building a road to the Spectrum claims would require bridging or possibly filling a short portion of the extreme southern end of Nuttlude Lake (see Figure 9).





HISTORY

Exploration on the Spectrum property has been carried out intermittently for more than 35 years by various companies. The earliest recorded work was in 1957 by Torbit Silver Mines who conducted some surface exploration on the Hawk vein at the north end of the property. The property was restaked in 1967 by Shawinigan Mining and Smelting Company who drilled a few X-ray holes on the Hawk vein. In 1969, Spartan Explorations staked the Spectrum claims to cover a newly discovered porphyry copper occurrence southwest of Nuttlude Lake. The following year, Mitsui Mining and Smelting Company Ltd. conducted geochemical and geophysical surveys. In 1970, Imperial Oil Limited optioned the property and conducted additional geophysical, geochemical and geological work and 463 metres of diamond drilling in four holes in 1973. The Red Dog claims were staked in 1975 by the Racicot Syndicate who optioned them to Canex Placer. Canex dropped the option and in 1977, the Northair Group optioned the property, added the Pink and Red claims in 1978, and carried out additional geological and geochemical surveys, Northair staked the Camp claim in 1979, built a 4x4 road, prospected and completed 3,232 metres of drilling in 28 holes. The company also completed 313 metres of underground development and nine underground drill holes on the Hawk vein. In 1984, Cominco Ltd. optioned the property and carried out soil sampling and geophysics, followed in 1988-89 by 1,199 metres of drilling in 10 holes. The last company to work on the property before the present operator was Moongold Resources who conducted a small program of geochemical sampling and ground geophysics in 1987-89.

RECENT WORK

Columbia Gold Mines Ltd. optioned the property from the Northair Group of companies in 1990 and in the same year conducted a program of trenching and drilled 2,363 metres in 20 holes. This program resulted in the discovery of the principal gold zones on the property. In 1991, in a joint venture with Eurus Resource Corp., Columbia conducted a 3,992-metre drilling program to define reserves on the QC and Porphyry zones and to explore some of the other peripheral gold zones on the property. Near the end of the 1991 drilling program, Orcan Mineral Associates Ltd. was retained to calculate geological reserves and Columbia subsequently calculated reserves after completing the 1991 program. In 1992, Eurus withdrew and Columbia drilled 710 metres in six holes to test one of the principal zones (500 Colour) and a newly discovered peripheral zone (East Creek). A small prospecting program was also conducted in 1992 to check for possible northerly strike extensions of the main gold zones.

Cumulative drilling on the Spectrum property to the end of 1992 is 11,960 metres in 92 holes. There has been no work done on the property since 1992.

GEOLOGICAL SETTING

REGIONAL GEOLOGY

The Spectrum property lies in what is locally known as the North Iskut Gold Camp within the Stikine Arch of northwestern British Columbia. The dominant geologic feature in this region is the Mount Edziza Volcanic Complex, a major Cenozoic volcano which is located a few kilometres northwest of the claims. Edziza volcanic flows comprising basalt, dacite and rhyolite surround Edziza Peak and tongues of these flows occupy the west-central and southern parts of the Spectrum property (Figure 3).

The volcanics sit on a basement of Paleozoic and Mesozoic volcanic, sedimentary and plutonic rocks known as the Stikine Terrane. This belt of rocks is bounded on the west by the Coast Plutonic Complex and on the east by Jurassic sediments of Bowser Basin. In the vicinity of the claims, Stikine Terrane rocks are primarily andesite, siltstone, chert and limestone of the Upper Triassic Stuhini Group.

Intrusive rocks in the region include granodiorite, monzonite and diorite bodies of Jurassic-Cretaceous age that range from large plutons to small dykes. These intrusions are widespread and many important mineral deposits are associated with them.

Structural features are not prominent but major faults on a regional scale generally trend east-west or northeasterly, however, strong north-south regional faults mark the valleys of some major creeks in the area.

There are numerous mineral deposits in the Stikine Terrane covering a wide range of deposit types. There are skarn deposits, porphyry copper, vein, exhalative and volcanogenic massive sulphide deposits, and all are genetically related to Mesozoic intrusions.



The Spectrum deposit which contains gold in silicified fracture zones as well as coppergold porphyry mineralization occurs adjacent to a prominent monzonite dyke. It has some features of a high-level gold vein deposit similar to the well known Eskay deposit 45 kilometres to the south.

PROPERTY GEOLOGY AND MINERALIZATION

The geology of the Spectrum property is simple with only three rock types present: Triassic Stuhini Group volcanics and sediments, a north-south dyke of Jurassic monzonite, and the Pleistocene Edziza volcanic flows (Figure 4). The central part of the property is marked by a conspicuous colour anomaly approximately two kilometres by four kilometres in area which is partially covered on the east and west by Edziza flows. The anomaly is due to strong alteration and pyritization of the Stuhini volcanic rocks which was no doubt caused by the intrusion of the north-south elongate monzonite dyke. Potassic alteration is present around the core of the intrusion while an irregular propylitic alteration zone occurs peripheral to the potassic zone.

The monzonite dyke is irregular in shape and has been mapped up to 100 metres wide along a strike length of 1,500 metres. The rock is pink to grey in colour, porphyritic in texture, and has a steep westerly dip and a concave eastern contact. It carries erratic gold and copper mineralization in zones of weakness; swarms of subsidiary dykes occur on the flanks of the main dyke.

The altered felsic volcanics of the Stuhini Group exhibit distinct weathering patterns with the central potassic zone, which is about one square kilometre in area, weathering to a bright yellow-orange colour while the outside propylitic zone is usually a dark orange-red.

There are 12 known mineral occurrences on the Spectrum property (Figure 4). Three styles of mineralization have been recognized:



- 3. 500 Colour Zone A northwesterly striking branch of the QC-Porphyry zones related to a dyke swarm near the west contact of the main monzonite dyke. Drilled along 250-metre strike length with narrow and erratic gold intercepts down to 150 metres below surface.
- 4. 33 Zone Appears to be an easterly trending splay off the main dyke, this zone which lies about 150 metres south of the southern terminus of the QC zone was intersected in one drill hole (11 grams per tonne gold over 8.8 metres) and returned a gold value of 9.25 grams per tonne across 6.3 metres in a surface sample.
- 5. 300 Colour Zone Not much is known about this satellite showing located 450 metres due west of the QC-Porphyry zone. Appears to be related to a dyke swarm and one drill hole returned two intercepts: 5.59 grams per tonne gold over 2.1 metres and 29.45 grams per tonne gold over 0.4 metres.
- 6. Boundary Zone Another satellite zone lying 300 metres due east of north end of the QC zone; anomalous gold geochem values in propylitically altered volcanics - no significant drill intercepts to date.
- 7. 4440 Zone Probably a northwesterly extension 300 metres along strike of the Boundary zone. No drill holes to date.
- 8. Skarn Showing Located 400 metres southwest of the 33 Zone along a southwest-trending splay of monzonite dyke material, this showing returned 2.9 grams per tonne gold and 0.50% copper across 20 metres in a surface sample. No drilling to date.

- West Creek Showing Located in the southwest corner of the property, anomalous gold and copper in soils. Trench and grab samples returned values of up to 35 grams per tonne gold and 8.30% copper.
- 10.G.R. Showing500 metres east of West Creek, a geochem target with
anomalous gold and copper in soils.
- 11. East Creek Zone Located at the north end of the property, this northerly trending 5-metre wide silicified shear zone within propylitically altered volcanics has been traced along a 600-metre strike length and remains open. High grade gold values associated with pyrite, arsenopyrite, chalcopyrite, and sphalerite have been found in surface trenches (58.46 grams per tonne gold across 2.6 metres) and in one drill hole (34.45 grams per tonne gold across 2.5 metres).
- 12. Hawk Vein Located in the extreme northwestern corner of the property, this vein was one of the original discoveries which was explored extensively in the 1967-80 period. It has been traced along a 200-metre strike length underground. The best gold values occur across narrow widths averaging 0.3 metres.

The presence of at least a dozen mineral occurrences on a relatively small property such as Spectrum emphasizes the mineral potential of this part of the Stikine Arch. No doubt other deposits remain to be discovered with gold as the main commodity of interest.





CHONG

	L E G E N D 3 Cretaceous - Monzonite Intrusive				
	2 Triassic - Stuhini Volcanics				
	Gold zone				
	7.36/2.5 g/t Au / interval in metres				
	Contraction OFESSION				
	D. D. D. DUDINSKI				
	0 10 20 40 METRES				
	ORCAN MINERAL ASSOCIATES LTD. CONSULTANTS				
	COLOMBIA GOLD MINES LID.				
	SPECIRUM PROPERTY (N.I.S. 1046-9,10)				
TYPICAL CROSS SECTION (9805N)					
	LIARD M.D., B.C.				
	SCALE 1:1000 JUNE 1994 FIG. 6				

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parameters, which included a five grams per tonne cutoff grade, were the same for both calculations. The comparative reserve figures are:

Orcan215,000 tonnes of 10.51 grams per tonne goldColumbia355,200 tonnes of 13.00 grams per tonne gold

Exploration Potential

Since the QC is the largest of the two potentially economic gold zones on the property, it is likely that it may also offer the best potential to increase total reserves to some predetermined threshold. Additional surface drilling is required to fill in some gaps and to expand reserves at depth. The zone appears to die at the south end, however it may have a southerly rake. It is apparently faulted off at the north end making strike extensions to the north doubtful. A 19-hole program of surface diamond drilling to explore the zone down to roughly the 1,300 metre elevation has been laid out as shown on Figures 5 and 7.

Conclusions

If the recommended deep drilling campaign is successful in establishing vein continuity and confirming zone geometry at depth, the reserves of the QC zone could be substantially increased.

PORPHYRY ZONE

The Porphyry zone, which lies adjacent to the monzonite dyke just a few metres west of and parallel to the QC zone, is virtually identical to the QC. It consists of two separate parallel gold-bearing veins that are one to ten metres wide enclosed within the 50 to 70-metre wide silicified fracture zone. Mineralization is structurally controlled and erratic and, as the QC, the zone has been drilled along a 500-metre strike length down to a vertical depth of about 200 metres. Gold occurs predominantly as free gold and copper mineralization is present in the form of disseminated and fracture-controlled chalcopyrite near and within the monzonite dyke. Copper values decline rapidly in the altered volcanics away from the monzonite contact and there are no significant copper values in the QC zone. Both the QC and Porphyry zones are surrounded by low grade gold values in broad zones of silicification.

Reserves

Geological reserves (1991) for the Porphyry zone are as follows:Orcan133,300 tonnes of 10.51 grams per tonne goldColumbia214,400 tonnes of 9.60 grams per tonne gold

Exploration Potential

Due to the proximity of the gold veins in the Porphyry zone to the veins in the QC zone, the proposed deep drilling program to test the QC zone at depth will also test the down-dip and possible down-plunge potential of the Porphyry zone. All holes with two exceptions have been designed to penetrate both zones (Figures 5 and 8).

Conclusions

The same conclusions apply for both the QC and Porphyry zones since the primary objective of the proposed drilling program is to increase reserves and confirm deposit geometry and continuity at depth.



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EXPLORATION PROPOSAL

A two-phase exploration program is proposed: surface and underground. The Phase II underground program would be contingent on encouraging results in Phase I.

PHASE I - SURFACE EXPLORATION

The next logical exploration stage on the Spectrum property is to continue helicoptersupported surface diamond drilling to delineate current reserves more precisely and to identify additional reserves at depth. Based on almost 12,000 metres of drilling in 92 holes and with geological reserves of about 500,000 tonnes grading 11.72 grams per tonne gold, only the QC and Porphyry gold zones appear at the present time to have mine-making potential and are therefore the highest priority targets. A proposed 20-hole drilling program has been designed to explore these two zones in more detail; however, one hole will test the south end of the 500 Colour zone because there is a possibility that it may be joined to the Porphyry zone. All proposed drill holes are shown in plan on Figure 5 and on longitudinal sections (Figures 7 and 8). For illustrative purposes, a typical cross section has been included as Figure 6. Particulars of the proposed drilling program are as follows.

Hole No.	Section	Easting	<u>Angle</u>	<u>Azimuth</u>	Depth (m)	Zone
94 - 1	9488N	9,920	45	270	170	OC-Porphyry
- 2	9512N	9,925	45	270	220	OC-Porphyry
- 3	9530N	9,946	45	270	150	ÔC
- 4	9540N	9,710	65	90	100	500 Colour
- 5	9575N	9,940	45	270	220	QC-Porphyry
- 6	9615N	9,966	45	270	200	OC-Porphyry
- 7	9640N	9,950	45	270	220	OC-Porphyry
- 8	9740N	9,998	45	270	200	OC-Porphyry
- 9	9770N	10,034	45	270	300	OC-Porphyry
- 10	9805N	9,800	65	90	270	OC-Porphyry
- 11	9845N	10,000	45	270	220	OC-Porphyry
- 12	9863N	10,060	45	270	300	QC-Porphyry

<u>Hole No.</u>	Section	Easting	Angle	<u>Azimuth</u>	Depth (m)	Zone
94 - 13	9900N	10,034	45	270	300	QC-Porphyry
- 14	9900N	9,750	60	90	270	QC-Porphyry
- 15	9920N	9,990	50	270	250	OC-Porphyry
- 16	9950N	9,940	45	270	150	OC-Porphyry
- 17	9966N	10,041	45	270	270	OC-Porphyry
- 18	9993N	10.050	45	270	260	OC-Porphyry
- 19	10.034N	10.053	-45	270	270	OC-Porphyry
- 20	10,114N	9,880	-70	90	<u> 120 </u>	QC
			Total:	20 holes	4,440	

(cont'd)

PHASE II - UNDERGROUND EXPLORATION

After the completion of surface diamond drilling on the QC-Porphyry gold zones, it will be necessary to conduct a new ore reserve calculation. If results indicate that tonnage and grade are potentially economic, or nearly so, the next exploration stage would consist of the following steps:

- (a) Access road construction extend Willow Creek Forestry road from south end of Kakiddi Lake approximately 16 kilometres (see Figure 9). Bridging the south end of Nuttlude Lake may be required unless the Park boundary is adjusted.
- (b) Underground drifting and bulk sampling on QC vein at 1,400 metre elevation with cross-cuts through the Porphyry zone (see Figure 5)
- (c) Underground drilling close-spaced as required
- (d) Metallurgical testing on bulk samples



ESTIMATED COSTS

Phase I - Surface Drilling

Estimated Phase I Cost - 4,440 metres @ \$300	/metre	\$ 1,332,000
- Estimated 1994 cost (including mob and demob)	\$ 300/metre	
- Weighted average of the above	\$ 260/metre	
- Actual costs of 710-metre program in 1992 were	\$ 393/metre	
- Estimated 1992 drilling costs for 4,600-metre program	\$ 240/metre	

Phase II - Underground Exploration

- Access road construction - 16 kilometres @ \$65,000/kilometre	\$ 1,000,000
- Drifting and cross-cutting - 820 metres @ \$1,000/metre	820,000
- Bulk sampling and assaying	10,000
- Underground drilling - 3,000 metres @ \$140/metre	420,000
- Metallurgical testing - estimate	20,000
Total Phase II	\$ 2,270,000

ESTIMATED TOTAL COSTS - PHASES I AND II \$3,602,000

Respectfully submitted,

ORCAN MINERAL ASSOCIATES LTD.

D. B uano. R. BUDINSKI BRITISH 6/7/94 SCIENT, Essignavid R. Budinski, P.Geo. OF R. S. ADAMSON

Robert S. Adamson, P.Eng.

- Columbia Gold Mines Ltd. (1991); Geological Reserve Calculations for Spectrum Property, Internal Report.
- Hylands, J.J. (1991); Summary Report on the 1990 Exploration Program, Spectrum Property for Columbia Gold Mines Ltd.
- Kilby, D.B., Casselman, S. and Roberts, W.J. (1991); Report on the 1991 Exploration Program, Spectrum Project, Columbia-Eurus Joint Venture.
- Norman, G. (1992); Report on the 1992 Exploration Program on the Spectrum Project for Columbia Gold Mines Ltd.
- Orcan Mineral Associates Ltd. (1991); Economic Appraisal of the Spectrum Gold Deposit for Columbia Gold Mines Ltd.
- Orcan Mineral Associates Ltd. (1991); Geological Reserves for the Spectrum Gold Deposit for Eurus Resource Corporation.
- Wojdak, Paul (1993); Evaluation of Mineral Potential for Mount Edziza Recreation Area, Report to Prince Rupert Interagency Management Committee.

I, David R. Budinski, of 219 Sandringham Crescent, North Vancouver, Canada, do hereby certify that:

- 1. I am a graduate of the University of Alberta (B.Sc. in Geology, 1955).
- 2. I am registered as a Professional Geoscientist in the Province of British Columbia and a Fellow of the Geological Association of Canada.
- 3. From 1955 until 1989, I was engaged in mining and mineral exploration in Canada for a number of companies; positions included Mine Geologist, Chief Geologist and Exploration Manager. Since 1989, I have been practising as a consulting geologist in minerals exploration, property development and deposit evaluation.
- 4. I have not examined the properties reported upon herein.
- 5. I have not received, nor do I expect to receive, any interest, directly or indirectly, in the properties or securities of Columbia Gold Mines Ltd. or any associate or affiliate of Columbia Gold Mines Ltd.
- 6. I do not have a direct or indirect interest in, nor do I beneficially own, directly or indirectly, any securities of Columbia Gold Mines Ltd. or any associate or affiliate of Columbia Gold Mines Ltd.
- 7. This report may be used for general information purposes only. Quotations, excerpts, or references from it must be made and used in such manner that their meaning and intent are not materially changed from the meaning and intent as contained in the report. For other uses such as financings, regulatory requirements, share exchanges, and so forth, permission must first be obtained in writing from Orcan Mineral Associates Ltd. and from the writer.

Respectfully submitted, PROVINCE R. BUDINSKI D. 6/1/94 TISH David R. Budinski, B.Sc., P.C.

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