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Specogna - Cons
Cinola 103F/9E

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

TO / A: Dr. W.R. Smyth , Chief Geologist
Geological Survey Branch
Ministry of Energy, Mines and Petroleum Resources, 756 Fort Street
Victoria, B.C. V8V 1X4

FROM / DE: Dr. K.M. Dawson on behalf of
Dr. A.B. Christie

SECURITY - CLASSIFICATION - DE SÉCURITÉ:

OUR FILE – N / RÉFÉRENCE:

YOUR FILE – V / RÉFÉRENCE:

DATE: 16 November, 1987

SUBJECT / OBJET: Application for British Columbia Geoscience Research Grant;
April 1, 1988-March 31, 1989

Title of Proposed Research Project:

"The hydrothermal system at the Graham Island (Cinola) gold-silver deposit: a possible geothermal explosion breccia".

This proposed research project replaces a 31 March, 1987 proposal entitled, "Comparative studies of alteration and vein mineralogy and geochemistry _____ at Lawyers _____ and Cinola __."

1. Definition of Problem

Gold and silver values in the large, low grade Graham Island (Cinola) deposit occur with finely disseminated sulphides both in a hydrothermally brecciated rhyolite porphyry dyke and also in the fractured, silicified and argillized Miocene clastic host rocks. Mineralization and alteration are restricted to the hanging wall of a normal fault which, as an extension of the Sandspit Fault, is interpreted by Tolbert et al. (1987) to be a reactivated synsedimentary structure. A sequence of coarse to fine clastic rocks was deposited as an alluvial fan adjacent to a fault scarp. Tolbert et al. have identified several features indicative of high level, energetic mineralization that include: hydrothermally brecciated dyke and hanging wall; hydrofractured stockwork in hanging wall; intensely silicified dyke and clastic host rock with argillic alteration developed peripherally in the latter; abundant chalcedony; possible siliceous sinter and alunite.

The deposit has been assigned a depth of formation of 1.1 to 1.8 km on the basis of limited fluid inclusion and stratigraphic data by Shen et al. (1981). Existing fluid inclusion data should be verified and a more thorough study undertaken with better equipment. All stages of quartz associated with mineralization should be studied systematically to determine filling

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temperatures, CO_2 and NaCl content and fluid/gas ratio. Evidence of boiling should be carefully sought. Sedimentological studies of surface, underground and drill core material should ascertain the depositional environment of the clastic hostrocks and permit estimation of depth of cover at the time of emplacement. Alteration and ore mineralogy should be determined by microprobe, and mineral distribution defined. Rock geochemical analysis of drill core should characterize deposit zonation. Textures indicative of shallow level mineralization, boiling, explosive hydrothermal brecciation and other hotspring characteristics should be sought. Stable (oxygen and hydrogen) isotope analyses would confirm depth of formation and determine the proportion of magmatic water vs. groundwater in the ore fluid. Hydrothermal sericite should be dated by K/Ar and compared to existing 14 Ma K/Ar age of the rhyolite dyke determined by Champigny and Sinclair (1980).

2. Methodology of Study

The deposit will be visited and studied during the 1988 field season, in the company of City Resources geologists. Field work should occupy about three weeks. Local surface and underground exposures will be mapped, drill core logged and samples taken for the specific studies outlined above. Analytical work will be done at UBC, BCGS, GSC Ottawa and local analytical labs in late 1988 and early 1989.

3. Qualifications of Researcher

See enclosed Resume and Publications. Anthony B. Christie is a minerals geologist with the New Zealand Geological Survey with extensive research experience in the geology and geochemistry of epithermal precious metal deposits and mineralization in active geothermal fields. Christie will be resident at the GSC Vancouver offices from April 1, 1988 to March 31, 1989 on a scientific exchange with K.M. Dawson.

4. Technical Resources

Christie will hold the position of Visiting Scientist at UBC and will have access to all required analytical equipment, under the supervision of A.J. Sinclair and C.I. Godwin. Thin and polished sections will be prepared at UBC, mineralogical identification will be carried out with the UBC microprobe and K/Ar analyses will be done in R. Armstrong's UBC lab. As an Exchange Scientist with the GSC, Christie will have access to all GSC facilities. Argon and hydrogen isotopic analyses will be done at Bruce Taylor's lab in Ottawa. Geochemical analyses will be done at GSC Ottawa labs if time permits, if not, they will be contracted out.

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5. Financial Resources Required

Field travel: Van-Cinola-Van, 3 weeks accomo. meals	$1700
Field supplies, fuel	500
Vehicle rental	750
Analytical expenses: UBC, contract	1600
Travel - Ottawa, 1 week, accomo, meals	1200
Travel - Victoria, 1 week, accomo, meals	600
Total	$6350

6. Reporting Format

A manuscript will be submitted in format suitable for publication in either 'Fieldwork' or 'Current Research', on or before March 31, 1989.

7. Related Research

Christie plans to undertake a comparative study of the Blackdome and Poison Mountain deposits under an EMR Research Grant, and to make short visits to epithermal deposits in both the Toodoggone and Mount Skukum districts. A basis for comparison of Cinola with other Cordilleran epithermal deposits will be established.

Dr. C.W. Jefferson, GSC Mineral Resources Division Ottawa, will start a resource evaluation of South Moresby Island Marine Park in 1988. Scientific and logistical support may be provided.

Scientific staff of the GSC Cordilleran and Pacific Margin Division will be carrying out the second season of field work in the Queen Charlotte Islands in 1988 under the Frontier Geoscience Program. Scientific support may be provided in the fields of sedimentology (R. Higgs), igneous petrology (R.G. Anderson), structure (R.I. Thompson) and volcanology (C. Hickson).

8. Supporting Individuals and Organizations

A) BCMEMPR Geological Survey Branch: Dr. Andre Panteleyev, Tom Schroeter, Dave Lefebure.

B) UBC Dept. of Geological Sciences: Profs. Al Sinclair and Colin Godwin.

C) GSC Mineral Resources Division, Ottawa: Drs. Bruce Taylor, Charlie Jefferson, Francois Robert.

D) GSC Cordilleran and Pacific Margin Division: Drs. Dirk Tempelman-Kluit, Bob Anderson, Cathy Hickson, Bob Thompson, Roger Higgs.

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9. Relevance of Research

A better understanding of the genesis of the economically significant Graham Island deposit would assist the mineral exploration community. The timing of the proposed study is appropriate in that it coincides with the development of the deposit for production, related geological studies by City Resources Canada staff, and regional studies by the GSC. Deposit models proposed by Tolbert et al. suggest genetic similarities with the McLaughlin, California deposit and the Waiotapu, New Zealand geothermal system. Christie's expertise in the latter will be brought to bear on genetic studies of Graham Island.

10. References Cited

Champigny, N. and Sinclair, A.J.
1980: Progress report on the geology of the Specogna (Babe) gold deposit, 103F/9E; in Geological Fieldwork 1979, B.C. Ministry of Energy, Mines and Petroleum Resources, Paper 1980-1, p. 158-170.

Shen Kun, Champigny, N., and Sinclair, A.J.
1981: Genetic implications of fluid inclusion studies, Cinola gold deposit, Queen Charlotte Islands, B.C.; in Geological Fieldwork 1980, B.C. Ministry of Energy, Mines and Petroleum Resources, Paper 1981-1, p. 197-200.

Tolbert, R.S., Baldys, C., Froc, N.V., and Watkins, T.A.
1987: The Graham Island (Cinola) deposit revisited - evidence for an epithermal hot-spring type gold deposit; CIM District 6 Meeting, Vancouver, Program and Abstracts, CIM Bulletin, v. 80, n. 904, August 1987, p. 30.

Kenneth M. Dawson

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cc: A.B. Christie
R.S. Tolbert