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by D. Bridge  
M.Sc. Thesis notes,  
Kerr Property  
104B/8

Feb 28, 1991

Memo to : J. Macdonald, MDRU  
C. Godwin, UBC  
A. Sinclair, UBC  
J. Kowalchuk, Placer Dome Inc.  
R. Kirkham, Geological Survey of Canada

From : D. Bridge

R.E. Revised thesis proposal for MASc thesis at The University of British Columbia.

The main focus of this thesis is to understand the geochemical processes that formed the alteration mineral assemblages and mineralization on the Kerr deposit in northwestern British Columbia. Preliminary geological mapping across the deposit and core logging of drill holes during Aug. to Sept. 1990 indicated that there were several mineralization events. These mineralization events will be studied by analyzing drill core from sections 9700N and 10600N. The alteration, mineralization and structural geology will be plotted on cross sections. Surficial geology 100m either side of the cross section will be mapped and correlated to the subsurface geology. The size of surface mapping area will be expanded depending upon the complexity of alteration and subsurface structural geology. Drill holes off the cross sections will be analyzed as necessary.

The following analytical methods will be used to describe the geology and alteration of the Kerr deposit. Specifically:

- (1) All units will be described in detail. Emphasis will be placed on marker beds.
- (2) Detailed petrographic analysis of polished thin sections of the different alteration assemblages, mineralization and relatively unaltered rock units.
- (3) X-ray diffraction (XRD) of clay minerals and very fine grained silicates will supplement the petrographic descriptions.
- (4) All of the samples analyzed by XRD will be photographed. These photos and respective sample descriptions will be used to make an atlas of all of the alteration mineral assemblages so that it can be used in the field during core logging of new and old drill holes. Reproduction of the photos will be monitored with a Kodak grey scale in each of the photos.

- (5) Sulphides, oxides and phyllosilicates in the various alteration and mineralization assemblages will be analyzed with either the scanning electron microprobe or electron microprobe to determine their composition. This data will provide important information for the PATH program that requires accurate chemical data of alteration mineral phases.
- (6) Major and trace elements in each of the alteration mineral assemblages and major altered/unaltered rock units will be determined. These analyses will be used to determine the relative changes in composition of the rock units.
- (7) Analysis of the mineralization fluids and events will use the PATH program developed by T. Brown at the University of British Columbia. All of the analytical data on selected samples from the drill core and geological mapping of the subsurface/surface will be used to determine the spatial and temporal extent of the mineralization events.

The following analytical methods will be used depending upon the time, accessibility and budget:

- (1) The data from fluid inclusion studies would improve the reliability of the fluid compositions calculated by the PATH program. However, the extensive deformation of the deposit might have affected all of the potential hosts for quality fluid inclusions so that their fluid chemistry would represent recrystallization and deformation events instead of the original mineralizing fluids.
- (2) The use of various radiometric dating methods would provide evidence on the timing of the various intrusive, deformation and mineralization events.
  - Whole rock K - Ar will be used to date the undeformed and unaltered intrusive dykes.
  - $Ar^{39}$  -  $Ar^{40}$  might be used to date the sericite alteration. Two foliation directions crosscut the deposit through the phyllic alteration zone. Use of this dating method is essential in determining an accurate age of the two foliations; however, the laboratories set up for  $Ar^{39}$  -  $Ar^{40}$  dating are at Queens University and The University of Toronto in Ontario.
  - U - Pb dating of zircons in the various intrusive dykes would provide precise radiometric dates for the intensely to weakly altered intrusions.
- (3) The following radiometric isotope analyses would provide evidence for the origin of the mineralization and fluids:
  - (i) analysis of S and O isotopes in sulphides, sulphates and carbonates will provide information on the hydrothermal history of the deposit. Core samples of sulphate - sulphide - oxide mineral assemblages could be used to determine the behaviour of S and O isotope partitioning between the various mineral phases

- (ii) analysis of Pb isotopes in galena from the various mineral assemblages could be used to determine the origin of the Pb. Analysis of Pb in K-feldspars in the various members of the Premier Porphyry and K-feldspar xenocrysts in the latest intrusive dykes might provide some constraints on the origin of the Pb.

Respectively Submitted

*David Bridge*

David J. Bridge BAsC

- cc. E. Kimura, Placer Dome Inc.  
G. Scheuchenko, Placer Dome Inc.  
R. Pease, Placer Dome Inc.

David Bridge

Jan. 31/91

Plans for thesis  
Fieldwork

Sections 106, ~~100~~, 97 detailed studies  
+ 100m on either side of section  
plus detailed look at all drill cores  
+ all holes within 25m

9700 A Zone plus thrust under B  
B Zone  
plus one hole in FW

10600 - many holes in <sup>depos</sup> ~~sed.~~ plus underlying  
Premier <sup>sed.</sup> sill along FW of min but to S  
cuts min

Far W fault - arc thrust to E

+ calcite - extensional qtz & py veins  
anhydrite stockwork <sup>posit tectonic</sup>  $\perp$  to 2 fabrics EW  
weathered out to produce rubble & younger NW fabric  
Analytical Work

- examine alteration assemblages across  
sections X-ray diff. analysis

ser.  
chl. ser-chl. argillic

layered qtz - separate alt of regional metamorphism  
- vein stages VMS Nancy zone - syngenetic broad dissemination  
1) massive qtz veins + Cu-Ag (crustal veins) - widespread alteration  
2) " sulphide veins (intill massive qtz) Ag - occur in veins out  
3) Age? minor A-Zone qtz ep-py-th-slt Ag - occur in veins out  
4) anhydrite - gypsum - clay stockwork top-mo (calcite perched)  
5) supergene enriched of dissolved (4)

Tom Brown - thermodynamic analysis of  
all minerals to predict  
chemical nature of ore fluids

- emphasize structural & alteration study - one more  
seasons & winter

- 93 dx of rubble zone best grade  
PT's "potential mineralized zone" = + (0.1% Cu)  
- 2000 for zircon date next year

Rob Pease - dissolution of anhydrite is  
not the source of the rubble zone

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Dr. R. V. Kirkham  
Geological Survey of Canada  
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September 29, 1986

Dear Rod,

Thank you for sending me a copy of your M.Sc. thesis. It will provide me with good area background information when I get around to writing the Kerr Report. I have enclosed a copy of the sampling grid as requested. If you require any other information, please feel free to ask.

I will look forward to the results of the research you and your colleagues are undertaking. As I mentioned earlier, I am interested in the relationships between metal concentrations in talus versus their concentrations in their host rocks in zones of mineralization. If possible, during your program, you might consider a test study of some sort over an area of known surface mineralization. This could prove useful, particularly at the property exploration stage, in the evaluation of talus geochemical anomalies. I am sure that such relationships may vary from area to area and from rock type to rock type. However, considering the mineral potential in the Sulphurets area, perhaps this is a good place to start. I would be interested in any comments or advice you may have, or any references you might suggest.

I am presently involved with a great deal of drill core and drift development on the McDame asbestos deposit in Cassiar. The ore body is just south of the Cassiar open pit and is being drilled off in preparation for a feasibility study. I am finding this an interesting change from andesites, diorites and sericite schists.

Rod, I am pleased that you were able to visit us on the Kerr this summer before we were driven out by the snow. Perhaps we will have the opportunity to discuss the area in more detail and hopefully, in better weather.

Best Regards,

*Rich*

R. E. Meyers

Encl.