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Atlas Explorations Ltd.
Report on
TINTINA EXPLORATION PROJECT
Yukon and Alaska
April 1, 1969
Dolmage-Campbell & Associates Ltd. Consultants
Vancouver, Canada.

DOLMAGE, CAMPBELL & ASSOCIATES

CONSULTING GEOLOGICAL & MINING ENGINEERS

608 BANK OF CANADA BUILDING

VANCOUVER 1, B.C.

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**D.D. Campbell
C.R. Saunders**

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Vancouver, Canada.

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following certificate

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- 1 -

INTRODUCTION

The purpose of this report is to give the geological background for a major exploration programme along the Tintina Trench area of the Yukon Territory and Alaska and to outline such a programme. The writer has based his report on government and private reports and, to a considerable degree on his own general knowledge of the area and of northern exploration techniques and problems.

Atlas Explorations Ltd., the company proposing this programme, does not own properties in the selected area at this time but of course anticipates that staking of claims will probably be warranted by the end of the first season's exploration.

- 2 -

SUMMARY AND RECOMMENDATIONS

Atlas Explorations Ltd. proposes to conduct a comprehensive, long term exploration programme of a large area of the Yukon and eastern Alaska. This area is a belt on either side of the Tintina Trench that extends northwesterly through the central Yukon from British Columbia and into Alaska.

The geology of this Tintina belt is a complex pattern of areas of Pre-cambrian and Paleozoic-Mesozoic formations all of which have been locally intruded by Jura-Cretaceous granitic bodies. All of the rock formations have been variously cut and locally displaced by faults, fracture zones and breccia pipes some of which are proven to have been conduits for mineralizing ore solutions.

The known ore deposits in the area consist of: the major lead-zinc-silver Anvil deposit located in the Trench at its southern portion; the silver-lead veins of the Keno Camp located 50 miles north of the Trench; and the Clinton Creek asbestos deposit located near the Trench at the Alaska border. Outside of the vicinities of these mines the Tintina Trench area has as yet been very sparsely and only locally explored; it therefore comprises an excellent target for the search for major orebodies.

RECOMMENDATIONS:

The first year of such an exploration programme should consist of aerial and ground reconnaissance concentrating on geophysical and geochemical surveys of selected geologically favourable regions. The cost of such a programme for the first year is estimated to be \$228,635.00.

The second year programme will be a continuation of the exploration methods begun in the first year, together with detailed investigations of areas or prospects found in the first year. The cost of the second year is estimated to be approximately \$300,000.00.

The following years of the programme will include expenditures for both exploration and property drilling and would require approximately \$2 million to completely explore the target area if no encouragement were to be found. Therefore, a total of approximately \$3 million is required to conduct a comprehensive exploration mineral programme of the Yukon-Alaska Tintina Trench.

GEOLOGICAL SETTING

The Tintina Trench represents a strong geological and topographical lineament which completely crosses the Yukon in a northwesterly direction and extends a considerable distance into Alaska. (see Figure 1) It is similar to and may represent the northern extension of the better known Rocky Mountain trench of British Columbia. There is conflicting evidence of major displacement along the Tintina Trench but its geological influence is expressed by the local alignment of volcanic, metamorphosed and intrusive rocks along it. It is noteworthy that the Anvil lead-zinc-silver deposits occur along the northeast side of the Trench, and relatively close to it, within metamorphosed sedimentary and/or volcanic formations. The localization of this orebody, which is in some ways similar to the Sullivan orebody in the Rocky Mountain Trench, may be a result of dilatational localities of up lift, anomalous structure, or divergence in a possible major deep-seated fault system. If the Trench does represent a major fault system it may also represent the major plumbing system for the ore-forming solutions which formed the Anvil orebody.

In view of the fact that the Tintina Trench represents a profound geological structure along which multimillion ton base metal deposits are known to occur, then primary exploration in its vicinity, in rock formations of known favourability, is a sound geological venture.

Within the area chosen for exploration, along the Trench between British Columbia and Alaska, and into Alaska, the general distribution of rock formations is as follows, (Fig. 1):

1. Paleozoic and Mesozoic formations along both sides of the Trench for the southeastern half in the Yukon. Some Precambrian formations lie 25 miles to the southwest of the fault.
2. Precambrian formations along the southwestern side of the northwestern half of the Trench in the Yukon and 15-20 miles south of it in Alaska.
3. Precambrian formations along the northeast side in Central Yukon as well.

4. Paleozoic and Mesozoic Formations along the northeast side of the Trench in western Yukon and in Alaska.
5. Jura-Cretaceous intrusive stocks up to batholithic size along the southwest side of the Trench in Alaska and most of the Yukon and along the northeast side in the Central Yukon.

Major faults, fracture zones and breccia zones are widespread and are known to cut, and locally displace, all of the foregoing formations throughout the length of the Trench. Some of these are known to be either mineralized with ore or spatially related to ore deposits.

GENERAL PROPOSAL

An exploration programme along this major geological trend will be regional in nature and should initially be designed to search for and explore such clues as:

- a) Subsidiary structures at oblique angles to, or parallel to the Tintina Trench.
- b) Areas of uplift or vertical tectonics which may also be accompanied by intrusives.
- c) Intrusives of Cretaceous age.
- d) Areas of Lower Cambrian or Proterozoic rocks, particularly if gently dipping; graphitic or pelitic sections with some limy members being favoured.
- e) Zones of ultrabasic rocks indicating deep transgressive structures.
- f) Areas in which replacement-type lead, zinc or copper mineralization occurs or is reported, or in which stratiform alteration zones occur.
- g) Areas of rust cemented overburden or rust seepages.
- h) Aeromagnetic anomalies that may tie in with the above conditions.
- i) North-south linears that may result from tensional fault directions.

Initial work should consist of compilation of all data of a physiographic, geologic or mineralogic nature. Some airborne reconnaissance should be done in remote areas to check for gossans, alteration zones, etc. not hitherto mapped.

Initial ground reconnaissance should be aimed to gathering further supporting data, especially geology, signs of mineral occurrences, and geochemical silt and soil samples. The geochemical samples should be at half mile or closer spacing and should preferably be silts obtained from small streams with soils taken at intervening areas. All samples must be assayed for zinc, copper and lead and in favourable areas, for other minerals or indicative trace elements as deemed necessary. The geochemical samples should be taken by experienced prospecting crews who can do competent prospecting and simple geology as well as take silt and soil samples.

Follow-up work should consist of more detailed geochemistry and geology and aeromagnetic surveys of likely areas, on the assumption that potential deposits are apt to be magnetic.

If several areas of combined favourable factors including mineralization are explored, probabilities of success will be greatly heightened even on an empirical basis.

PROPOSED EXPLORATION PROGRAMME

The Exploration Area will encompass a belt some 60 miles in width (30 miles on each side of the Tintina Trench) and 580 miles in length (from Fyre Lake, Yukon to Loper Fork Creek in Alaska). This would involve a total area of approximately 35,000 square miles of which more likely 10,000 square miles would be examined through actual field work. The areas to be examined would be chosen by geologic environment.

Project Area:

The Tintina Project would operate in four areas:

- a) Fyre Lake to Ross River.
- b) Ross River to Stewart Crossing.
- c) Stewart to Alaska Boundary
- d) Boundary to Circle Area.

These regions have been chosen on the basis of:

- i) Known geologic boundaries.
- ii) Present locations of road and ground access routes.
- iii) Proximity to settlements and supply points.

Proposed Programme:

Phase I - (1st year)

1. Preliminary Studies:

- (a) Aerial photo interpretation
 - i) Government low level
 - ii) Satellite shots - if available
 - iii) False colour - feasibility.
- (b) Geologic (Regional)
 - i) Study of G.S.C. 4 mile sheets
 - ii) G.S.C. and other personal interviews
 - iii) Alaska State Publications
 - iv) Available reports on known mineral occurrences

- (c) Prospecting
 - i) Study of areas of known mineral occurrences for geologic control.

- (d) Geochemical
 - i) Study of sampling techniques used in past and recommendations for improving regional surveys.

- (e) Administration
 - i) Hiring
 - ii) Equipment and supply ordering
 - iii) Transportation logistics
 - iv) Budget and proposed expenditures
 - v) Study of Alaska work regulations
 - vi) Program planning.

2. Reconnaissance:

- (a) Examination of areas of known showings.
- (b) Familiarization with regional geology.
- (c) Reconnaissance of all regions:
 - i) Ross River - Stewart Crossing
 - ii) Stewart Crossing - Boundary
 - iii) Boundary - Circle
 - iv) Ross River - Fyre Lake

to include:

- Fixed wing aircraft reconnaissance
- False colour techniques
- Gossan spotting
- Geochem orientation such as silt sampling of all drainages into Tintina Valley.

- 3. Evaluation of data and planning of major program.

- 4. Commencement of detailed investigation of major areas in preparation for 1970 program.

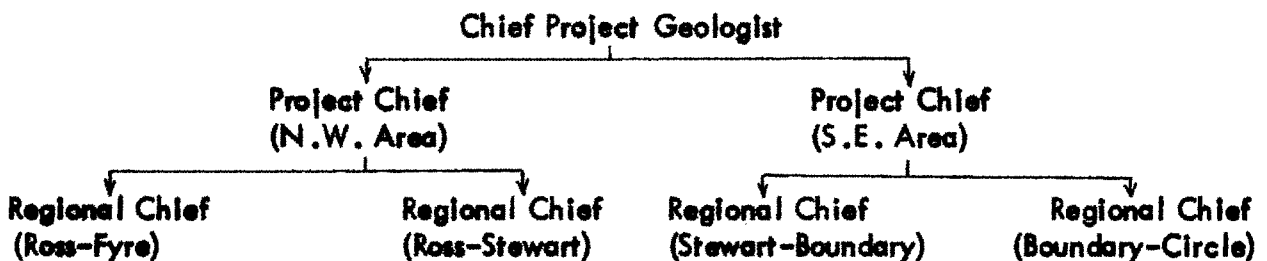
Phase II - (2nd year)

1. Preliminary Studies:

- (a) Evaluation of Phase I data and recommendations as to areas requiring detailed follow-up in each project area.
- (b) Establishment of programs by project chiefs in each area:
 - i) Fyre Lake to Ross River.
 - ii) Ross River to Stewart Crossing
 - iii) Stewart to Alaska Boundary
 - iv) Boundary to Circle Area.
- (c) Property acquisition (if required).
- (d) Property development program (if required).
- (e) Administrative:
 - i) Budget approval
 - ii) Personnel hiring
 - iii) Logistics

2. Exploration:

- (a) Establishment of camps in each of 4 project areas.
- (b) Supervision to consist of:



- (c) Within each region selected areas of economic potential will be explored using proven geological, prospecting, geochemical and geophysical (ground and airborne) techniques.

- (d) Previous and current property acquisition will be developed and explored consecutively to the regional program.
- (e) Properties acquired will be developed to target preparation stage if feasible.

Phase III - (3rd year)

1. Preliminary Studies:

- (a) Evaluation of Phase II data and recommendations and planning for Phase III program.

2. Exploration:

- (a) Detailed regional follow-up on defined zones for intensified exploration.
- (b) Further property acquisition.
- (c) Target testing of developed properties.

Personnel Requirements:

Phase I - (1st year)

- (a) 1 Project Chief - Permanent employee, should be of Ph.D. or M.Sc. level, several seasons experience in regional exploration and property development, Western Canada. Would be responsible for decision making and field management. Will report directly to Operations Manager.
- (b) 2 Regional Geologists - 1 permanent employee, 1 seasonal, should be of B.Sc. level, several seasons experience in regional exploration with some knowledge of property development. Would be ultimately responsible for management of exploration crews in regional areas. Will report to Chief Project Geologist.

- (c) 2 Geologic Field Assistants - Seasonal employees, should be of 4th year or possibly B.Sc. level with several seasons exploration experience; would report to regional geologists. If recommended would participate more actively in Phase III program.
- (d) 4 Silt Samplers - To conduct regional helicopter supported silt sampling of all drainages into Tintina Valley for reconnaissance purposes.
- (e) 2 Prospectors - To commence detailed prospecting in immediate areas of interest for possible early property acquisitions.
- (f) 2 Prospector's Assistants - To assist prospectors in fly camp locations.
- (g) 1 Cook - For base camp purposes.

Phase II - (2nd year)

- (a) 1 Project Chief (permanent)
- (b) 2 Regional Geologists (2 permanent)
- (c) 4 Project Geologists
- (d) Support crew (would involve approximately 30 man crew)

Phase III - (3rd year) - to be decided.

ESTIMATED EXPLORATION BUDGET

Phase I (1st year)

1. Preliminary Studies:

Wages	10,000.	
Supplies	2,500.	
Travel and accommodation	2,000.	
Contingency	<u>3,000.</u>	
Sub-total:		\$ 17,500.

2. Reconnaissance:

Wages	32,000.	
Supplies	3,500.	
Travel and accommodation	2,000.	
Consultant's Fees	1,000.	
Assaying	15,000.	
Fixed-wing aircraft	3,000.	
Helicopter	38,500.	
Camp Support	15,000.	
Contingency	<u>5,000.</u>	
Sub-total:		\$115,000.

3. Evaluation of Data:

Wages	7,300.	
Supplies	1,100.	
Consultants Fees	1,000.	
Contingency	<u>1,000.</u>	
Sub-total:		\$ 10,400.

4. Continuation of Detailed Investigation:

Wages	17,000.	
Supplies	2,000.	
Travel and accommodation	1,500.	
Consultants Fees	2,000.	
Assaying	2,000.	
Camp Support	5,000.	
Claim Staking (contingent)	10,000.	
Contingency	<u>2,500.</u>	
Sub-total:		\$ 42,000.

Carried forward:- Total: \$184,900.

Pro-rated Costs:

Fuel	7,000.	
Field Supervision	5,000.	
Expediting	4,000.	
Office Overhead @ 15%	<u>27,735.</u>	
Sub-total:		<u>\$ 43,735.</u>

GRAND TOTAL:- \$228,635.

Phase II - (2nd year)

Reconnaissance	\$ 80,000.
Evaluation of Data	20,000.
Detailed Investigation	150,000.
Contingency	<u>50,000.</u>
<u>TOTAL:-</u>	<u>\$300,000.</u>

Phase III - (3rd year)

Reconnaissance	\$ 70,000.
Evaluation of Data	30,000.
Detailed Investigation *	(100,000. - 1,000,000.)
Contingency	<u>50,000.</u>
<u>TOTAL:-</u>	<u>\$250,000. - \$1,150,000.</u>

*Expenditure on detailed investigation will be dependent upon results of initial exploration programme. One or more areas of good potential could require considerable diamond drilling, geophysics, etc.

It is mandatory for the successful conduct of an exploration programme of this extent in such a remote region that a flexibility be maintained in the course of action and expenditures after the first two seasons in particular. The first season (Phase I) is one of orientation and general reconnaissance; the second season (Phase II) will become more involved in exploration of particular areas and possibly drill targets will be found. From the third season onwards it will be a programme of exploration and follow-up of an undeterminable nature and extent, for by that time drill targets will probably be defined and new avenues of detailed exploration be indicated. For these reasons the budget for the first seasons can be well defined but thereafter it must remain general.

CONCLUSIONS

The belt of rocks lying for a width of 50 miles on either side of the Tintina Trench throughout the Yukon are of such favourable nature and variety for the occurrence of all types of ore deposits, but particularly base metal and copper, that the area comprises an excellent target for comprehensive aerial exploration. This favourability is further enhanced by the profusion along the belt of fault, fracture and breccia structures that may have provided geological plumbing for mineralizing solutions, together with the occurrence along the belt of relatively recent acidic intrusives. In addition, the recent development of the Anvil mine, a major lead-zinc deposit, near the southeastern end of the Tintina Trench, and the lack of comprehensive exploration throughout most of the Trench, are further incentives to the proposed programme.

Because of the above geological reasons the exploration programme proposed by Atlas Explorations Ltd. is warranted provided sufficient funds can be made available to give logical continuity to the programme over several seasons. It is the writer's estimate that such a programme, to be successful, would require the expenditure of at least \$600,000. In the first two years, with at least \$2 million available thereafter on a contingent basis.

Respectfully submitted,



Douglas D. Campbell, P.Eng., Ph.D.

DOLMAGE, CAMPBELL & ASSOCIATES

CONSULTING GEOLOGICAL & MINING ENGINEERS

808 BANK OF CANADA BUILDING

VANCOUVER 1, B. C.

CERTIFICATE

April 1, 1969

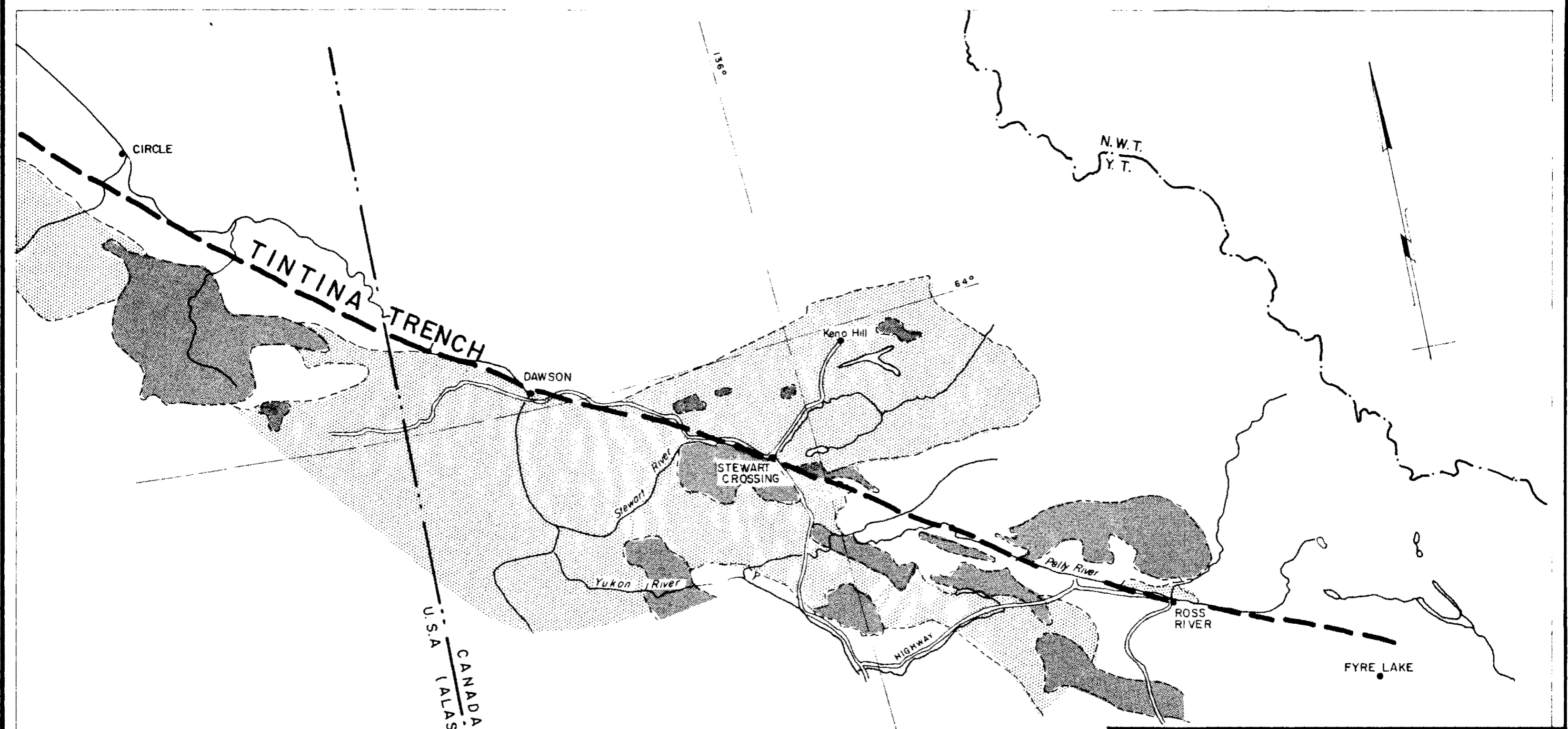
I, Douglas D. Campbell, with business and residential addresses in Vancouver, British Columbia, do hereby certify that:

1. I am a consulting geological engineer.
2. I am a graduate of the University of British Columbia, (B.A.Sc., Geological Engineering, 1946), and of the California Institute of Technology, (Ph.D., Economic Geology & Geophysics, 1955).
3. I am a registered Professional Engineer of the Province of British Columbia and the Yukon Territory.
4. From 1946 until 1957 I was engaged in mining and mineral exploration in Canada and the United States as geologist for a number of companies. In 1957 I retired as chief geologist for Eldorado Mining & Refining Co. Ltd. to begin private practice as a consulting geologist.
5. I have examined most of the area proposed for exploration in this report, on foot and from the air. I have also worked on the Anvil Mine, the principal deposit in the area. In addition, I have had full use of all available published and much private literature on the area.
6. I have not received, nor do I expect to receive, any interest, directly or indirectly in the properties or securities of Atlas Explorations Ltd., or any affiliated companies.



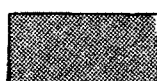
Respectfully submitted,




Douglas D. Campbell, P.Eng., Ph.D.



LEGEND

-  PALEOZOIC & MESOZOIC FORMATIONS
-  PRECAMBRIAN FORMATIONS
-  JURA - CRETACEOUS
Granitic intrusives

DOLMAGE CAMPBELL & ASSOCIATES		CONSULTANTS
VANCOUVER, CANADA		
ATLAS EXPLORATIONS LTD.		
VANCOUVER, CANADA		
<u>LOCATION MAP</u>		
TINTINA PROJECT		
YUKON - ALASKA		
SCALE		MARCH 28, 1969
		FIG. 1