A REPORT ON THE 1983 EXPLORATION PROGRAM
ON THE ALI CLAIM OF SAVANT EXPLORATION LTD.,
REVELSTOKE MINING DIVISION, B.C.

November 30, 1983

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SUMMARY

A program of confirmatory field work and subsequent drilling was recommended to Savant Exploration Ltd. by Kerr, Dawson & Associates Ltd. in their report on the ALI property in the Goldstream River area of British Columbia, dated April 25, 1983. The confirmatory work was undertaken by Savant Exploration Ltd. during the summer of 1983, under the supervision of W. Rainboth, P.Eng. The program consisted of geological evaluation during June and July, 1983, reviewed in a report by W. Rainboth dated August 13, 1983. The second stage consisted of linecutting, geochemical soil sampling, and some geophysical work completed during September and October, 1983. The results of this latter work are described in this report.

In the course of this latter program 11,480 meters of line-cutting were completed on a base line and three detail grid areas. VLF-EM surveying was completed over one detail grid area (575 meters of survey), and 214 soil samples were taken and analyzed for copper and zinc content. Access to certain parts of the property was not possible because logging operations were in progress.

In general this work confirmed the results of earlier work done by Conwest and Denison in more detail. However, some of the soils lying in the north part of the property close to the Goldstream River were shown to be non-residual in character, and anomalous geochemical conditions within them are accordingly eliminated as indicative of metalliferous content in underlying bedrock.

On the basis of the confirmatory work completed during 1983, a test drilling program consisting of four sectional holes is recommended for the property. The program will comprise four holes, each drilled to an approximate depth of 300 meters. The total 1,200 meter drilling program is estimated to cost approximately $115,000. It is suggested that consideration also be given to the provision for additional drilling, if warranted, in the program, and for the extension of geochemical soil sampling in the property area.
INTRODUCTION

This report deals with investigations carried out on the ALI claim in the Goldstream River area of British Columbia during September, 1983. The claim area is topographically rugged and largely drift-covered, but encompasses a favourable geological environment for the occurrence of copper-zinc sulphide deposits of the type recently developed by Noranda Mines Ltd. about 1½ miles to the northwest. Scattered geochemical "highs" and geophysical activity are known on the property, and it was recommended by Kerr, Dawson and Associates Ltd. in their report to Savant Exploration Ltd. of April 25, 1983, that some confirmatory work be carried out prior to drill testing (see location, Fig. 1).

The purpose of the Savant Exploration 1983 program was thus to carry out the confirmatory work recommended, and define target areas more precisely for subsequent drilling.

Field work was contracted to Doal Explorations of Calgary, Alta., and was supervised by the writer. It consisted of establishing a permanent, well-located grid system, and carrying out soil sampling and geophysical surveys in selected areas. Detailed examination was also carried out in areas indicated as geologically favourable by Denison Mines Ltd. during their 1981 exploratory program.

The writer visited the Noranda Exploration office in Vancouver earlier in the summer and examined exploration data on the Goldstream deposit and the Noranda property. Also, two diamond drilling contractors visited the Savant property on request, and are prepared to submit bids on the proposed drill program.

The cost of the 1983 program was approximately $34,500 in total, of which $19,500 was spent in respect to the September field program.
O - Kilometers
Meters

Surface projection ore horizon
(Conwest)

Surface projection ore horizon
(Denison)

ALI CLAIMS

Goldstream - Cu Zn Ag
Montgomery - Cu
Keystone - Pb Zn Ag
Standard - Cu Zn
J & L - Pb Zn Au Ag
Mastodon - Zn Pb Ag

FIG. 1

FIG. 2
EXPLORATION ON THE GOLDSTREAM DEPOSIT

Results of geochemical, magnetic and electromagnetic surveys on the Noranda Goldstream property were examined in the Noranda Exploration office in Vancouver. The following comments are based on study of that data, and discussion with Noranda personnel.

I - Geochemistry:
Soil sampling of shallow overburden (approx. 10 ft.) over the subcropping Goldstream orebody showed erratic values up to 2300 parts per million (ppm) copper. It is believed that if the orebody did not subcrop, or if overburden thickness was greater, it is doubtful if the ore deposit would respond to routine soil sampling methods.

II - Magnetics:
Although pyrrhotite is the predominant sulphide of the Goldstream deposit, no magnetic anomaly occurs over the orebody. Numerous samples of ore were held against a magnetometer, all showing negligible effect. This is a rare case, but the occurrence of massive non-magnetic pyrrhotite is known in a few locations in Canada. In addition, it appears that magnetic variations in local phyllitic rock formations are insufficient to be useful indicators of geologic trends. For these reasons magnetic surveys are considered of little value in exploration in the area.

III - E.M.:
Because of the abundance of graphitic lenses and disseminations in the surrounding rocks, the near-surface conducting effect of the sulphide ore body is masked. Most of the strongly graphitic horizons occur in the hanging wall formations of the favourable horizon, however, so E.M. surveys proved useful in tracing geologic trends.

The favourable horizon containing the Goldstream deposit is thus traced
into the northwest corner of the ALI claim. However, the intensity of graphite mineralization appears to diminish to the east, and it is not known what effect this may have, if any, on the sulphide depositional regime. The host rock itself is a chloritic quartz-sericite phyllite.

GRID PREPARATION

Exploration on the ALI property has reached a stage where accurate location control is essential. Two reconnaissance grids were used in previous programs in 1976 and 1981, but both are difficult to locate, and inadequate for detailed work.

The new Savant 1983 grid was established on an east-west base line chained between two legal survey posts (Noranda boundary survey) along the common boundary on the northwest corner of the ALI claim. This base line was extended east for a distance of 1,600 meters. Lines were cut 500 meters south of the base line in three sub-grid areas at 50 meter spacing. These sub-grid areas lie between 0 and 450 m.E, 100 m.E and 1150 m.E, and 1350 m.E and 1600 m.E (11,480 m. in total).

The steep rise to the south and dense vegetation (large cedar, devil's club and windfall) slowed linecutting. Large trees necessitate offsetting and frequent resighting of pickets, and machetes are required for cutting through dense underbrush. Average linecutting progress was 275 meters per man day. However, the new grid can be readily located, and it is accurately positioned.

GEOCHEMISTRY

Four areas had been suggested for diamond drill testing in previous reports, based on the projected presence of favourable geology overlain by scattered high background geochemical values obtained in the reconnaissance soil sampling program completed by Denison Mines Ltd. in 1981. These values range up to 300 ppm zinc, and 200 ppm copper. They do not necessarily indicate the presence of subcropping ore, but certainly indicate the presence of favourable mineralized horizons in which ore may occur.
Because of the lack of outcrop and the reconnaissance nature of the Denison program, it was decided to resample the four proposed drilling areas to confirm the anomalous conditions, and to obtain more precise location of the underlying mineralized horizons. In three locations samples were taken with auger at 50 meter intervals on grid lines at 50 meter spacing. In the fourth area current logging activity precluded sampling for the present (southeast of Grid Area 1 as indicated on Figures 1-4 included with this report).

The average depth of sampling was about 1 meter, and the sample classified as to whether composed of residual or transported till. A total of 214 samples were taken, and analyzed geochemically for copper and zinc by Terra Min Research Labs of Calgary, Alta.

The results of the geochemical survey are discussed in the following sections, in reference to Figures 1 and 2 accompanying this report.

Grid No. 1:

Applying a 100 ppm \((\text{Cu} + \text{Zn})\) cutoff, a definite southeast-trending mineralized horizon is indicated to exist underlying the area of residual soils. The range of values shown suggest the underlying formation to contain above average amounts of copper and zinc, and the area appears favourable for ore occurrence. Transported till, in which geochemical values are considered unreliable, obscures the width of the mineralized horizon.

A formational dip of 60° NE was observed in outcrop located near 500 m.S on line 1500 m.E. Also, a formational dip of about 35°NE was observed in outcrop on the Goldstream River Road approximately 200 meters north of the grid area. If this attitude is maintained throughout the grid area, the drilling as proposed will intersect the indicated mineralized horizon(s) at depth (see Figure 4).
The eastern part of the outcrop area noted near 500 m.S on line 1500 m.E contains a limestone unit. It lies stratigraphically below the mineralized horizon indicated by the geochemical survey. It is not known if this is stratigraphically equivalent to the limestone unit which is found in the footwall of the Goldstream deposit.

It should also be noted that the massive sulphide float (mainly pyrrhotite) located by Denison Mines Ltd. in 1981 lies downslope from the Grid No. 1 area.

Grid No. 2:

The value of geochemical surveying in this area is suspect since the entire grid area is underlain by transported till. The testing of the favourable formations presumed to exist in this area will thus have to be undertaken on the basis of geological projection only.

Grid No. 5:

Although not as well defined as in the No. 1 Grid area, geochemical results in the Grid No. 5 area over residual soils indicate the presence of underlying mineralized horizons. There is no outcrop in the immediate vicinity, but areal trends suggest the formations in this location to strike SE and dip to the northeast.

The favourable phyllite horizon hosting the Goldstream ore deposit has been traced into the northwestern corner of the ALI claim geophysically. This is the area covered by the No. 5 Grid. This fact, supported by the noted geochemical activity, identifies the area as well worth drill testing. The sectioning hole as originally suggested should intersect the interpreted mineralized horizon at depth.
VLF-EM SURVEYS

Because of the presence of numerous graphitic beds occurring mainly in the hanging wall of the Goldstream orebody, shootback EM surveying by Noranda was able to trace the favourable horizon into the Grid No. 5 area of the ALI property. A decrease in profile strength approaching the ALI claim boundary, however, indicates the graphite content of the horizon to be decreasing.

In the course of the 1983 program it was decided to survey the No. 5 Grid area by VLF-EM methods in an effort to trace the favourable horizon into the ALI property area. Doal Explorations conducted the survey using a Crone Radem unit, and employing the transmission signal from Cutler, Maine (17.8 kHz). 25 meter station intervals along the north-south grid lines were read (see Figure 3).

The VLF-EM survey results indicate the hanging wall graphitic beds of the Goldstream horizon to have almost disappeared on extension into the ALI claim area. Only a few weak crossovers trending to the southeast are apparent on lines between 200 m.E and 400 m.E of the grid area, indicating the presence of only low concentrations of graphite. Interestingly, this weak conductivity appears to lie in the hanging wall of the mineralized formations indicated as present by geochemical sampling.

A few southwesterly-trending, weak conductors are also indicated by the VLF-EM survey, which are probably a response to shear and/or fault zones. It has been suggested by Noranda that southwesterly faulting may be one of the controlling factors in the Goldstream deposit. This should be kept in mind in future evaluation work on the ALI property.

Also in respect to VLF-EM surveying in the ALI property area, it will be noted that Conwest carried out such work over the property area during their option period in 1976-77. This work was of poor quality, and grid locations are uncertain. However, several zones of moderate to good conductivity are indicated to exist in the area to the south and to the east of the present Grid No. 1 and No. 2 areas.
In reference to Figure 4 to this report, which is a general compilation plan of the ALI property, the areas designated 3, 4 and 6 were noted as geochemically active by the Denison Mines survey in 1981. These were examined geologically by the writer during June and July, 1983.

Areas 4 and 6 contain numerous outcrops of siliceous gneissic rocks. These are considered to be either xenoliths within the large granite mass underlying the southern part of the property, or metamorphosed sediments lying close to the contact of the intrusive mass. These rocks have a higher background in copper and zinc than the granite in any case, and the soils in their vicinity are locally anomalous. It is considered doubtful if these anomalous conditions are economically significant.

Area 3 is bisected by a swift-flowing creek within a sharp canyon with locally abundant outcrop. Unfortunately, no outcrop is present in the Area 3 location where the favourable Goldstream horizon is interpreted to extend. Eleven stream silt samples were taken from the Creek over a distance of 1,100 meters. The sampling area extended from the mouth of the Creek at the Goldstream River, through the Area 3 location. No very high values were reported from these samples, but one anomalous sample (134 ppm Zn) was obtained from a small tributary draining the west side of the canyon near the projected Goldstream ore horizon. The sample location lies about 25 meters downstream from an isolated limestone outcrop.

In respect to the silt sampling, it may be noted that the conditions in the canyon area are not ideal for the purpose. The waters are very fast flowing, and do not allow the formation of much silty material which may be derived from and representative of underlying rocks.
As noted, the 1983 program was undertaken to assess potential of the property area more fully, and to refine mainly through confirmatory geochemical work the suggested drilling locations (W. Rainboth Report, August 13, 1983).

Geochemical surveying done in 1983 was fully confirmatory of earlier results, but location has been much improved, and the recognition of residual vs. transported till soil types allows the identification of significant anomalies. While the 1983 program did not locate any obvious locations where ore material may subcrop close to surface, it appears to have defined very closely the position of the favourable Goldstream horizon and shown it to be mineralized.

Sectional drilling across the favourable horizons in essentially the same locations as suggested earlier appears to be the most effective way of completing an initial test of the economic potential of the property. The favourable locus has been well located in the Grid No. 1 and Grid No. 5 areas. Unfortunately the transported till cover in the Grid No. 2 area masks the geochemically significant residual soil layer, and the drill location suggested therein remains essentially a geological bet.

Because of logging operations sampling could not be completed in the area south and east of Grid No. 1. This is a very attractive part of the property, known to be active both geochemically and geophysically. Also, it is an area of residual soil cover, so the earlier geochemical work very likely reflects bedrock character. Accordingly the drilling of the suggested test hole in this geologically complex area remains highly recommended.

To avoid later examination of the drill project by contractors prior to bid, possibly under poor access conditions, two contractors were contacted and visited the property during September. They are prepared to submit a firm bid on the program when requested. The drilling companies were as follows:
INTERPRETIVE CONSIDERATIONS

Clearly the ALI property constitutes a very attractive exploration area, and the chances for location of a stratiform sulphide deposit similar to, or larger than, that of the Goldstream property within it are considered good. The programs completed on the property since 1976 have been superficial, and represent only the initial phase of its exploration. The proposed drilling, for example, will provide the first factual information as to the character of the mineralized Goldstream horizon known to exist within the property area.

To provide proper perspective of the nature of the target sought, and the potential of the ALI property, the following review of pertinent features is included herein:

1. The Goldstream deposit is a stratiform massive sulphide deposit which fortuitously subcrops close to surface. It is about 500 meters in length and 1 to 3 meters wide, and has been traced at least 1,200 meters down dip (approximately 40° to the north). The deposit consists of a massive sulphide layer composed chiefly of pyrrhotite, chalcopyrite and sphalerite contained in sometimes garnetiferous chloritic and sericitic quartz phyllite. It is overlain by carbonaceous phyllite interlayered with thin gray limestone, and underlain by gray banded limestone.

2. The depositionally favourable formation has been traced geophysically onto
the northwest part of the ALI property by electromagnetic survey, which responds to the contained graphite in the hanging wall rocks. At this point the graphite content in the formations appears to decrease significantly. Graphite is found in several outcrops within the ALI property, but it occurs as thin, discontinuous lenses of insufficient volume to respond effectively to electromagnetic methods.

3. The Goldstream deposit does not respond directly to electromagnetic, magnetic or gravity surveys. Oddly, the sulphide mineralization is essentially non-magnetic, and electromagnetic response appears masked by the associated graphite. Noranda notes that a gravity "high" was located immediately west of the deposit where previous drilling did not intersect ore. In respect to gravity, it is possible that the combined effects of irregular topography and dense limestone mask the massive sulphide response.

As illustrated by the observed formational decrease in graphite content, however, formational changes may be expected along strike. Thus one or the other of these "standard" geophysical methods may prove more useful in exploration in the ALI area.

4. VLF-EM, a very sensitive variant of the standard electromagnetic method, has proven useful in tracing the Goldstream horizon on the ALI property. Because of the still substantial graphite content of the associated formations, however, it appears most useful as a structural tool.

5. The Goldstream deposit responded well to soil geochemical survey because it subcrops within 3 meters of surface. However, there is no reason to expect undiscovered ore deposits to occur close to surface. Nonetheless geochemical soil surveying has identified formations in which copper and zinc mineralization must be present within the ALI property, and providing residual soils are sampled, it constitutes a very useful and effective exploration method in the area.
6. The Goldstream region is notoriously outcrop-poor in areas underlain by formations favourable for the occurrence of sulphide mineralization. In addition, it is a new mining area in which the agencies of control on such mineralization are not well known. For example, it is recognized that fragmentation exists within parts of the Goldstream ore body, suggesting the presence of faulting and/or sharp folding. Structural as well as lithological complexity is also suggested as present by geophysical data, again of unknown implication at this time.

The only discernable features of direct exploration importance in the area at present are (1) the stratabound nature of the known deposit, and (2) the very strong likelihood of repetition of ore forming conditions within the favourable formations.

7. Geological work and prospecting on the ALI property has, in spite of poor outcrop exposure in areas of interest, stratigraphically identified the approximate trace of the favourable Goldstream formations. It has also indicated the presence of rather complex structural deformation in these rocks, particularly in the central and eastern part of the property (see Figure 4).

These observations are corroborated by geochemical survey results. Also, early VLF-EM surveying by Conwest indicates (1) the presence of widespread conductivity of moderate strength in this same area, and (2) that the area is indeed structurally complex.

**RECOMMENDED EVALUATION PROGRAM**

The drilling program essentially as recommended in the writer's report on the ALI property of Aug. 13/83 should be implemented. As shown in Figure 4, four exploratory holes are suggested, each to be drilled at a dip of $-45^\circ$, to a depth of 300 meters (approximately 1,000 feet) on the indicated bearings. The
program will cost approximately $115,000, and had best be undertaken during
summer months when access to the area is not difficult.

It is suggested that provision be also made for an additional 500 meters of
drilling, to be used for follow-up work if required.

It is also recommended that the geochemical surveying of the central and
western part of the property by undertaken in 1984. This work would be
carried out on the same basis as the 1983 geochemical program, and will
cost an estimated $30,000.

CONCLUSIONS

The mineralized formations hosting the Goldstream copper-zinc deposit have
been shown to extend to the east onto the ALI property. In reference to
Figure 4, they appear to run through the Anomaly 5 area, thence to the
Anomaly 3 area, and extend in folded configuration into the Anomaly 2 and
Anomaly 1 areas to the east. This interpretation is supported by geological,
geophysical and geochemical evidence. Insofar as this formational locus is
active geophysically and geochemically, sulphide concentrations may well
exist within it.

The 1983 exploratory program provided confirmatory data on previous work,
and a well-located grid system was established in the process. Unfortunately
the program could not be extended into the eastern property area, which is
of particular interest, because of current logging operations. However, the
confirmatory work completed was positive, and there seems little reason to
doubt the essential accuracy of the previous work completed in this general
location.

It is recommended that a test drilling program be undertaken on the ALI
property during 1984. The basic test drilling program will consist of four sectional holes comprising a total of approximately 1,200 meters. It will serve to evaluate the economic potential of the anomalous Goldstream formations in four widely separated locations. The cost of this drilling is estimated at $115,000. As noted, consideration may be given to the extension of soil geochemical surveying and to a provisional drilling allotment in financing arrangements.

Respectfully Submitted,

W. Rainboth, P.Eng.
APPENDIX I

Summary of Costs - 1983 Field Program
Summary of Costs- 1983 Field Program on the ALI Property, Revelstoke Area, B.C.

Phase I Program: (June-July, 1983)


Professional Fee (24 days @ $400/day) .......... $ 9,600.00
Meals, Accommodation, Misc. Expense .......... 2,025.72
Transportation ................................... 2,291.00
Equipment Rental .................................. 300.00
Compilation (2 days @ $400/day) ............... 800.00

Subtotal ....................................... $ 15,016.72

Phase II Program: (Sept.-Oct. 1983)


Professional Fee (10 days @ $400/day) .......... $ 4,000.00
Contract costs (Doal Expl.) ....................... 9,279.00
Geochemical Analysis ............................ 2,264.11
Accommodation, Travel, Misc Expense .......... 3,916.83

Subtotal ....................................... $ 19,459.94

Total Field Expense, 1983:

Phase I Program ....................... $ 15,016.72
Phase II Program ...................... 19,459.94

Total Cost ......................... $ 34,476.66
SAVANT EXPLORATION LTD.
ALI CLAIMS, GOLDSTREAM RIVER
Revelstoke M.D., B.C.

INTERPRETATION

November 1983
Scale 1:5000
Dwg. No. 2