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J & L PROJECT 1986

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for

Noranda Exploration

NORANDA EXPLORATION COMPANY, LIMITED

J&L PROJECT 1986

SUMMARY of WORK and

RECOMMENDATIONS for FURTHER EXPLORATION

Project No. 0162
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INTEGREX ENGINEERING
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INTRODUCTION

The J&L property is a polymetallic gold-silver prospect recently optioned by Noranda Exploration from Pan American Minerals Corp. J.D. Williams of Integrex Engineering was asked to visit the property to assess the possibilities and priorities for further exploration. The property was examined over seven days in late June 1986. This report will record initial impressions of that visit and propose a concept for additional exploration. From a geological standpoint the J&L is an impressive prospect.

A fairly consistent and generally continuous main zone of massive sulfide 845 metres long averaging 1.23 metres wide (1.5m horizontal width) has been exposed in the only accessible underground working on the property. This zone grades 6.69 gram/tonne gold and 68.75 gram/tonne silver. Surface showings have suggested that the main zone may extend along a 3,280 metre strike length, and other parallel zones are evident. The main zone has a potential exceeding 11 million tonnes.

This report concludes with a concept for following-up mineralization exposed in the underground by continuing the drift to the south by at least 950 metres - to do so will require preparing another portal and access drift. From the new development, drilling platforms may be cut which will provide the only practical method to assess the potential of the zone above and below the drift.

In September 1986 a three-week program to gather metallurgical samples from the underground was started. This involved drilling and blasting with a special technique which will be described below. Results from the metallurgical tests are pending.

It is recognized that this concept to advance the status of the property will be a major undertaking. Even so, no other method seems appropriate especially since the property appears to hold such a favorable potential. It is also noted that in spite of its geological and mining potential, the mineralization may present insurmountable milling problems and that additional exploration on the scale suggested here may be contingent on the results of initial metallurgical studies.

PROPERTY CONDITIONS

The access road turns off Hwy 23 about 30 kilometres north of Revelstoke. It is about 10 kilometres long and is in good condition. It winds its way along steep slopes and will require occasional maintenance while regular traffic is travelling over it. The first kilometer or so just off the highway is the steepest which may pose a problem for heavily loaded two-wheel-drive vehicles. All roads on the property itself are in good condition except for the long road which parallels Carnes Creek south of the camp area. This road was probably built for only occasional use and while it is passable over at least most of its length, it will need further work to support regular use (see drawing 001).

The bridge crossing Carnes Creek just before arriving at the camp and portal areas is in good condition and can easily support light vehicles. Some work will need to be done before it will be safe for heavier loads.

A nine building camp includes five two-person sleep units, a cook-house, office, core shack and shower. Each of these is of frame and plywood construction and is in excellent condition. All the core from recent exploration is stored in the core shack. Although the core shack door is locked, the screen and plastic sheeting covering the windows has been removed. Thus, the core is no more secure from vandalism than an outside storage rack would be. Pulps and rejects from the same exploration program are locked in one of the sleep units.

Terrain at J&L is steep and overgrown with mature forest and in places with dense bush. Mobility, at best, is difficult. A farther hazard to persons working in the field may be from bears - several were seen while working at the site. In the interests of safety, no one should be required to work in the field alone at the J&L.

The two portals to the underground are secured by padlocked steel and mesh doors. Sometime during the summer one of the steel doors was damaged by someone wanting to gain access to the underground. Each door is now secured by locked chains wrapped thorough it as well as a lock on the door frame. Most of the mined material from the level has been moved to a single location away from the portal and McKinnon Creek by a few hundred metres. All other adits or shafts which have been located from maps of the property have caved and access to them is not possible.

It is a tribute to B.P.-Selco, which conducted the extensive exploration program on the property from 1982 to 1985, that left the property in a clean, orderly and secure condition. In addition, the quality of data that was gathered and the professional manner in recording and presenting it deserves a special compliment. In fact, it is difficult to be critical of any way in which the program was conducted or in the condition of the property when it was turned over to Pan American.

UNDERGROUND

A total of 1250 metres of underground drifting exists in the single accessible adit on the property. The portal is located at 834 metres elevation. This drift has exposed a Main mineralized zone over a horizontal distance of 845 metres. The main zone dips easterly at about 55 degrees. Every 150 metres or so, a 65 metre crosscut driven into the hanging wall serves as a drill platform. A total of 2640 metres of drilling has been recorded on the J&L property and all of it with the exception of 83 metres in a single hole was collared from this level (see drawing 002).

Westairs Mines Ltd. drove the first 288 metres of drift (on a 5'x 7' opening) during the 1960's. About 180 metres of the Main zone was exposed which proved to be fairly narrow but consistent and continuous. At the end of the drift the zone had thinned and became less regular as the mineralization was displaced slightly by a series of slip faults.

In 1983, B.P.-Selco advanced on the only thin structure that was available which continued thin and weak for about 130 metres. From there to the south, the main zone generally improved in width and grade. During the 1984 field season B.P.-Selco returned to extend the drift to its current length and continued to find a generally consistent zone to follow. The face now shows a feature that is as wide or wider than any other portion of the zone exposed to date. All of B.P.-Seclo's drifting was done on a 2.1x2.1 metre opening.

Ground conditions underground are good. Only a few locations required rock bolts but some spalling from platey rocks along the hanging wall occurs in places. It may be significant to note that the worst ground conditions was observed where the main zone was very weak or absent.

Several of the long drill holes make a significant amount of water. The total volume of water draining into the drift has not been estimated nor is it known if this volume is sustained year-round.

The drift is fitted with air and water line throughout its length including the crosscuts. Vent tube (24"? dia) is also strung along almost all of the main drive. Track extends to all points on the level and is in good condition. It is estimated that the B.P.-Selco portion of the drift was driven at a 1.5% grade, but the Westairs section was not controlled so that water up to a depth of 40cm has accumulated along much of it.

GEOLOGY & STRUCTURE

All of the country rocks are sedimentary except for the rare dike (or sill). The mineralization is hosted by a variety of dirty quartzites or argillites and limestones. Most of the non-calcareous material shows a schistosity, and adjacent to mineralization demonstrates bleaching and/or silicification. Limestone tends to occur on the footwall of the zone over about half of the strike length exposed underground. The limestones are often banded by argillic sediment or graphite.

Several examples of folding can be seen underground but they have not often been seen to exceed a metre in scale. Even so, most of the folding was restricted to the wall rocks and did not affect the mineralization. Limestone is much more strongly folded than argillite or quartzite. Only locally, where mineralization is completely enclosed by deformed limestone is it affected by folding.

Faulting is almost exclusively confined to the vein. Barely visible slips with a thin smear of gouge can be seen running along portions of the vein. Occasionally the heaviest of these faults turn into either wall carrying the mineralized zone with them. Even so, displacements along the faults appear to be minor.

MINERALIZATION

The main zone can be described as a nearly continuous tabular feature extending throughout the length of the drift. It is composed of closely spaced bands of massive sulfides which frequently coalesce at its widest parts. The sulfide components include pyrite, pyrrhotite, arsenopyrite, sphalerite and galena. It has been suggested in the B.P.-Selco references that across the vein the sulfides are distributed from a sphalerite-rich footwall through a pyrite-pyrrhotite section to an arsenopyrite hangingwall. There appears to be so many persistent exceptions to this description that generalities of this kind are meaningless. Along strike, no obvious pattern to the sulfide minerals has been noticed (see line charts in Appendix II).

One notable feature is that where the mineralization is narrowest, it is almost completely composed of arsenopyrite. Mineralization seems to be widest and the sulfide assemblage more diverse where it lies in contact with, or is completely enclosed by limestone.

By and large, mineralization can be found through most of the length of the drift. On average, the horizental width of mineralization is about 1.5 metres but varies from absent to greater than 6 metres. The continuity of the main zone is broken by its absence in a few places within very narrow sections. On occasion, the mineralized band dies along strike but mineralization can be found in an adjacent band in the footwall or hangingwall. This feature is to be expected in a mineralized zone that is defined by bands which to some degree behave independently. In some cases the main mineralization swings off into a wall while other zones that are interleaved with it widen and continue unaffected by their errant partner.

Between mineralized bands the host rock has been altered and contains disseminated mineralization or thin sulfide streaks. Near the current face an extended zone of quartz up to 1.6 metres wide exists. This quartz contains about 20% coarse to spectacular sized arsenopyrite and sphalerite crystals; this material is low in gold but returns elevated silver values. Elsewhere quartz is notably absent or very subordinate.

In speaking of the main zone the term 'vein' is often used to describe it. Although it is recognized that the mineralization does not represent a vein-type deposit, the thin continuous tablular gold-bearing characteristics sometimes make it difficult to call it by any other name.

Certain features of the main zone lend themselves to geological control in a mining operation. It appears that recognizing the boundaries of enriched material may simply be a matter of selecting the massive sulfide zones in a manner which minimizes the removal of intervening host rock. Unless the host rock is very strongly mineralized, it will not exceed a grade of about 1.0 gram/tonne.

Assays from the extensive sampling carried out by B.P.-Selco have revealed a pattern of elevated silver values corresponding to the amount of lead (probably in the form of galena). Silver assays can be high enough to exceed its importance over gold in places (see scatter charts in Appendix II).

A similar though less distinct correlation exists between gold and arsenic. Presumably the arsenic is contributed almost exclusively by arsenopyrite. Estimating gold content in a rock of a particular sulfide composition may become easier with experience. But at this time, a rock with abundant arsenopyrite returning a high gold assay cannot be distinguished from a rock with similar composition but low in gold. It was suggested in the B.P.-Selco reports that gold may be linked with arsenopyrite of a particular grain size. If so, then grade control may be simpler than at some other gold deposits.

RESERVE

In reviewing the distribution of the surface showings identified by B.P.-Selco and noting the continuity of the mineralization exposed in the drift, it appears likely that the main zone extends through the surface showings south of McKinnon Creek, and includes some or most of the showings on Roseberry Mountain north of McKinnon Creek. This is a strike length of about 3,260 metres (see drawing 003).

Another indication of the continuity of the main zone is the evidence that every hole drilled through the plane of the zone intersected mineralization.

It is argued that the main zone exposed in the drift is a random sample of the total known strike length. If the main zone can be expected to continue below the drift by at least the same distance as the drift is below the surface showings, then the total expected area (measured vertically) is estimated at 2,130,000 square metres. This area reaches to 500 metres elevation.

An analysis of all the available sample and assay data from the underground has been completed to provide average values for each economic variable. A eimilar separate examination of the diamond drill data provides an indication of the continuity of the main zone in the area of the underground. None of the assays have been cut - the distribution of each element follows a smoothly decreasing frequency curve with increasing grade (see bar charts in Appendix II). The results for each data set follow:

DATA	Au (gram/tonne)	Ag	As (%)	Pb (%)	Zn (%)	Horiz. WIDTH(m)	Specific Gravity
Drift	6.69	66.75	5.16	2.56	4.48	1.5	3.56
Drilling	3.98	47.33	3.19	1.61	3.27	4.42	3.27
Average	5.34	58.04	4.18	2.09	3.88	2.96	3.43

Note the disparity in the widths of mineralization. Selecting mineralization over long drill intervals has diluted the average grades of each element compared to the drift values. Because averages from drifting have been compiled from over a thousand samples, it is appropriate to suggest that drift averages are a more accurate estimate of the properties of the main zone than the much more limited data that generated drilling averages. Assays from a widely spaced sample survey during the visit to the property are consistent with the calculated values listed above (see sample & assay summary in Appendix I).

Showings of the main zone on surface have been sampled by B.P.-Selco and returned much less than average values obtained from the underground. These surface samples may not be representative due to surface weathering, perhaps especially by leaching. The present condition of all trenches looked at during the visit to the property is poor.

If numbers from the drift data are to be accepted as fully representing the main zone then the 2,130,000 square metre zone has a horizontal width of 1.50 metres and a specific gravity of 3.58 (tonnes/cubic metre). The resulting total geological reserve is 11,438,100 tonnes; all but a small portion near the drift and at the drill intersections can be classified Possible reserve.

While it may be optimistic to suggest that the total geological reserve can exist in the manner described, there are additional features of the J&L property which may add to the picture with further work. Evidence from surface showings indicate several weaker parallel features which may, by themselves, prove to be significant.

Furthermore, a brief examination of the rocks exposed by the access road shows geology not unlike that at the J&L. Fragments containing favorable alteration and gossanous exposures may indicate a favorable area larger than the limits of the J&L property line.

A reserve picture prepared by B.P.-Selco outlined 3,370,900 tonnes from surface through the 830 metre level to 530 metre elevation. This reserve was identified in four zones and was calculated on the basis of 0.10 ounce/tonne (3.43 gram/tonne) equivalent-Au cut-off grade over a minimum true thickness of 1.60 metres (~1.95 metre horizontal width). Grades of this reserve were reported at 5.86 gram/tonne Au, 59.14 gram/tonne Ag, 4.86% As, 2.15% Pb and 4.04% Zn (J. Wan, Feb85).

There is good agreement between the figures presented in this report and those prepared by B.P.-Selco. B.P.-Selco's grades are slightly lower over a correspondingly greater width. The total tonnage in the B.P.-Selco study also compare well with the proportionately greater extent of the main zone which formed the basis for the 11 million tonne figure presented here.

PROPOSED EXPLORATION

The total strike length of the mineralization south of McKinnon Creek, as suggested by the extent of surface showings, is 1600 metres. The underground has tested only about half that distance.

Drilling for additional reserves from surface is made difficult not only because of the rugged terrain but also because of the attitude of mineralization; the main zone dips in the same direction as the topography rises. The shallowest hole that can be drilled from surface to a useful intersection would be 500 metres long.

Thanks to the efforts by B.P.-Selco enough is known of the property and mineralization to consider the J&L property as an attractive target for additional work. Effort will need to be placed on improving the classification of reserve tonnage and to examine the various types of ore that may exist along the main zone so that suitable metallurgical studies can be carried out. Shifting more of the ore reserves to a Proven category will require diamond drilling. And testing for ore types will require drifting to open up the zone.

Unfortunately advancing the current face under the conditions that exist on the 830 level will not be productive due to the limited ventilation that is possible from a drift of this size. A vent raise to surface from a point near the face will require a drive of over 800 metres which is impractical with conventional methods.

To provide access to advance the current face and to install underground drilling platforms, a concept is proposed for underground development which includes a 650 metre decline to the main zone and drifting along the mineralization for as long as favorable mineralization continues (see drawings 003 & 005a-j). Drilling platforms at the end of 200 metre long cross cuts spaced 200 metres apart will provide access to at least 600 vertical metres of the main zone (assuming it continues to dip 55 degrees to the east).

In detail, this concept proposes that a portal be established at 930 metre elevation. A 600 metre decline driven at -15%, flattening to an additional 50 metres of -2% grade is expected to intersect the mineralization about 100 metres south of the current face. The expected elevation of the decline at the main zone is 840 metres. Drifting from that point will follow the main zone in both directions. Breaking through to the existing adit will facilitate ventilation up to the bottom of the decline.

If mineralization at drift elevation extends no further south than the surface exposures indicate, then about 950 metres of drift from the bottom of the decline will reach that point. In that case, the total drifting including two crosscuts will amount to 2,085 metres. However there is no reason to suggest that the mineralization ought to end where it apparently does so on surface. It is possible that the main zone could be followed much further south.

With a decline grade of -15% trackless equipment will be required. In addition, ventilation facilities for at least 1,600 metres of drift will need to be installed. Given these requirements, the size of drift along the main ventilation route will need to be greater than the existing track-drift.

Note that a site for the proposed portal has not been selected so that this concept, if approved, may be modified to suit the specific conditions of the selected location. If this concept is implemented, the existing drift should be check-surveyed and tied to the new portal site. A brief examination of the proposed portal area shows that the slope of the ground is comparatively gentle, flattening to horizontal for some distance towards Carnes Creek. The moderate slope will provide ample room to locate buildings and storage areas. However, this area appears to contain a thick layer of sandy overburden which could make collaring a portal difficult. Considering the size of the timber and extent of forested area there does not appear to be a history of avalanches at the proposed portal site.

It may be worthwhile to drill a hole from the most southerly crosscut in the existing drift ahead of the face, to assure project management that the main zone exists and to locate it for planning the decline. A drill hole about 150 metres long might be able to reach the mineralization as far as 100 metres ahead of the face.

Once this new drift has been completed, the extent of the mineralization will be known, at least to the south. In addition, a fully prepared haulage level will be available if this development provides results favorable to a production decision.

METALLURGICAL SAMPLING

One of the problems with mineralization at J&L is its more difficult metallurgy. During September and October 1986 a program to gather metallurgical samples was completed. The sample material was selected from four zones along the Main zone in the 830m level. The location of the four zones was made by David Carson who attempted to provide samples containing the kind of material that would be mined. The selected areas included intervals of average or better metal grades and widths of mineralization that would be practical to stope in a producing mine (see tables and plans in Appendix III).

The four zones ranged in length from 30m to 113m. And a 200kg sample was required from each zone made up of subsamples taken across the full width of the mineralization at 10m intervals. A total of 28 subsample sites were located and sampled to a minimum horizontal width of 1.5m.

After several days of experimenting it was decided that the best technique for obtaining each subsample was to drill short holes perpendicular to the drift wall or back in a single row across the mineralization. The holes would be just long enough to accommodate the length of an electric detonating cap and a birdie - generally 6 to 10 cm long. Tovex powder was used to in an amount to pack the hole. The holes were spaced to account for the properties of the rock. In massive mineralization the spacings were as close as 10 cm but ranged to 20 cm in unmineralized sections.

Blasting was done with short period caps all of about the same delay time to reduce missholing. The broken material was collected on mats made from split lengths of vent tube about 2m long laid below the sample line before loading the holes. Breaking a sample in this manner can produce at least 50kg of broken material. From the total broken volume the sample to be shipped was shoveled from the mat in a representative pattern and loaded into 20 litre pails.

Exactly double the number of samples were gathered than was required. One set of samples was sent to Noranda Research for testing and the other set is stored at the Goldstream mine for future use. The 830m level and the portal area at J&L was cleaned up and restored to its former condition as much as possible.

CONCLUSIONS

Exploration on the J&L property to date has indicated a potential for an ore deposit exceeding 11 million tonnes at a grade of 6.69 gram/tonne Au, 68.75 gram/tonne Ag, and 7.04% combined lead and zinc. Further exploration can only be effectively done underground and the current underground workings are not capable of being extended without substantial effort. The concept of creating a new portal and a decline to meet the main zone and to follow along it until it dies has been proposed. Drilling above and below the new drift can be carried out from crosscuts driven into the hangingwall of the zone.

Information form drifting and drilling will provide assurance that the main zone behaves as it appears to. It is hoped that from this proposed drifting and drilling the new proven tonnage reserve will be enough to make use of the underground development in a producing mine.

Respectfully submitted,

J. David WILLIAMS, P.Eng.

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STATEMENT of QUALIFICATIONS

I, J. David WILLIAMS residing at 310 - 1225 Cardero Street in the City Of Vancouver, in the Province of British Columbia;

DO HEREBY CERTIFY:

1. That I am a consulting engineer with a business address of 310 - 1225 Cardero Street in the City of Vancouver, in the Province of British Columbia.

2. That I am doing business as INTEGREX ENGINEERING and that I am the sole proprietor of the company and that I hold a valid license issued by the City of Vancouver to conduct business.

3. That I am a graduate of the University of Toronto where I obtained a Bachelor of Applied Science degree in Geological Engineering (exploration option).

4. That I have actively practised my profession as a geological engineer since graduating in 1978.

5. That I am a registered member, in good standing, of the Association of Professional Engineers of the Province of British Columbia.

6. That this report on the J&L Property is based on a visit to the property and a complete review of the available and relevant data.

7. That I have no direct, or indirect, interests in any mineral claims, or in any securities held by by any person or organization, nor do I expect to receive any.

8. That permission is hereby given to NORANDA EXPLORATION Co. Ltd. to reproduce this report in whole.

David Williams

J. David WILLIAMS, P.Eng.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA J.D. WILLIAMS

Dated this first day March 1987

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