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FINAL REPORT

OKANAGAN FALLS PROJECT

DUSTY MAC MINES LTD.

CANNON-HICKS ASSOCIATES LTD.

DECEMBER, 1969.

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PART A

INTRODUCTION

In June, 1969, the firm of Cannon-Hicks Associates Ltd. was given the assignment of continuing the exploration at the Okanagan Falls Project of Dusty Mac Mines Ltd. Cannon-Hicks Associates Ltd. was given complete authority in the planning and direction of the work but all phases of the investigation were discussed with the Dusty Mac Directors before commencement and results were reported as received.

The purpose of the work programme was to:

- (a) Prove or disprove the existence of the gold-silver mineralization that had been indicated by prior sampling.
- (b) Try to establish some form of continuity to the mineralization so that tonnage and grade estimates could be prepared.
- (c) Determine the geologic controls of the metallic mineralization.
- (d) Provide additional data so that a crude assessment of the economics of mineralization could be made.

The project was discontinued before completion, but enough information was obtained to prove that a potentially viable mineral deposit does exist on the property.

CONCLUSIONS

Gold-silver mineralization, associated hydro-thermal silicification, is erratically distributed throughout a slightly folded and well fractured fragmental stratigraphic unit.

The controls of metallic mineralization have not been established, nor have all of the minerals been identified. The deposit as a whole appears to be lenticular in habit with the individual lenses of higher grade mineralization possibly having been deposited in saucer-like depressions formed as a result of gentle but complex folding.

Present indications are that the deposit as a whole, and the individual high grade lenses in particular, are dipping to the east and have a slight plunge to the north. This tends to give a north-easterly migration to the ore zone, which is open in that direction, and also at depth on that part of the property.

At the present time, 67,790 tons, with an indicated grade of: Gold - 0.23 oz./T and Silver - 4.97 oz./T have been drill proven. Additions to this can be anticipated, but it can also be anticipated that the distribution of high grade will be erratic. Alternatively, it may be profitable to mine the unit as a whole and ship to the Cominco smelter as a flux. Before

the feasibility of such an operation can be determined, initial negotiations will be required with officials at Tadanac.

RECOMMENDATIONS

The following recommendations are made with a view to developing as quickly as possible a minimum tonnage of ore grade material that will justify production plans. Additional exploration can be conducted during the production period.

1. Continue percussion drilling and renew diamond drilling to the north and east of the present grid. The grid pattern should be maintained but the spacing between lines can be increased to fifty feet. Spacing of holes on the lines should be kept at twenty-five feet.
2. Develop pit plans and costs for several alternative production situations:
 - (a) Selective mining of the different grades of material using the equivalent of 2 oz., 3 oz., 4 oz. and 5 oz. of silver per ton as cut-off grades.
 - (b) Bulk mining of the complete zone.
 - (c) Mining using company owned equipment vs. leased equipment.
3. Construct a crushing and grinding addition to the sampling department.

4. Have all sample rejects, now at the assay offices, returned to the property for future reference.

ESTIMATED COSTS

The following costs are based on an assumed four month drilling programme, during which period the other engineering data is also obtained:

| | |
|---|---------------------|
| Supervision | \$ 4,000.00 |
| Diamond drilling (5,000 ft. @ \$6.00) | 30,000.00 |
| Percussion drilling (10,000 ft. @ \$3.00) | 30,000.00 |
| Sampling & assaying | <u>20,000.00</u> |
| | 84,000.00 |
| Engineering studies | <u>10,000.00</u> |
| | 94,000.00 |
| Contingencies @ 15% | <u>14,100.00</u> |
| | <u>\$108,100.00</u> |
| Say, | \$110,000.00 |

PART BINTRODUCTION

Exploration work at the Okanagan Falls Project of Dusty Mac Mines Ltd. was renewed on June 28, 1969 and was continuous to December 5, 1969. At that stage drilling was temporarily discontinued pending compilation of results and in anticipation of the forthcoming holiday season. All work was under the general supervision of Mr. Marcel Guiguet of Cannon-Hicks Associates Ltd. Geological mapping, core logging and percussion drill sampling was done or supervised by Messrs. P. Ropp or B. Switzer, staff members of this company. General foreman at the project was Mr. L. A. McDonald, who had an average of about four men as a crew for blasting, crushing and sampling. Bulldozer work and drilling were both contracted.

Title

The Okanagan Falls property of Dusty Mac Mines Ltd. is comprised of 130 mineral claims, all held by Right of Location in the Osoyoos Mining Division of British Columbia. A list, showing the names, date of forfeiture and recorded owner is attached to this report as Appendix A.

All records were checked on December 17, 1969, at the office of the Mining Recorder in Vancouver.

History

The early history of the property is unknown, but old claim posts were observed on both the "A" Zone and "B" Zone. Prior to 1968 almost all work was done on the "A" Zone.

In 1967 the At Last Mineral Claim was staked by K. Ewars of Okanagan Falls. This staking covered the old adits that had previously been driven on the "A" zone. Subsequently, in the same year, a small amount of surface trenching was done.

In 1968, between January 25th and December 17th, the balance of the property was staked. In January, 1969, some internal fractions were abandoned and restaked as the Au Fractional Claims.

A small work programme was conducted in 1968 and in January and February, 1969, an inclined shaft and raise were driven. Surface trenching commenced on June 29, 1969, and was followed by diamond and percussion drilling. Two small shipments were made to the Cominco smelter at Tadanac, B. C.

WORK PERFORMED (this section prepared by P. Ropp)Geological Mapping

Detailed geological mapping was confined to the area of surface trenching. Messrs. P. Ropp and B. Switzer, Geologists on the staff of Cannon-Hicks Associates Ltd., cooperated in this work which is recorded on the enclosed geological plan.

Drilling

Drilling on the property was continuous between September 25, 1969 and December 5, 1969. Twenty diamond-drill holes and 101 percussion-drill holes were collared on 25 foot-centered grid pattern consisting of 16 lines bearing N 78° E crossed by 11 lines bearing N 12° W.

Diamond drill: grid-centered - Of the twenty diamond-drill holes, 19 were drilled at an inclination of 60° bearing N 78° E along grid lines #1, #2, and #3. Fourteen of these holes were approximately 75 feet in length, four (#4, #5, #8 and #15) were between 85 and 101 feet in length, and one (#10) was ended at 35 feet upon intersection with the raise. Diamond-drill hole #11 on grid line #1 was drilled vertically to a depth of 500 feet.

In addition to the twenty grid-centered diamond-drill

holes, four other holes were drilled in an area approximately 2,000 feet north-west of the grid-drilled area (see map). These four holes (#21, #22, #23 and #24) averaging 75 feet in depth at an incline of 60° to the east, were collared at 25 foot intervals along a line bearing $N 8^{\circ} E$.

Percussion drill - All of the 101 grid-centered percussion-drill holes were drilled vertically. 91 of these holes were between 50 and 60 feet deep, 9 were from 65 to 80 feet deep, and one, P4, was ended at 35 feet when it intersected DDH #9.

Sampling

Percussion drill sludge samples were allowed to settle in iron sample pans for periods of greater than fifteen minutes, after which they were decanted, heated until dry, and bagged for shipment to the assay office.

Diamond drill cores were split longitudinally in five foot sections for sample purposes. One half of the core was sent for assay and the other half is stored at the property.

Channel samples were cut along the bottom of the surface trenches by blasting out a section two feet wide and

eighteen inches deep. All of the material from 10 foot sections was passed through a crusher and then split in a Jones splitter to a sample weighing about 10 pounds.

Samples were cut by Mr. David McDonald and were assayed by John O. Dolphin in Osoyoos, B. C., Coast Eldridge of Vancouver, B. C. and Crest Laboratories of Vancouver, B. C.

Assay plans showing the results of all sampling done in 1968 and 1969 are included.

Geochemical and Geophysical Surveys

No geochemical sampling or geophysical work has been done on the property.

Surface Trenching

A total of 7,330 feet of bulldozer trenching was done in 14 trenches that were dug at 50 foot and 100 foot intervals along a strike length of 1,040 feet. Across the breccia zone rock trenches 2 feet wide and 1-1/2 feet deep were blasted out of the bottom of the bulldozer trenches. A total of 1,486 feet of rock trenching was done and 310 tons of rock removed for sampling purposes.

Underground Development

Underground development consisted of a shaft 178 feet deep that is inclined at 20° to the north and a raise 97 feet long driven at an angle of 50° to the surface from a point 145 feet from the collar of the incline.

A map of this work is included.

EXPENDITURES

See Page 11 for Summary of Expenditures from August, 1968 to December, 1969 inclusive.

DUSTY MAC MINES LTD.
SUMMARY OF EXPENDITURES
AUG. /68 to DEC. /69 INCL.

| | |
|-------------------------------------|----------------------|
| Administration and Engineering Fees | \$ 13,300.00 |
| Supervision | 7,650.00 |
| Sampling | 21,958.73 |
| Trenching | 9,590.42 |
| Underground Development | 19,835.67 |
| Diamond Drilling | 17,077.37 |
| Percussion Drilling | 13,492.76 |
| Recording Fees and Assessment Work | 9,833.43 |
| Mapping | 6,499.18 |
| Assaying | 5,936.28 |
| Equipment Rental | 6,279.99 |
| Claim Survey | 5,862.07 |
| Travel | 2,439.02 |
| Communications | 790.40 |
| Ore Shipment | 920.15 |
| Miscellaneous | <u>2,863.93</u> |
| | <u>\$ 144,329.40</u> |

GEOLOGY (this section prepared by P. Ropp)Regional Setting

The regional geology is recorded on May 15, 1961, published by the Geological Survey of Canada. It shows the section to the south-east of Skaha Lake to be underlain by Precambrian schist and gneiss of the Monashee Group. To the immediate south-east, south and south-west of the lake, the Monashee group is overlain by a rectangular-shaped segment of fragmental rock that has been classified as being Eocene or Oligocene in age. Similar Oligocene rocks are to the west and south-west.

To the north the schists and gneisses are intruded by the Cretaceous Nelson plutonic rocks and immediately to the south-east of the Oligocene segment there are two small plugs of Cretaceous granodiorite (Valhalla Formation).

Rock Types

1. Quartz Breccia: This rock consists of angular to subangular milky quartz, glassy quartz, chalcedony and chert fragments ranging in size from 1/20th inch to 3 inches.

Two types of matrix material occur:

- (a) Light silicious matrix
- (b) Dark andesitic matrix

In areas where both matrices are found, the andesitic matrix appears to have been introduced along fractures within zones containing the siliceous matrix.

2. **Porphyritic Andesite:** This rock type consists of a very fine-grained groundmass within which feldspar phenocrysts ranging in size from 1/20th inch to 3/20th inch are set. A brecciated version of this rock is common throughout the area. Porphyritic andesite and porphyritic andesite breccia are the predominant rock-types on the surface and constituted by far the greatest portion of the core from the upper 250 feet in DDH #11.
3. **Sediments:** Zones of interbedded argillite, greywacke sandstone, and conglomerate with easterly bedding dips occur on or near the surface and were also encountered in DDH #11 at depths below 250 feet.
4. An agglomerate composed primarily of porphyritic andesite fragments within an andesitic matrix constituted a great portion of the core from the lower 250 feet in DDH #11 and was also encountered in the diamond drill holes in Zone A.

Note: Two legends were used for mapping subsurface geology

using drill-hole data due to the differences between diamond-drilling and percussion-drilling. The percussion drill produced a sample comprised of rock cuttings or chips varying in size from 1/40th inch to 3/10th inch. The logging and mapping of percussion-drill samples was primarily based upon estimated percentages of the various lithological constituents within each sample. Therefore, certain distinctions between various rock-types using diamond-drill data, such as the distinction between porphyritic andesite and porphyritic andesite breccia, were not possible to make in logging percussion drill samples.

Structures

There are two major structural features:

1. The most prominent structure is the quartz breccia extending over 1,200 feet along a northerly trend with varying widths up to 150 feet. Depth of this breccia varies considerably from approximately five feet to greater than 35 feet. The quartz breccia tends to overlie the porphyritic andesite breccia in most of the drill holes, but zones of the former overlain and underlain by the latter were observed in DDH #5.
2. The quartz breccia may be associated with a strong fault mapped by the Geological Survey of Canada as striking S 35° E.

This fault forms the contact between Oligocene rocks and Precambrian rocks. The predominant trend of major faulting mapped in the area is northerly with minor faulting occurring along an easterly trend.

Rock Alteration

Observed rock alteration falls into three main categories:

1. Surface oxidation of iron pyrites has produced a zone of heavy limonite staining extending over depths up to 15 feet.
2. Partial and complete replacement of porphyritic andesite fragments by silica has occurred throughout the quartz breccia.
3. A small amount of epidotization of mafics within the quartz breccia was observed.

MINERALIZATION

ZONE A

Metallic mineralization consists of pyrite, chalcopyrite, and tetrahedrite along with limonite, hematite, malachite, and azurite.

1. Pyrite: Less than 0.25% in the quartz breccia, porphyritic andesite, and agglomerate.

2. Chalcopyrite: Found in the quartz breccia (see assays from DDH #21)
3. Tetrahedrite: Small amounts disseminated through quartz breccia.
4. Limonite: Found over depths of up to 15 feet from the surface in all rock-types.
5. Hematite: Occurs only in the agglomerate.
6. Malachite and azurite: Occur as films and precipitation rings associated with chalcopyrite.

ZONE B

Mineralization consists of pyrite, sparse chalcopyrite, bornite and tetrahedrite along with limonite, hematite, and sparse malachite. The rock types in which these minerals occur are the same as those noted in Zone A.

Native gold and silver were observed in many of the samples from the quartz breccia. Although diamond drill data indicated negligible values in gold and silver in the porphyritic andesite, some relatively high values occurred in numerous percussion drill holes in zones which appeared to be predominantly porphyritic andesite, usually with 20 - 40% quartz cuttings in the samples. The geology within these zones needs clarification through further diamond drill work.

ASSAYS

All samples taken from the property were assayed by J. O. Dolphin, Osoyoos, B. C., Warnock-Hersey Ltd., Vancouver, B. C. or Crest Laboratories, Vancouver, B. C. Results are all recorded on the enclosed assay plans and sections.

METALLURGY

One metallurgical test was done by Britton Laboratories in 1968. A copy of this report on the work is attached as Appendix B.

ORE RESERVES

For the purposes of this report reserves were calculated on the basis of metal content only and two alternative considerations were used. In both calculations gold was valued at \$37.50 per ounce and silver at \$1.80 per ounce.

- (1) Using a cut-off grade of 2.0 ounces per ton silver equivalent and including internal sections of lower grade material there is a drill proven tonnage of:

67,790 tons averaging: Gold - 0.23 oz./T, Silver - 4.97
oz./T

(2) Using a cut-off grade of 1.0 ounce per ton silver equivalent to determine the bottom of the zone including all material between the bottom of the ore intersection and the surface, there is a drill proven tonnage of:

129,750 tons averaging: Gold - 0.12 oz./T, Silver -
2.59 oz./T

The latter calculation was made to provide some indication of the value of the silicious material as a flux. This exercise should be continued with active negotiations with the Cominco smelter staff to determine whether or not the ore could be sold as flux rather than silicious ore and beneficial rates received.

According to the smelter settlement sheet received the silica content is worth \$3.50 per ton but the total deductions reduced this figure to a net of \$0.52.

Probable and Possible Ore

Due to the extremely erratic nature of the mineralization it is not possible to anticipate ore grade mineralization with any degree of authority. On the basis of present evidence it appears that there is a good possibility of continuity of the mineralization to the north-east but at somewhat greater depth.

SERVICES

The property is not equipped with a mining plant or a camp. However, its proximity to the village of Okanagan Falls, which is serviced with power, water, railroad and highway, reduces the consideration of capital cost items for such services to a minimum. In the event that the total finally developed reserves are inadequate to justify a separate milling plant, consideration should be given to the shipping of raw ore using leased equipment for mining.

ECONOMIC ASSESSMENT

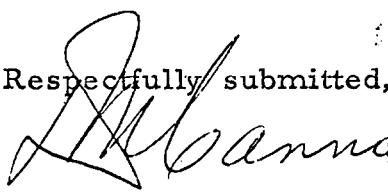

Too little data is yet available to make any authoritative estimate of capital costs, operating costs, taxes, or possible profitability. When the mineralized zone has been delimited, this exercise can be completed with relative ease.

CONCLUSIONS

Exploration to date has proven the existence of a modest tonnage of relatively high grade gold-silver mineralization contained in erratically distributed lenses in a silicious breccia. Structural controls are not completely understood, but it is

apparent that the grade of mineralization is partly dependent on the degree of fracturing and may also be related to obscure folding.

The continued investigation of the deposit is well justified. In my opinion the ultimate evaluation must be made on the basis of statistical rather than geological data.

Respectfully submitted,
 

P. ROPP, Geologist
D. M. CANNON, P. Eng.

23/12/69

PART C

References

Geological Survey of Canada Map 25-1961 A.W. Little

Smelter Settlement Sheet 9573-C Oct. 1, 1969

B.C. Dept. of Mines Records re Claims Ownerships

Reports by:

M. Guiguet - Sampling, 1968

D.M. Cannon - Dec. 23, 1968

Progress Reports: July - December, 1969

Cyanidation Tests Britton Research Limited
Sept. 10, 1968

Appendices:

(A) Britton Research Report

(B) Smelter Settlement Sheet

(C) List of Mineral Claims

(D) Ore Reserve Calculations