

Skyline's Iskut River a hot B.C. play

VANCOUVER — In general, gold discoveries in northern British Columbia require a grade premium over comparably-sized deposits further south; the reason, of course, is to offset poor exploration logistics and high mine development costs in these areas which typically have poor infrastructure.

Three discoveries in northern British Columbia, all of which will probably be producers, stand out at the moment: Skyline Explorations' (TSE) Johnny Mountain project 65 miles northwest of Stewart; the nearby Cominco/Delaware Snip property, currently the subject of a major underground exploration and development program; and the Newhawk Gold/Granduc Mines' Sulphurets project which should reach feasibility this year. Recent results from Sulphurets have been nothing short of spectacular and the depth potential there has exceeded expectations.

However, the Skyline/Iskut River area will be one of the hottest plays in the country this year and Prime Capital (Murray Pezim's merchant bank) holds the largest land position in the region. Prime Group companies have concluded option agreements with several juniors in the region and with Vancouver-based North West Gold Syndi-

cate/Iskut Gold Syndicate. At last report, the syndicate still had some ground open in the area.

Prime has agreements with several VSE-listed companies which, over the next few years, will involve expenditures of \$10-\$15 million in the Skyline-Iskut River area. Some Prime Group companies have concluded joint venture agreements among themselves and the following fall under Prime control or have joint venture agreements with Prime.

One of Prime's most important agreements (through Pezgold Resources) is with International Prism, a deal that involves five properties and \$2 million in expenditures over the next two years. Crest Resources, Dundee Resources and Ascot Resources, all of which are now in the Prime Capital fold, will also be active there this year. Golden Band and American Ore are farming into one of Delaware's properties, each with the right to earn a one-third interest.

Achilles Resources a Prime company, has an underlying exploration agreement with North West Gold/Iskut Gold Syndicate. Cheryl Resources can earn 50% of Ticker Tape's property, Pezgold has an agreement to earn 50% of Vanstates Resources property, Wildcat Re-

sources can earn 50% of Brenwest Mining's ground, while Gigi Resources, Norman Resources, Androne Resources, Achilles Resources, and Regal Resources have all optioned ground from the syndicate. Androne has a property under option from Skyline and Balcor Resources is negotiating for a ground there. Danstar has just optioned a claims from Ascot and Crest Resources is doing a deal with Magenta Development.

There are many other companies in the region which have either prepared or are formulating work programs. Significant land positions are held by: Jazzman Resources, Western Canadian Mining, Kestrel Resources, Cove Energy, Inel Resources, Mt. Calvary, Dryden Resource Corp., Barytex Resources, Hector Resources, Kyle Resources, Big M Petroleum, Gulf International Minerals, Consolidated Sea Gold, Racer Resources and Tanker Oil and Gas. There are many others too.

In recent months attention has been drawn away from the Skyline property to the much larger SNIP discovery which is being developed by Cominco (TSE) and Delaware Resources (VSE). Cominco has the right to earn a 60% interest in the project in return for financing the

first stages of mine and plant construction. Delaware will be spending \$4.5 million at SNIP this year, bringing its total outlay to \$8 million. Under their agreement, Cominco will have to fund the next \$16 million in exploration and development expenditures.

Reserves have been calculated at 1.2 million tons grading 0.7 oz gold in the Twin zone and this has been diluted by 20% and cut to 4.5 oz. These reserves lie within the geological boundaries of the Twin zone vein and extend from surface to depths ranging from 550-850 ft. Based on drilling and underground development, the vein appears to have good continuity and it's still open at depth and along strike to the east.

The Twin zone is a discordant shear vein that cuts through a massively-bedded feldspathic greywacke-siltstone sequence the character of which hardly changes over the vertical range tested to date.

Gold mineralization occurs in variably-sized bands of massive calcite, heavily disseminated to massive pyrite, biotite-chlorite, quartz, and pyritic to non-pyritic fault gouge. Considerable amounts of calcite exist throughout the Twin zone and there is only about 2% sulphide in the deposit. Values to 0.3 oz gold per ton have been encountered in rocks adjacent to the Twin but these haven't been included in reserve calculations. The current program is expected to provide data on ore continuity, grade estimation, mining conditions, and several other elements required for a production decision.

Reserves at Skyline currently total 256,150 tons grading 0.76 oz gold of which 82,150 tons averaging one ounce gold are classified as proven and 174,000 tons grading 0.64 oz gold are classified as drill-indicated and probable. Silver content is estimated at one ounce per ton and copper at 1%.

Two major veins have been explored to date: the 16 vein and Discovery vein both of which are open at depth and along strike. Only about 25% of the known surface length of these veins has been explored thus far. The company apparently has 40,000-60,000 tons of broken ore underground to feed the mill initially. Because the ore occurs in high grade and often narrow shoots, finding sufficient working places could be a problem. It will be interesting to see whether or not the mill suffers from any hunger pangs.

Finally to Newhawk Gold Mines (TSE) and joint venture partner Granduc Mines (TSE). Reserves in the West zone at Sulphurets total some 1.5 million tons grading 0.51 oz gold and 20.2 oz silver. This mineral inventory was as of Dec 31 and does not include extensive drilling completed earlier this year which returned some spectacular results, at times over above average widths.

The Shore zone, with reserves of 539,776 tons grading 0.26 oz gold and 27 oz silver, and the Gossan Hill, with 27,639 tons averaging 1.9 oz gold and 3.5 oz silver, have yet to be fully evaluated and could enhance over-all reserves for the property. Concentrate shipments (with the silver) will have to be made over a glacial road but much of its production will be refined on the property.

Ground control meeting

The 7th International Conference on Ground Control in Mining will take place Aug 3-5 at the Sheraton Lakeview Resort and Conference Center at Morgantown, W.Va., under the sponsorship of the U.S. Bureau of Mines, U.S. Mine Safety and Health Administration and West Virginia University.

For more information, contact the Department of Mining Engineering, West Virginia University, P.O. Box 6070, Morgantown, W.Va. 26506-6070, U.S.A.

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milling rate of 500 tons per day is based solely on the presently known reserves at the eposit totalling over one million tons at an average grade of 0.186 oz/ton gold and mately 200,000 ozs. of gold. It includes the new high grade N-2 Zone discovered in presently calculated at close to 800,000 tons at an average grade of 0.23 oz/ton gold, pgraded to an average of 0.27 oz/ton based on sampling of the 2nd, 3rd and 4th levels. mp. reserves are estimated to a depth of 1,000 feet and remain open for extension both olunge below that horizon. Including the recently increased geological reserves at the 43,000 tons averaging 0.13 oz/ton, the mineral inventory now totals some 2.8 million estimated 450,000 ozs. of gold.

omplex, while initially to operate at 500 tons daily or 180,000 tons per year, has certain for capacity of up to 1,000 tons to accommodate future expansion from other satellite he 'East' and 'Porphyry' Zones, which provide substantial additional tonnage potential.

erty Interests Now Total 191 claims or 12 Miles straddling the Porcupine-Destor Fault Structure

f the recent purchase for \$950,000 cash of the residual interest of Esso Minerals in aims adjoining the main Stock Township Mine Property, giving St Andrew Goldfields the underlying ore reserves, together with its earned increased ownership to at least a "designated lands" covering the 'Shoot' and 'Porphyry' deposits in adjoining Taylor ty interests now encompass a total of 191 claims or approximately 7,500 acres along he Porcupine-Destor Fault Structure, host to many former and presently producing nmins-Porcupine Gold Camp.

its an area approximating 15% of the total Porcupine-Destor Fault in Ontario, which f Timmins to the Quebec Boundary, and is currently the focus of a great concentra- id development interest, including the Harker-Holloway portion, which will see its first come on stream in mid-1988.



ISKUT-SULPHURETS GOLD

The Boundary Ranges, which separate the Alaska Panhandle from northwest British Columbia, host the Iskut-Sulphurets gold belt. The belt is at an early stage of exploration. New surface showings continue to be found and the winter of 1987-1988 saw the region fully staked for the first time. Despite its frontier status, two new gold mines have begun production and two more properties are in advanced stages of underground development and fill-in drilling — a tribute to the persistence of the operators and the power of flow-through share financing. Reserves of the four largest gold-silver deposits are moderate in tons but impressive in grade. All are still open along strike and to depth, and geological similarities with the 6.5-million-ton Silbak-Premier orebody to the south provide good cause for optimism.

The area first attracted interest at the turn of the century when prospectors, heading south from the Yukon goldfields, searched for placer gold and staked bedrock gossans. In the 1970s, the porphyry copper boom again drew prospectors and companies into the area, but the new golden age began with the 1979 option of the Sulphurets claim block by Esso Minerals Canada and the 1980 acquisition of the Mount Johnny claims by Skyline Explorations.

In the Iskut area, Skyline announced its production decision in 1987 and the mill was commissioned in July, 1988. The adjacent Snip property of Cominco Ltd. and Delaware Resources is scheduled to begin production in 1989.

In the Sulphurets area, Catear Resources began mine construction in August, 1987, and started mill production in June, 1988. Underground exploration and development are under way at the Brucejack Lake West zone of Newhawk Gold Mines and Granduc Mines. All these deposits are described below.

Apart from early placer gold recovery from some creeks, the area has no mineral production history. Since 1979, more than 70 new mineral pros-

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pects have been identified and more than \$110 million spent on exploration and development in the district. For 1987 alone, expenditures reached \$25 million.

Ground acquisition was relatively slow in the Iskut-Sulphurets camp until the fall of 1987 when the results of summer exploration programs became known and the provincial government announced upcoming release of analytical results from a regional stream sediment geochemical survey for the area. By April, 1988, all open ground was staked in anticipation of the busiest field season yet.

TWO MINES HAVE BEGUN PRODUCTION AND TWO PROPERTIES ARE BEING DEVELOPED

At least 60 companies hold ground in the Iskut-Sulphurets belt, with the most advanced development on properties being held by Catear Resources, Cominco Ltd., Delaware Resources, Echo Bay Mines, Granduc Mines, Magna Ventures, Newhawk Gold Mines, Silver Princess Resources and Skyline Explorations. To date, only small areas within this 25x50-mile district have received intensive exploration. Its full potential is essentially untested.

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The Iskut-Sulphurets district represents the northward extension of the historic Stewart gold-silver mining camp. Country rocks are Upper Triassic to Lower Jurassic Hazelton Group andesitic pyroclastics and related sedimentary rocks. Characteristic ore minerals include electrum, native gold and silver, as well as silver sulphosalts. Base metals are present in recoverable amounts in some deposits. The ore deposits and alteration assemblages are typical of mesothermal to epithermal vein systems in island arc environments. Combined age dates and lead isotope studies indicate that the early Jurassic volcanic and intrusive host rocks and the mineralization are essentially coeval; they formed about 195 million years ago. This age is similar to deposits in the Stewart and Alice Arm mining camps to the south, and the Toadoggonne camp to the east — all hosted in Hazelton Group rocks.

All original discoveries resulted from prospecting programs, although follow-up rock geochemistry surveys have identified additional mineral zones nearby and induced polarization surveys have successfully delineated high-sulphide areas within large alteration zones. Typical prospect evaluation involves initial sampling of blasted bedrock trenches followed by large-diameter diamond drilling. Regionally, the two mining camps stand out as strong geochemical anomalies in gold and silver, but associated or "pathfinder" elements differ between the camps: the Iskut area is anomalous in lead, zinc, copper, and cobalt; the Sulphurets area is anomalous in copper, arsenic, antimony, mercury, barium and fluorine.

Both the federal and provincial governments have mapping programs and other studies under way in the area. Jointly, they have just completed a 20-element stream sediment and water geochemical survey of the entire region and a side-looking radar survey proposed by the province has been commissioned by the Canada Centre for Remote Sensing (Energy Mines and Resources Canada) to outline

major structures in both camps

The Snip Property

This property, held by Cominco and Delaware Resources, is on the lower slopes of Johnny Mountain. It adjoins the north boundary of the Skyline Explorations' Stonehouse property where gold production began in 1988.

The first claims on the northeast flank of Johnny Mountain date from 1910. Since then, Cominco has prospected and explored the area intermittently, discovering significant gold in 1965. Native gold was first observed in outcrop by a Cominco exploration crew prospecting the ground around Johnny Mountain for base metals. Trenching in 1966 revealed a strong calcite-quartz-chlorite-sericite shear vein hosting pyrite, sphalerite, galena, and native gold. Assays of 1.36 oz gold per ton over 11 ft, 0.44 oz per ton over 18 ft, and 6.54 oz per ton over 4 ft were obtained over a 60-ft strike length. The property was abandoned by Cominco in the early 1970s but restaked in late 1980. Since that time, work has confirmed the existence of high gold grades and outlined strong gold geochemical anomalies in soil.

In early 1986, Cominco signed an

option agreement with Delaware Resources. During 1986-1987, programs financed by Delaware led to the completion of 85 diamond drill holes (50,350 ft) which intersected several high-grade veins. The best of these is the Twin zone, a 3-to-25-ft-thick, discordant, shear vein cutting a thickly bedded sequence of intensely carbonate-altered feldspathic greywacke and siltstone.

Iskut-Sulphurets Area Reserves

Deposit	Tons*	oz per ton	
		Gold	Silver
Silbak Premier	8,195,000	0.07	2.03
Snip	1,570,000	0.64	—
Stonehouse	1,090,000	0.70	1.00
Goldwedge	319,000	0.80	—
Brucejack Lk West	854,000	0.35	22.94
Total	12,028,000	0.24	1.86

*indicated, inferred and proven.

The Twin zone structure strikes 120°, dips 50° southwest and has been traced over a strike length of 3,500 ft and through a vertical range of 1,500 ft. During 1988, underground drifting on the zone system on the 300 Level demonstrated the existence of two distinctly different ore types. Type A occurs in a complex banded shear vein composed of alternating bands of massive calcite, heavily dissemin-

ated to massive pyrite, crackle quartz, and thin bands of biotite-chlorite. Pyrite averages 15% in Type A mineralization. Other sulphide minerals include pyrrhotite, chalcopyrite, sphalerite, galena and arsenopyrite. Molybdenite is also common locally. Minor to trace amounts of bismuth and lead tellurides have been observed.

Type B mineralization is dominated by pyrite-pyrrhotite mineralogy (quartz and calcite are absent) and tends to be more attenuated and discontinuous than Type A. Both types lie within the Twin zone structure with Type B located eastward and down-dip from the more mineralogically complex Type A.

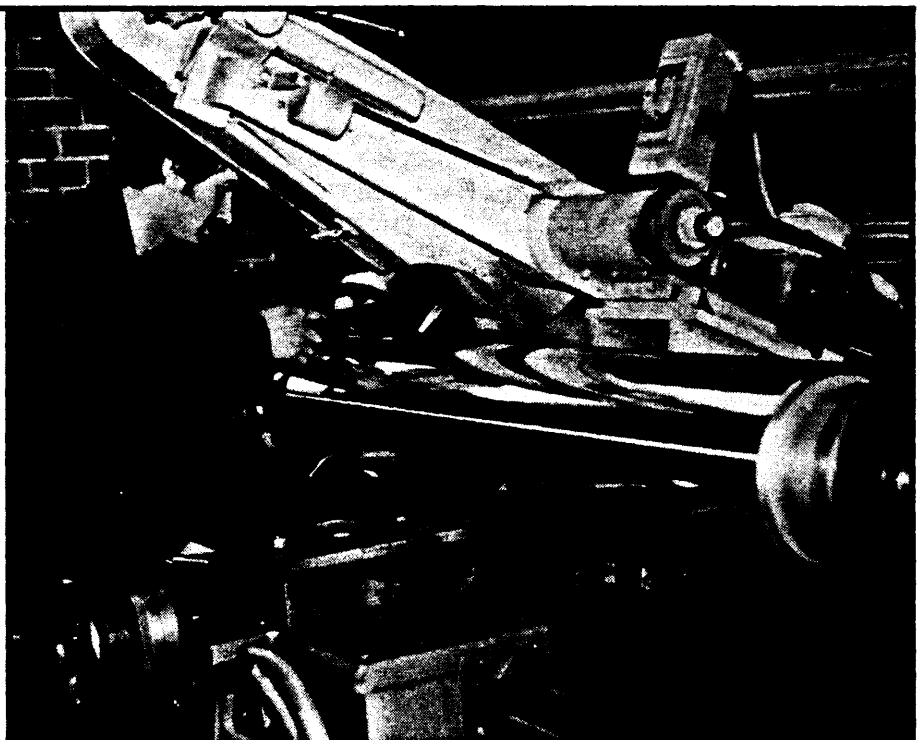
Polished sections reveal that native gold is in free form. It occurs with gangue minerals (biotite, sericite, quartz, carbonate) and commonly at the margins of pyrite, arsenopyrite and lead-bismuth tellurides. It also fills late-stage fractures in pyrite and arsenopyrite.

The current ore reserve estimate comprises 1.57 million tons of 0.64 oz gold per ton in indicated and inferred categories. The reserve includes 25% mining dilution at zero grade, based on a minimum mining width of 6 ft. Individual assays greater than 5 oz per

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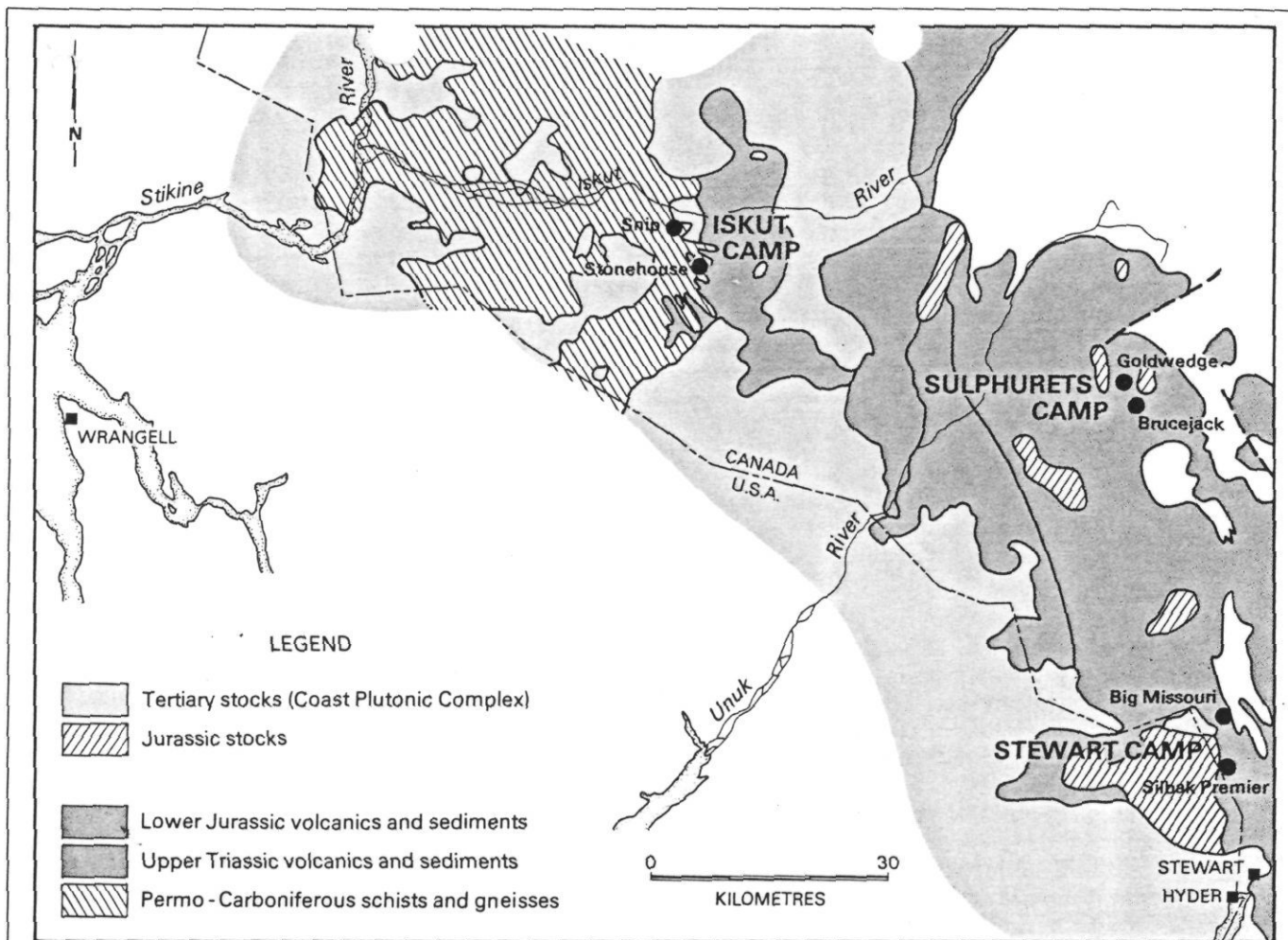


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ton have been cut to 5 oz per ton. Metallurgical tests on underground bulk samples and drill-core composites spaced throughout the ore reserve produced combined gold recoveries (gravity plus cyanidation) of 91% to 98%. The gold-to-silver ratio in the deposit is approximately 3:1.

Underground exploration and development of the deposit is in progress and preliminary engineering for construction of mill, tailings disposal sites and surface facilities is under way in preparation for late-1989 start-up of a 330-ton-per-day operation.

The Stonehouse Deposit

The Johnny Mountain gold mine, 100% owned by Skyline Explorations, was officially opened Aug 17, 1988. Skyline staked the REG claims in 1980 and outlined five major areas of gold-bearing sulphide mineralization, of which the Stonehouse deposit was judged the major economic target. Men and supplies were first flown in from Terrace, B.C., but currently Wrangell, Alaska, is the key air transport centre. The mill, bunkhouses and major equipment were flown to the

site by Hercules and S-61 aircraft in early 1988 and were largely in place by April, 1988.

The Stonehouse deposit includes a number of extensive subparallel sulphide-potassium feldspar-quartz vein and stockwork systems which have been only partly explored. The deposit extends for 5,000 ft on surface and has been drilled to a depth of 700 ft. Surface exploration was followed by trackless underground development in July, 1986, in order to prove the continuity of both grade and vein structures. Development has concentrated on the 16 and Discovery vein systems which trend northeasterly with steep northerly dips. The deposit has been developed on the 1,125 and 1,075 levels and a decline is now being driven to reach the deeper vein systems. Development ore and ore from shrinkage stopes on both the 1,125 and 1,075 levels have been stockpiled on the surface for mill feed during the first year of operation. The 400-ton-per-day mill utilizes standard flotation and cyanide circuits as well as new cyanide regeneration technology.

The gold/silver/copper-bearing sulphides comprise mainly pyrite and

chalcopyrite with some sphalerite, galena and minor pyrrhotite. Gangue is mainly potassium feldspar (orthoclase) with variable quartz. The host rock is part of a potassium-feldspathized syenite-syenodiorite stock of probable Lower Jurassic age that has intruded a thick Upper Triassic sedimentary sequence. The Triassic strata are overlain by a younger, gently dipping volcanic-sedimentary sequence. The veins and sulphide stockworks are found entirely within fracture systems cutting altered and deformed syenite and sedimentary rock pendants. High grade gold mineralization appears to be concentrated along phyllonite/massive syenite contacts.

Geological reserves as of January, 1988, include 1.09 million tons of proven, probable and inferred ore grading about 0.70 oz gold per ton, about 1.0 oz silver per ton, 1% copper, plus minor zinc and lead. Both surface and underground drilling are continuing to develop further reserves.

The Goldwedge Deposit

The Goldwedge fractional claim group is owned 100% by Catear Resources. The claims cover an area of

fragmental andesites and derived sedimentary rocks of the Hazelton Group. All rocks in the area of interest have been foliated and sericitized; they are cut by quartz stockworks containing pyrite, electrum, tetrahedrite, arsenopyrite, sphalerite, galena and pyrrhgyrite. Pyrite is also common in the volcanic host rocks and the sericite-altered rocks. These altered zones are interpreted as structurally controlled, high-level, mesothermal-epithermal vein systems associated with syenodiorite intrusions.

The gold occurs as fine fracture fillings, as near-massive seams, and as specks within white quartz. It also occurs as narrow sheets and seams within the sericitic wallrocks, generally where the quartz veinlets have pinched out. Coarse sheets of gold are also present within fault gouge and along slippage surfaces.

The property has been explored by 58 surface drill holes and 62 underground drill holes totalling 26,000 ft as well as drifting, raising and a test stope with decline access. Results of the surface drilling indicated a grade of 0.837 oz gold per ton while the drifting has indicated a grade of 0.825 oz per ton along 178 ft of drift. Based on the drifting and drilling, proven ore reserves are calculated at 40,000 tons grading 0.825 oz gold per ton. Reserves in all categories total 319,000 tons at 0.80 oz per ton.

Fifteen Holes Completed

At least three other structures on the property have the potential to develop reserves. Fifteen underground drill holes have been completed in the Discovery vein; two of the holes intersected coarse native gold.

A 50-ton-per-day mill is in the final stages of commissioning with low-grade ore currently being run through the system prior to processing of the high-grade stockpile. The deister tables will produce gold concentrate, sulphide concentrate and tailings. Metallurgical work carried out by Catear indicates an 80% recovery of gold at the deister tables in the form of a gold concentrate. The overall recovery is estimated to be in the region of 97% after flotation of the sulphides.

Catear plans to stockpile the sulphides for processing during the summer while flotation and additional milling equipment are installed. Following the installation of this equipment, the mine will be able to process

250 tons per day.

The Sulphurets Property

The Sulphurets property is a joint venture between Newhawk Gold Mines (60%) as operator and Granduc Mines (40%). Present access to the property is by helicopter, by a barge-road link, or by fixed-wing aircraft to a strip near Knipple Lake.

The property covers 25 gold, silver, copper and molybdenum showings in a 35-sq-mile claim block. Exploration and development have focused in the southeast corner of the property, on the Brucejack Lake West zone. Work on the West zone includes 72,853 ft of surface diamond drilling and 26,327 ft of underground diamond drilling plus 2,266 ft of decline, 4,119 ft of drifting and 1,771 ft of raising.

West zone mineralization is localized in quartz-filled shear zones and subsidiary tension veins. The shear zones developed along the contact between andesitic tuffs and sandstones. Early syenite bodies have intruded both rock types. Later plagioclase porphyry stocks appear to be genetically related to the gold-silver mineralization. West zone mineralization consists of electrum, tetrahedrite, polybasite, pyrrhgyrite, acanthite, sphalerite, galena and pyrite. Gangue is predominantly quartz and carbonate.

There are two styles of mineralization. Quartz veins with argentiferous tetrahedrite, pyrite, sphalerite, galena and electrum typically grade 0.3 oz

gold per ton and 20 oz per silver ton. A second type consists of the preceding mineral suite with an overprint of bonanza-style disseminated to massive ruby silver (pyrrhgyrite), argentiferous tetrahedrite, sphalerite and minor galena. Electrum is common in these bonanza shoots as coarse blebs and leaves. This ruby silver type of mineralization commonly grades 5 to 6 oz gold and 500 to 700 oz silver per ton.

Ore shoots have strike lengths of 120 to 500 ft and depths of more than 1,000 ft. Measured, indicated and inferred ore reserves in the immediately accessible area of the West zone are 854,072 tons grading 0.354 oz gold and 22.94 oz silver per ton, using a cut-off grade of 0.20 oz gold equivalent per ton and a minimum width of 5 ft.

The current \$4-million development program consists of advancing the decline to the 1,250-m level, as well as additional raising, drifting and underground diamond drilling. This program will further define the West zone, its strike extension, and several newly discovered adjacent zones. A pre-feasibility study is under way. □

Ore Horizons features both general and specific mineral deposits articles of current interest. Papers are refereed by the Mineral Deposits Division (MDD) of the Geological Association of Canada. Submissions are invited and should be addressed to Dr W. E. Roscoe, Editor, c/o The Northern Miner Magazine.



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