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GCNL #8 13 JAN 1986

DIAMOND DRILL BUDGET OF \$250,000 PLANNED
FOR 1986 TOODOGGON RIVER, B.C. PROPERTY
CHAPPELLE, BAKER

miles north of Smithers, B.C. The first work will follow up on an old hole in the B zone which assayed: 0.33 oz.gold/t, 5.21 oz.silver/t across 14 ft. including 5.3 feet assaying 0.702 oz.gold/t, 11.34 oz.silver/t. The B zone includes two sub-parallel vein structures exposed in trenches over 400 feet of length.

MULTINATIONAL RESOURCES INC. (MUT-V) 94E/6E (094E 026)

- President William Clancey has reported consultant Dr.N.C.Carter, P.Eng. has recommended a \$200,000 to \$250,000 exploration program, mainly diamond drilling on the B zone on the property in the Toodoggone River area, 300

GCNL 86 MULTINATIONAL RESOURCES INC. (MUT-V)

DRILL PROGRAM TO START - Drilling will start about mid-
MAY 87 May 1987 to increase ore reserves at the Multinational Resources property in the Toodoggone gold camp 175 miles north of Smithers B.C.

Drilling will focus on extending the "B Zone" to the northeast towards the North Quartz zone. Surface investigation of other known gold bearing zones also will be undertaken. Third phase of the Multinational campaign will include underground drifting. 94E026(66)

Nissho Iwai Canada Ltd., a wholly owned subsidiary of the Japanese trading house Nissho Iwai Corp., will earn a 20% joint venture interest in the Toodoggone project by funding the \$1,000,000 exploration package.

*GCNL 114 MULTINATIONAL RESOURCES INC. (MUT-V) JUNE 15, 87

TOODOGGONE DRILL PROGRAM STARTS - Multinational

94E026

Resources Inc.

president William Clancey has reported the drill crew and company personnel are on site at the Chappelle property, Toodoggone area, B.C., making preparations to commence drilling by 12Jun87. Phase I includes more than 5,000 ft. of diamond drilling designed to expand upon and further define reserves indicated last season on B Zone. The program is expected to take 5 weeks to complete and will be followed by additional drilling of B Zone and other targets and possible underground work on B Zone. (See property location map overleaf page 2 of GCNL 80(87).

Multinational Resources Inc. MUT
Shares issued: 4,601,602 Sep 25 close: \$1.17
SEPT 29/87 News Release
Mr William Clancey reports. S.W

The company and its joint venture partner Nissho Iwai Canada announces that two phases of diamond drilling are now complete on the Cappell property in the Toodoggone River area of north-central BC. 94E026

Drilling to date has further defined gold-silver mineralization on the B zone and has allowed a rigorous estimate of reserves. A steeply northeast plunging ore shoot containing gold and silver grades is estimated to contain 50,000 tons grading 0.587 oz gold and 5.16 oz silver per ton at a 0.20 oz/ton gold cutoff grade and a minimum mining width of 6 feet. Metal prices are at a gross value of approximately \$20,000,000.

This zone of better grade mineralization is enveloped by extensive areas of lower gold grades, indicating potential for discovery of additional high grade shoots within the B zone structure which to date has been traced more than 900 feet along strike and to depth exceeding 600 feet. Additional diamond drilling along the untested portion of the B zone is planned for this field season and should be completed by mid-October.

Recent prospecting has resulted in the discovery of a new vein structure one-half mile northeast of B zone. Vein mineralogy is similar to B zone. Analytical results are pending.

WIN 1011 #7, JUN 87

Multinational drilling

94E026 or 94E16E or 94E600
Multinational Resources Inc. (VSE-MUT) accelerated preproduction plans on their Toodoggone properties when it recently announced an extensive drilling program will be in full swing by June.

"We've got excellent exploration targets in sight, and we'll focus on extending our successful 'B' zone program in a northeasterly trend toward the adjoining North Quartz zone," said Multinational president Bill Clancey.

One of Japan's largest trading houses, Nissho Iwai Corp. of Canada, has agreed to provide C\$1 million for this year's exploration and mine development. Two Canadian subsidiaries of Nissho Iwai are putting up the money for a 20% undivided interest in the company. Both firms already hold a 20% equity interest in Multinational through common share purchases made in 1985.

"After the C\$1 million exploration and development campaign is concluded, the parties will enter a joint-venture agreement. Both parties will contribute on a pro rata basis for future exploration and development expenses," explained Clancey.

The agreement is believed to be the only investment in a junior firm by any of the major Japanese trading houses. Until now, these traders have limited themselves to base metals or partnerships in operating companies. "We have confidence in the Toodoggone and in British Columbia's future, as well as confidence in Multinational's management," said Iwao Okamoto, president of Nissho Iwai Canada.

Multinational is still negotiating for Dupont's Baker mill, which would be used to process ore on the property. Clancey said he is hopeful a deal can be struck by June. Multinational was given the first right of refusal for the mill when it purchased the property in 1985. The Baker mill is rated at 100 tons per day, and can be reactivated easily and relatively cheaply.

Clancey confirmed his company will follow the recommendations of Dr. N.C. Carter, a highly-respected consultant to the industry. Multinational's 5,300 feet of drilling will help define reserves in the 'B' zone. Exploration expenditures are estimated at C\$270,000 for the first phase, and a similar amount for the second phase.

Genh MULTINATIONAL RESOURCES INC. (MUT-V) 9/30/87
GOLD-SILVER RESERVE ESTIMATED - Multinational Resources Inc. and its joint venturer, Nissho Iwai Canada, report 2 phases of diamond drilling completed on the Chappelle (ex-Baker mine) property in the Toodoggone River area of north central B.C. Drilling has further defined gold-silver mineralization on the B Zone and has allowed an estimate of reserves. A steeply NE-plunging ore shoot containing excellent gold and silver grades is estimated to contain 50,000 tons grading 0.587 oz. gold and 5.16 oz. silver/t at a 0.20 oz.-gold/t cut-off grade and a minimum mining width of 6 feet. Management considers this to be a viable reserve at current metals prices with a gross value of some \$20,000,000 Cdn. ISSUFE #188

This zone of better grade mineralization is enveloped by extensive areas of lower gold grades, indicating potential for additional high grade shoots within the B Zone structure which to date has been traced more than 900 feet along strike and to depths exceeding 600 feet. More drilling along the untested portion of the Zone is planned and should be completed by mid-October.

In recent prospecting a new vein structure was discovered half a mile NE of B Zone. Vein mineralogy is similar to B Zone. Assay results are awaited.

The Omineca Resource road extension reached the property in early September. Construction of the road is being undertaken by Cheni Gold Inc. with half the costs being advanced as a loan by the Provincial Ministry of Energy, Mines and Petroleum Resources.

Serem Inc. could be first to produce in

Toodoggone area

by David Duval

VANCOUVER — Exactly when Serem Inc. will make a production decision on its Lawyers property is still uncertain. What is known, however, is the fact the company must decide by March 31 in order to qualify for government assistance to construct a road into the property.

Serem is rumored to have purchased the residual interests of minority interest holders in the project, overcoming a major obstacle to securing production financing. Apparently the company has been looking for a joint venture partner and is also said to be contemplating some form of public offering to finance the development, possibly in Toronto.

Other companies in the Toodoggone area, which is 170 air miles north of Smithers, B.C., have anxiously been awaiting a production decision: Serem's deal with the government is contingent upon it announcing the decision first.

All operators in the region stand to benefit when the Omenica mine road is extended into the Toodoggone area. **Energex Minerals**, which believes it has sufficient reserves to commence production, says the economics of its situation would be enhanced significantly by good road access.

Energex President Arne Birkeland says his company wants to step up the timetable for production, adding that an exploration budget of \$3 million has been proposed for this year. At least \$1 million (flow-through) will be budgeted for a deep drilling program and he confirms a \$2-million private placement is being secured for additional work. This would include \$1 million for more deep drilling and a similar amount for road access into the property.

Trunk road needed

The company would have to build a trunk road into its property from the main Omenica road. Presumably some of the cost would be financed by other operators whose properties were in close proximity to the road.

Concentrate from the company's pilot plant operation is being tested to determine actual recoveries. In any event, they are expected to be equal to, or better than, the industry average. The plant will probably operate this year and its crushing capacity will be expanded. The production rate will be 6-10 tons per day, he adds.

Shallow open pit reserves in three deposits now stand at 262,242 tons grading 0.25 oz gold using a 0.03-oz cutoff grade. There are 60,100 tons of drill-proven reserves averaging 0.56 oz gold which could be mined to reduce the payback period.

Noting they had good success in the Bonanza Ridge zone last year (which appears to be getting stronger with depth) Mr. Birkeland confirms it is still wide open and will be tested to depth. Drilling in the BV zone will also include testing the rake of the mineralization.

New vein discovered

Multinational Resources has been exploring the Chappelle property and has opened negotiations for the Baker mill which was operated previously by Du Pont Canada. Multinational acquired the mineral rights to the 170-claim property in 1985 and successfully located a significant gold-silver-bearing quartz vein structure in 1986.

The B zone discovery is approximately 1,200 ft northeast of the A vein which was mined by Du Pont from 1981-83. Multinational consultant Dr N. C. Carter says the surface expression of the zone includes several 1-2-ft-wide quartz veins which contain low gold and silver values. Du Pont tested the alteration zone in 1981 but the hole yielded no significant values.

One of Multinational's 1985 drill holes intersected 14 ft of 0.33 oz gold and 5.2 oz silver which alerted them to the potential. Last year, further drilling defined a well mineralized quartz vein structure with an apparent true width of 8-25 ft. The highest gold and silver values occurred over a 7-ft average true width and occupy a gently northeast-raking shoot over a 200-ft vertical interval with the plane of the vein.

Significant intersections

The B zone has been drill-tested over a strike length of 450 ft and to a depth of 425 ft below surface. Two significant intersections were reported in hole M86-19, one of which averaged 1.2 oz gold and 3.1 oz silver over 11.3 ft and the other 1.4 oz gold and 0.87 oz silver over 7.5 ft. The last hole drilled in the season intersected a 16.8-ft section



Photo by The Northern Miner

Prospector J. Auger and Dr N. C. Carter, geological consultant, standing near the B zone discovery at Multinational's Baker mine property in Toodoggone area.

assaying 1.7 oz gold and 21.3 oz silver. Within that interval was a 10-ft section grading 2.7 oz gold and 32.5 oz silver. The zone is open to depth and along strike, particularly to the northeast, says Mr Carter.

He interprets the B zone as being an extension of the A vein structure, although the former doesn't appear to have the same structural complexity. The Baker mine had a big dilution problem which was related to extensive cross-faulting underground.

The 1987 program will include an initial 5,000 ft of drilling to further define the B zone before commencing underground drifting. Mr Carter confirms they will attempt to get back into the property this April to complete the drilling so there will be adequate time for the underground program.

*N. Miner
Mar 9/87*

*94E066 Lawyers
94E026 Chappelle*

Toodoggone production hinges on provincial aid

by David Duval

SMITHERS, B.C. — Pressure is mounting on the B.C. government to cover the cost of extending the Omenica road into the Toodoggone area 180 miles north of here.

The move would probably lead to a production decision for at least one property (Serem's Lawyers) and enhance the economics of several others — particularly those held by **Energex Minerals, Multinational Resources** and the **Golden Rule/Manson Creek** joint venture.

All these companies have been reporting very encouraging drill results lately (N.M., Sept 15/86) and Energex has been successfully recovering gold from a small pilot plant operation.

With jobs a high priority in the upcoming provincial election of Oct 22, industry officials are optimistic they will be able to work out an equitable arrangement with the government. Although he has only been in power for a few months, Premier Bill Vander Zalm has proved to be surprisingly decisive on a number of issues including government participation (through a preferred share issue) in Cominco's lead smelter project at Trail.

Energex in particular has been anxiously awaiting a production decision by Serem, something that was expected this summer. Exploration work on the Energex property this year has enhanced its bulk tonnage potential, the economics of which would be heavily weighted towards a good road access. The government has agreed to loan Serem \$4.5 million to construct a road into the region but the \$10-million total cost still represents a sizeable investment for the company.

Sources say Serem is trying to negotiate non-recourse financing for the project, but there is a 40% carried interest in the property which has tended to complicate things. Also, there is said to be infighting among Serem board members who have different opinions on the project.

The Northern Miner obtained a first-hand perspective on the Toodoggone during a recent visit to Energex, and also to Multinational at the old Baker mine property. Most of the companies in the region were packing up for the win-

ter although Energex was prepared to run its pilot mill until weather closed down the operation.

Getting into the Sturdee airstrip can be difficult at this time of year and there was more than one "white knuckle" passenger on the aircraft, including this reporter. Good road access is obviously essential to the area, not only for bringing in personnel, but also heavy equipment. The mill at the Baker mine was hauled in piece by piece in a Hercules aircraft at great cost. In most other provinces, governments provide infrastructure to spur industrial development, but B.C. has often been reluctant to do so.

This year's program by Energex has confirmed the reserves in the Thesis III and BV deposits as tabulated by Wright Engineers. Prior to the start of exploration the reserve totalled 143,000 tons grading 0.248 oz gold in the Thesis and 130,000 at 0.249 in the BV. The Thesis III is composed of hard microcrystalline quartz which has been highly fractured, something that has inhibited coarse recovery in the past.

The bulk of the feed for the pilot plant has come from here and the difference between the calculated and actual head grades is about 5%, The Northern Miner was told. The BV and Bonanza zones were also bulk sampled and the material was said to be representative of higher grade material on the property which could be extrapolated to a 50-ton-per-day milling operation.

The small pilot plant is rated at six tons per day and the head grades have averaged more than 1.5 oz gold per ton. Results from the Verrenass pit in the Bonanza zone suggest an average grade of 2.5 oz but the values are erratic, the company admits. High grade mill feed is sacked and transported to the mill.

Four major linears

There are four major northwest-trending linears on the property where high grade values have been found. But subsidiary structures also exist where values are lower but more consistent. Basically they are dealing with ore shoots or lenses in a low grade system and on-site geological staff appear to favor the bulk tonnage potential which at this point appears to range from 0.1-0.15 oz gold per ton. That grade, of

course, is very preliminary and could be revised upward as exploration work progresses.

Gold values are related to the porosity of the host rock, barite content and high sulphide content, particularly in the Bonanza area. The BV zone is the strongest structure and on surface averages 0.65 oz gold. The company expects the drill grade will be around the same, noting the zone has been tested to about 120 ft in depth on 165-ft centres.

The structure seems to disappear at depth but could be found again with more drilling. Energex expects to complete about 3,000 ft of drilling this year on the BV zone which has been outlined over a strike length of at least 500 ft.

The Thesis II and III zones are probably controlled by a single structure and the former is marginally economic at the moment, says Energex. The strike length of the Bonanza zone has increased substantially and as they drill the various zones the chances of locating blind deposits is excellent.

Some of these will probably be high grade and they could be used as a sweetener in a lower-grade bulk-tonnage operation. The pilot plant is small but impressive and about half the gold is recovered jigs and the rest by flotation.

Multinational recently completed a 6,500-ft drill program at its Baker mine property and is fast establishing a threshold reserve for production. The company has an option to purchase Du Pont's Baker mill which is rated at 100 tons per day and could be reactivated quickly and relatively cheaply. Multinational completed 2,000 ft of drilling last year and the only good intercept encountered was in the B zone which has been the focus of this year's program.

The company's geological consultant, Dr Nick Carter, said the B zone lines up with Du Pont's A zone which lies across a small valley. The only surface expression for the B zone is a series of small quartz stringers but none of these carry gold. The zone is about one-quarter mile from the old Baker mine workings and it could be developed by adit.

Drilling has been on 50-75-ft centres and the zone has been out-

94E026 Baker
94E066 Lawyers
94E091 Thesis BV

lined for some 400 ft along strike over 10-20-ft widths. It's a simple quartz vein and the better values are in the hangingwall which is similar to Du Pont's A zone. The major difference between the two is the fact the B zone has only small amounts of silver. The gold is associated with sulphides and there is no visible gold, he pointed out.

At this point their potential seems to be around 50,000 tons grading 0.5 oz gold which might be sufficient to reactivate the mine, but more detailed studies will be required to determine this.

More drilling planned

The Baker mine had severe dilution problems because of cross faulting and generally poor ground conditions. But there doesn't seem to be much faulting in the B zone and the structure is predictable so "we should be able to lay out new holes on the money," he said.

One of the last holes drilled this year included 80 ft of quartz (representing about 25 ft true width) and he said there were sulphides in the hole. J. T. Thomas Diamond Drilling has been providing drilling services on an all-inclusive basis which has guaranteed a fixed drilling cost for companies in the region.

Mr Carter would like to see another 10,000 ft of drilling completed before going underground to define the limits of the structure. Du Pont was drilling the North Quartz zone to the east when the mine was closed and it could join up with the B zone, he added. Unfortunately, Du Pont didn't have the financial resources to conduct a more detailed evaluation of the property, otherwise it might have made the B zone discovery.

Multinational has the mineral rights to the entire property excluding 10 claims and fractions held by Du Pont which includes the mill site and tailings areas. The tailings dam would have to be built up to accommodate waste from any future production.

Golden Rule and Manson Creek Resources have drill-tested their Mets zone at Toadogone over a strike length of 495 ft and to a depth of 295 ft. True widths have varied from 16-30 ft in a quartz barite breccia epithermal vein system that is oriented roughly north-south and dips steeply to the west. The gold-bearing structural system has been traced on surface by backhoe trenching and mapping for 7,900 ft. Results were so good that the joint venture is planning a major program next year.

Recent assay results included: 22.5 ft of 0.414 oz gold (including 15 ft of 0.5 oz) in hole 86-09; 20 ft grading 0.214 oz in 86-12; 35 ft averaging 0.181 oz gold in 86-13, and 22.5 ft grading 0.233 oz gold in 86-16.

GCNL #191 3007986

MULTINATIONAL RESOURCES INC. (MUT-V)

HOLE NO. INTERVAL LENGTH OZ. GOLD/T OZ. SILVER/T

M86-33	115.2-132.0	16.8 ft.	1.702	21.26	94E/6E
Includ.	119.2-129.2	10.0	2.749	32.46	
M86-20	336.3-340.3	4.0	0.240	1.15	1014E 026
M86-21	426.4-431.0	4.6	0.122	0.09	
M86-22	334.8-336.8	2.0	1.301	0.01	

Dr. N.C. Carter, P. Eng., supervisor of the drilling program on the B zone of the Baker property held by Multinational Resources Inc. and located in the Toodoggone River gold area, 200 miles north of Smithers, B.C. has reported drilling to date has shown good gold and silver grades to be contained within a persistent quartz vein structure over a strike length of 400 feet, a vertical range of 200 feet. The true widths of the structure are estimated to be 8 to 10 feet. (SEE DETAIL OF ALL PREVIOUS DRILL HOLES IN THE B ZONE OVERLEAF P.3 GCNL NO. 183, Sept.23,1986)

M86-23 was collared 50 ft. southwest of previously reported hole M86-19 which intersected two well mineralized sections with 1.151 oz.gold/t, 3 oz.silver per ton over 11.3 ft. and 1.35 oz.gold/t, 0.807 oz. silver/t over 7.5 ft. The M86-23 hole intercept is 60 ft. vertically above that of previously reported hole M86-14 which intersected 0.486 oz.silver/t over 12.9 ft. The first two holes, M86-20 and M86-21 in the recent program were stepouts at 75 ft. intervals along the northeast striking B zone structure, where a third hole intersected the zone 150 ft. vertically below the previously reported intercepts in hole M86-19.

Gold/silver values high at Multinational's Baker bet

VANCOUVER — Some late-year drill results from Multinational Resources' Baker mine property in the Toodoggone area north of Smithers, B.C., are quite spectacular. Not only are the gold assays high grade but the silver values are proving to be a surprise because only minor silver was evident in earlier drilling.

Four holes were recently reported including 86-33 which graded 1.7 oz gold and 21.3 oz silver over a core length of 16.8 ft (12 ft true width). In addition, 10 ft of core within that intercept graded a hefty 2.7 oz gold and 32.5 oz silver.

Another hole, 86-23, was collared 50 ft southwest of 86-19 which intersected two well-mineralized sections with 1.2 oz gold and 3 oz silver over 11.3 ft and 1.4 oz gold and 0.8 oz silver over 7.5 ft. Multinational consultant, Dr N. C. Carter, notes that the intercept in 86-23 was 60 ft vertically above that of

previously reported 86-14 which graded 0.49 oz silver over 12.9 ft.

Two stepout holes along the northeast-striking B zone structure returned lower grade values over narrower widths including 4 ft of 0.24 oz gold and 1.15 oz silver in 86-20 plus 4.6 ft of 0.122 oz gold and 0.09 oz silver in 86-21. Another hole intersected 2 ft of 1.3 oz gold 150 ft below the previously reported intercept from 86-19.

Mr Carter confirms that gold and silver values are persistent within a quartz vein structure that runs some 400 ft along strike and for a vertical range of more than 200 ft. The structure is still open along strike and to depth.

Multinational gets \$1m. from Japan

N.M. 4 MAY 87 94E/6E

VANCOUVER — A large Japanese trading house will provide \$1 million for exploration and development of Multinational Resources' Toodoggone gold property in northwestern B.C. Two Canadian subsidiaries of Nissho Iwai Corp. are putting up the money for a 20% undivided interest in the project. The companies already hold a 20% equity interest in Multinational through common share purchases made in 1985.

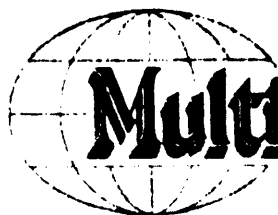
After the exploration program is completed, Multinational and Nissho will enter into a formal joint venture agreement with future expenditures shared on a pro rata (80/20) basis.

According to President William Clancey, negotiations are still under way for Du Pont's Baker mill which would be used to process any feed from the property. He expects these

negotiations to be concluded within the next month. Multinational was given the right of first refusal for the plant when it negotiated the property agreement several years ago. Mr. Clancey says it would cost about \$350,000 to rehabilitate the mill which is rated at 100 tons-per-day.

He confirms the company will follow the recommendations of its consultant for the upcoming pro-

gram. Dr. N. C. Carter has recommended 5,300 ft of drilling in the first phase to define reserves in the B zone. This would involve an expenditure of \$270,000 which would be followed by a second phase costing a similar amount. The latter would be predicated on results from the first part of the program. Underground drifting will be considered when the programs are completed.



Multinational

RESOURCES INC.

<u>Drill Hole</u>	<u>Interval (ft.)</u>	<u>Length (ft.)</u>	<u>Gold (oz/ton)</u>	<u>Silver (oz/ton)</u>
M86-10	320.2-328.8	8.6	0.306	0.76
		including-		
	323.5-327.0	3.4	0.667	1.33
"	382.0-395.5	13.5	0.289	0.17
		including-		
	391.1-395.5	4.4	0.484	0.41
M86-12	255.5-261.5	6.0	0.270	0.10
		including-		
	255.5-257.5	2.0	0.608	0.02
M86-14	159.8-172.7	12.9	0.486	8.27
		including-		
	163.4-170.6	7.2	0.734	13.25
M86-15	280.5-287.5	7.0	0.053	0.08
M86-16	196.2-200.2	4.0	0.046	0.11
M86-17	123.8-128.0	4.2	0.173	0.55
M86-19	135.0-146.0	11.3	1.151	3.05
		including-		
	143.0-146.3	3.3	3.221	7.24
	146.3-165.0	18.7	0.090	0.40
	(sheared wallrock-50% recovery)			
	165.0-172.5	7.5	1.351	0.87
		including-		
	169.0-172.5	3.5	2.378	0.67
M86-13		No Values		
M86-18		No Values		
85-1	136.0-150.0	14.0	0.327	5.16
		including-		
	136.0-141.3	5.3	0.698	10.51
M86-1	220.0-225.0	5.0	0.147	11.49
		including-		
	223.0-225.0	2.0	0.309	27.56
	(hole stopped-burnt bit)			

94E026(6E)
GCNL # 183 Sept 23/86

GCN #183 23 SEPT 1986

MULTINATIONAL RESOURCES INC. (MUT-V)

ADDITIONAL 1986 DRILLING UNDERWAY - Multinational

Resources Inc. has reported an extension of its current diamond drilling program into a third phase at the Toodoggone gold camp 200 miles north of Smithers, B.C. A further 1000 feet of drilling is recommended all in the B zone. SEE TABLE OVERLEAF for assay results to date in this zone. Assay results indicate a northeast raking shoot of better grade material within the northeast striking vein structure. 94E026 (6E)

The principal structure has a N60°E strike and a vertical to steep northwest dip. The structure has been intersected in drill holes over a strike length of 300 feet and to a depth of 300 feet below surface. The better grade shoot has a vertical dimension of 180 feet and true widths of the structure are estimated to be 8 to 10 feet. Repetition of the structure by gently dipping faults has been encountered in drill holes MB6-10 and -19.

Better gold grades are concentrated in the hangingwall (north) section of the vein, a feature similar to the A Vein 900 feet southwest. B Zone is currently interpreted as being an extension of the A Vein structure. Two days of prospecting on the Peregrine-Falcon claims 10 miles north of "B" zone resulted in the discovery of a mineralized zone in the central part of the Falcon claim. Three float samples over a several hundred ft. area returned values of 1063 ppm copper, 21866 ppm lead, 6766 ppm zinc, 6.8 ppm silver and 16 ppb gold. One grab sample from mineralization in place yielded 700 ppm copper, 39000 ppm lead (3.9%), 162000 ppm zinc (16.2%), 12 ppm silver and 70 ppb gold. Hand trenching is recommended.

94E078, 079
94E66w (094E 093)

Manson Creek Resources and Golden Rule Resources recently reported encouraging results from their **Mets** property and **Multinational Resources** from the Baker mine property.

Energex has spent \$6.5 million exploring its large land position which included 36,000 ft of drilling. This year's budget is \$24 million, more than half of which has been spent already, says Energex President Arne O. Birkeland. Noting there are extensive soil geochemical anomalies on the property, he feels there could be "a fault control" for several kilometres of strike length through the Thesis II and Thesis III zones.

More than 10,000 ft of drilling has been completed so far this year and, given the success of the program, Mr Birkeland predicts they will probably be over budget. Besides the Thesis zones, surface drilling has encountered a mineralized core in the BV zone and trenches in the Bonanza Ridge were found to contain 1.0 oz gold over 20-ft widths.

He says representative material containing visible gold has been sacked from the BV and Bonanza Ridge zones and it will be used as a sweetener in the pilot mill. The average head grade going into the small 6.5-ton-per-day plant is 1.88 oz gold and he predicts bulk sampling material could be 50% higher than the calculated reserve grade from drilling.

Energex expects to continue drilling and also operating the pilot plant until water runs out, if indeed that does happen. The focus of the current exploration program is the A1 property, results from which Mr Birkeland describes as "outstanding." Infill drilling now is under way with the objective of confirming reserves on the Thesis and Bonanza Ridge deposits "in order to establish the increased milling rates for planned 1987 production."

Target forecast surpassed

The company expects to surpass its target forecast of 500 oz gold by the end of September and it also anticipates a sharp increase in gold production when high grade material from the Bonanza Ridge deposit is processed. This zone has yielded the highest grade assays to date including 16.4 ft grading a hefty 4.04 oz gold per ton in hole A86-54. That intercept was at a depth of 92 ft. A second intercept in that same hole assayed 0.36 oz gold across 14.8 ft and even better grades were reported over narrower widths within those intercepts.

Energex drilled a stepout hole (A86-55) 100 ft along strike and to the south which intercepted 15.1 ft of 0.38 oz gold. A second hole drilled

200 ft south of A86-54 assayed 0.49 oz gold over 11.8 ft. The best previous assay from the zone this year was 0.59 oz over 30 ft.

Results have also been extremely promising in the Thesis III zone which has been supplying feed to the pilot plant. The zone has been extended "substantially down dip," he claims, adding that the high grade tenor of the deposit has been confirmed. The best interval from this zone was 22.6 ft of 0.81 oz gold. Importantly, geophysics, trenching and diamond drilling indicated the Thesis II zone, some 1,400 ft to the southeast, is probably an extension of the Thesis III; so the tonnage implications could be substantial if this holds true.

The company will not be able to process all its stockpiled ore this year so any surplus will go towards the expanded milling operations proposed for 1987. Metallurgically, the ore is simple and recoveries have typically averaged 93.4%, much better than the design rate for the plant.

At the company's recent annual meeting, Mr Birkeland expressed confidence the company would have a "bankable feasibility" by year-end. Rather than raise money publicly and dilute existing shareholders' equity, he said they would probably try to borrow funds to expand the pilot plant to 50 tons per day. Revenue from the plant would be used to define "a larger Serem-type deposit," he adds.

N. Moore Sept 15/86

GCNL 151 MULTINATIONAL RESOURCES INC. (MUT-V) 86-08-07

TOODOGGONE, B.C. GOLD BELT - Best assay results to
 DRILL PROGRAM TO RESUME date on the Toodoggone
 94E026(6E) River, B.C. gold belt

property of Multinational Resources include the last two feet of hole M86-1 where a quartz vein assayed 0.309 oz. gold/t and 27.5 oz. silver/t. The hole was terminated due to technical difficulties. Nine holes were drilled in Phase One, all in the B zone. A further hole is to be drilled in this area. The potential for an ore shoot at depth on the A vein structure will be tested by two 500 to 600 foot holes which will be drilled while awaiting results of the trial holes on the B zone. A second phase of drilling on the property is to start immediately.

GCNL No 160 MULTINATIONAL RESOURCES INC. (MUT-V) AUG 20/86

HOLE NO.	INTERVAL FT.	LENGTH	OZ. GOLD/T	OZ. SILVER/T
No. 86-10	320.2- 327.0	6.8 ft	0.37	0.90
	including	3.4	.67	1.33
also	382 - 395.5	13.5	.29	.17
		4.4	.48	.41

Drilling in the B zone of the Toodoggone gold camp property of Multinational Resources has provided the assay results above. Drilling is continuing. 94E026(6E)

GCNL #171 5 SEPT 1986

MULTINATIONAL RESOURCES INC. (MUT-V)

HOLE NO.	INTERVAL FT.	LENGTH	OZ. GOLD/T	OZ. SILVER/T
New Drill Hole Assay Results From B Zone.				
No. M86-12	255.5- 261.5	6	0.27	0.14
	including	2	0.608	0.02
No. M86-14	159.8 -172.7	12.9	0.468	8.27
	including	7.2	0.733	13.25
No. M86-19	135.0 -158.0	23	0.63	1.79
	165 -172.5	7.5	1.315	1.00
Previously Reported Drill Hole Assays From B Zone				
No. M86- 1		2	0.309	27.5
No. M86-10	320.2- 327.0	6.8	0.37	0.90
	including	3.4	0.67	1.33
also	382 - 395.5	13.5	0.29	0.17
		4.4	0.48	0.41
No. M85-1	139 - 147	8	0.465	7.06

Chappelle, Baker 94E/6E (094E 026)

Drilling in the B zone of the Toodoggone gold camp property of Multinational Resources has provided the assay results above. Drilling is continuing on the property 190 miles north of Smithers, B.C. The B zone trends northeast southwest and is approximately half a mile to the northeast of the A zone which was mined. The drill holes to date have indicated a zone some 300 feet along trend and to approximately 200 feet below surface. The zone is open to extension along strike both directions and to depth.

Energex most active

Road would open up Toodoggone to juniors

by David Duval VANCOUVER
- The region with the unusual name will certainly be one of the hot spots on the B.C. exploration front again this year. Known as the Toodoggone, the area has already hosted one small gold-silver producer (Du Pont of Canada's Baker mine) and another (Serem's Lawyer's property) should come on stream in the next few years.

Serem has received approval for a \$4.5 million loan from the provincial government to construct a road into the property. But the loan is conditional upon it making a production decision.

The Toodoggone, which is about 180 air miles north of Smithers, has a good airstrip near Baker mine and it has accommodated Hercules aircraft in the past. Once crews are established in the region, exploration logistics are excellent and the road will improve that situation even more by reducing mobilization costs and also expenses relating to production.

94E/6E7W
In terms of exploration, Energex Minerals has one of the more advanced properties in the region. The company is well financed and expects to spend about \$2 million this coming season. The funds will be directed towards increasing reserves but some bulk sampling and possibly a pilot test are also planned on established deposits. Energex believes some cash flow could be generated through the recovery of 2,000 to 5,000 oz of gold.

94E091
(0217W)
Reserves in the Thesis III and BV zones total 264,000 tons grading 0.24 oz gold uncut and undiluted all within 225 ft of surface. Production permits have been filed and a small gravity plant might be used for a bulk test on the two deposits. Some lower grade material also exists that could be heap leached, according to Energex.

Both shallow and deep drilling are planned to upgrade and increase reserves in the Thesis, BV and Bonanza Ridge deposits. However, up to 10 other gold bearing zones will also be looked at. 94E/6E, 7W (94E 031,081)

The company's Moose property has been optioned to New Ridge Resources which funded a 1985 exploration program. New Ridge can earn a 50% interest for expenditures of \$3 million by 1989 with Energex as operator. Widespread gold mineralization has been discovered on the Moose property some of it statabound, says Energex.

Multinational Resources will probably increase exploration activity on its Toodoggone property this year. The company has an agreement with Du Pont Canada to acquire the Baker mine and adjoining properties. A consultant for Multinational, Dr. N.C. Carter, has recommended up to \$250,000 to be spent on the B zone where a previous drill hole intersected 14ft of quartz carbonate vein material and altered rocks grading 0.33 oz gold and 5.21 oz silver per ton.

94E/6E
(04E 026)

The B zone is 1,600 ft northeast of the A vein which was mined by Du Pont between 1981 and 1983. The bulk of the proposed surface drill program will probably be directed towards the B zone which

is located in the western half of the property. The eastern portion also has potential. Dr. Carter says.

There are dozens of companies in the area and many of them will mount program this summer. Arctic Red recently won a low suite with International Shasta which will allow the former to continue work on a property originally explored by Newmont Exploration.

94E/6E

St. Joe Canada has ground south of Energex and is rumoured to have

94E/6E
Silver Pond,
Silver Grizzly

encountered significant gold values on its drill program last year. Golden Rule Resources will conduct a major drill program on its Mets claims in 1986 and further trenching of quartz breccia zones will be undertaken on nearby properties. A gold bearing zone covering several thousand feet has been outlined based on trenching, soil geochemistry and mapping. 94C/5E W

GCNL #192 4 OCT 1985

MULTINATIONAL RESOURCES INC. (MUT-V) 94E/6E (094E 026)

NEW GOLD BEARING VEIN SYSTEM - Multinational Resources Inc.'s diamond drilling in their recent work program intersected **FOUND ON TOODOGGONE CLAIM** significant gold mineralization in a newly discovered vein system at its Baker Mine property in the Toodoggone gold camp in north-central B.C. The exploration program included 2,000 feet of diamond drilling, an induced polarization survey for orientation purposes, bulldozer trenching and heavy mineral stream sediment sampling.

Director C.A.R. Anderson says the program was designed to re-evaluate known vein systems. He points out that "It was successful in uncovering a new gold-bearing vein system and we found geochemical evidence that there is at least one additional previously undiscovered vein system. Our hole No.85-1, drilled on the south B vein, intersected 8 feet grading 0.465 ounce of gold and 7.06 ounces of silver per ton over the interval 139 feet to 147 feet. We'll need additional drilling to evaluate this new find, as well as ongoing detailed surface exploration.

Mr. Anderson says, "future activities will be carried out as field conditions permit."

CHAPPELLE, BAKER 94E/6E (094E 026)
INT. PROS. 4 DEV. MAR. 1986
FEB 1986
Multinational Resources VSE-MUT
Multinational intends to significantly expand its diamond drilling and surface exploration on its Toodoggone property in north-central British Columbia. It has been recommended to expend \$250,000 to assess the "B" zone which includes two sub-parallel vein structures exposed in trenches and over strike lengths in excess of 400 feet. One drill hole intersected 14 feet of 0.33 ounces of gold and 5.21 ounces of silver per ton, including 5.3 feet of 0.702 ounces of gold and 11.34 ounces of silver per ton. Several other target areas were identified by 1985 work, included are the "E" Zone, 225 feet north and parallel to the "A" Zone. The "E" zone has a marked surface gold geochem anomaly, but poor core recovery hampered investigation. Most of the exploratory and development to date has been concentrated on the western half of the property now it is intended that the eastern claims be thoroughly investigated. Multinational is also examining a Nevada heap leach gold property and a gold prospect in Quebec.

MINOR 21 OCT 1985

New vein system at Multinational 94E/6E (094E 026)

Significant gold mineralization has been encountered in a newly discovered vein system at the Baker mine property in the Toodoggone area of B.C. by Multinational Resources.

The exploration program was designed to re-evaluate known vein systems, the company points out, adding geochemical work has also indicated at least one additional undiscovered vein system.

Hole No. 85-1, drilled in the south B vein, intersected eight feet grading 0.465 oz. gold and 7.06 oz. silver per ton from 139-147 ft. Additional drilling will be required to evaluate this new find, says Multinational, with future work to be carried out as weather conditions permit.

Approximately 2,000 ft. of drilling has been carried out so far, plus an induced polarization survey, bulldozer trenching and stream sediment sampling.

GCNL #237 10 DEC 1985

94E/6E (094E 026)

MULTINATIONAL RESOURCES INC. (MUT-V) has received Vancouver Stock Exchange approval for acquisition of the 180 claim Chappelle property in Omeneca mining division, B.C., from Du Pond Canada Inc. for \$100,000 and a 2-1/2% net smelter royalty to the vendor. The agreement between Multinational and Du Pont also grants Multinational an option exercisable through 30Jun86 to buy certain mill assets for \$2,000,000, the right of first refusal to buy the mill assets during the period 1Jul86 to 30Jun87 and the right of first refusal to buy mining camp facilities through 30Jun87. Multinational will pay a finders fee of 20,000 shares to P.W. McCleery.

Multinational has also received Vancouver Stock Exchange approval for acquisition of 2 claims in Omeneca mining division, B.C., from Toodoggone Syndicate for \$15,000 and 50,000 shares.

GCNL #136 16 July 1986

CHAPPELLE, BAKER
MULTINATIONAL RESOURCES INC. (MUT-V)
DRILLING IS STARTING ON GOLD - First phase of a \$250,000 CLAIMS IN B.C. AND IN QUEBEC exploration program at 94E/6E (094E 026) their Toodoggone River gold project in north central B.C. is now under way, according to president William Clancey of Multinational Resources Inc.

Elsewhere, exploratory drilling is scheduled 21July86 for Multinational's joint venture in the Casa Berardi area in Quebec adjoining Golden Knight's discovery area.

GCNL #162 22 AUG 1985

MULTINATIONAL RESOURCES INC. (MUT-V)

94E/6E (094E 026)

EXPLORATION PROGRAM TO START - Three major exploration and drilling targets are now under examination on Multinational Resources Inc.'s Baker Mine property holdings in the Toadoggone Gold Camp in the Omineca mining division of north central B.C. Exploration is being carried out under direction of F. Marshal Smith, P.Eng.

The company plans bulldozer trenching of outcrops on the "D" vein to extend its length. The vein has a long strike length similar to the "A" vein, which produced ore.

Exploration will concentrate on the "C" vein and the West Chappelle vein which have 240 feet and 1,600 feet of exposed strike length. Diamond drilling is expected to start by August 27, 1985.

On Multinational's second property in the Belle Creek area to the north of the Baker Mine, a prospecting and stream sediment sampling program will be carried out.

NMINER
29 AUG 1985

Letters to the Editor

Baker mine background

Your article on *Japanese firm takes position in Multinational, Toadoggone*, which appeared on Page 1 of the Aug. 15 edition warrants comment. The article concerns the Baker mine property — the only past producer in the highly active Toadoggone gold-silver camp, which was recently optioned to Multinational Resources by Du Pont Canada. An otherwise excellent article includes a sentence "According to Multinational, there are seven known veins on the Chappelle property with potentially minable reserves similar in grade to the previously mined A vein," which could mislead the reader.

As one responsible for Kennco Explorations' (Western) 1971-73 programs, following discovery of gold-silver mineralization at the Chappelle property, in 1969 and subsequently for the option of the property from Kennco by Du Pont in 1974; for recommending placing the property into production in 1980 and for managing the mining operation in 1981-83, I feel a continuing obligation to ensure that no unintentional misrepresentation is made of the past history of the property or of its potential.

Kennco deserves considerable credit for its serendipitous discovery of gold-silver in this hitherto

unrecognized camp. Du Pont also shares in this area in its decision to place the Baker mine into production.

Although the production decision by Du Pont was based on the very high grade gold-silver reserves in A vein, it would be reasonable to expect that subsequent exploration success would prolong the life of this property. Unfortunately this was not the case, in spite of considerable additional exploration.

Both Kennco and Du Pont either discovered or recognized the potential of seven other quartz veins situated within a 1-mile radius of A vein, and these veins were either trenched and/or sampled and/or diamond drilled at relatively shallow depths to test the inferred source of stream sediment anomalies which led to their discovery. No reserves of possible economic interest were indicated by this work which, however, served to explain the geochemical anomalies.

However, deeper drilling, or more drilling on the extensions of these veins may lead to new discoveries and I wish Multinational every success in this respect.

D. A. Barr, P.Eng.
Geological Consultant
West Vancouver, B.C.

94E/6E
(094E 026)

Japanese firm takes position in Multinational, Toodoggone

by David Duval

VANCOUVER — In general, Japanese investment in the British Columbia mining scene has largely involved major projects, primarily base metals and coal. But now a leading Japanese trading company, Nissho Iwai Corp., will be taking an equity position in **Multinational Resources** which, although autonomous, is associated with **Teck Corp.** through directors and an advisory committee.

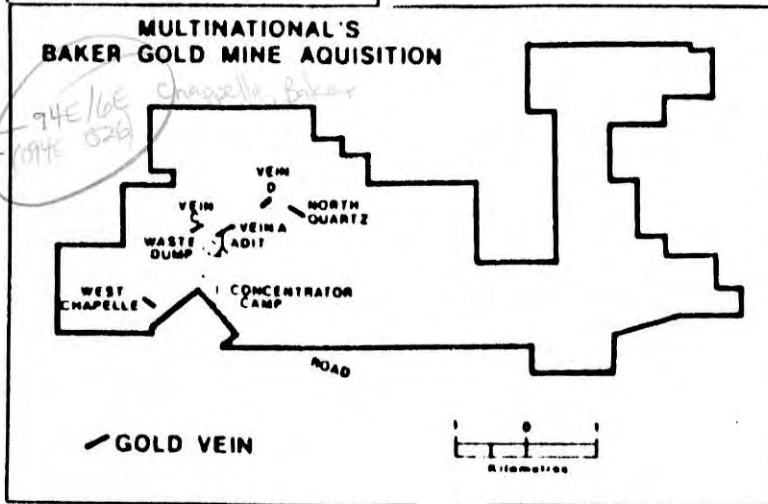
That association appears to be a key factor in Nissho Iwai's participation through Multinational in the burgeoning Toodoggone gold camp where a number of significant discoveries have already been made. Serem, for one, is expected to develop its Lawyers property following a decision recently by the provincial government to provide financial assistance for a road into the property.

Multinational fits into the Toodoggone picture by way of an agreement with Du Pont Canada to acquire the Baker mine and adjoining properties. The mine is now closed but Multinational feels there is still additional potential on the 180-claim property which will certainly be enhanced by the existing infrastructure and plant facilities that are part of the deal.

The agreement with Du Pont represents somewhat of a coup for Multinational as the total consideration is \$100,000 plus a 2½% net smelter return. Multinational has the right to purchase the existing mill for \$2 million — well below the cost of construction — but it will not own the plant site until that option has been exercised.

The company is not locked into any prescribed work expenditures and has budgeted a minimum \$100,000 this year for exploratory work, says William B. Clancy, president, although a proposed 3-phase program will cost about \$1 million, primarily for drilling.

According to Multinational, there are seven known veins on the Chappelle property with potentially minable reserves similar in grade to the previously mined A vein. The company believes the Baker deposit was actually the bottom edge of an orebody and there could be other preserved orebodies with higher tonnages on the property.



Pointing out that the east and west extensions of the A vein (the main producer at Baker) have never been found, it theorizes that part of the A vein may have been pushed forward and the ends remained still.

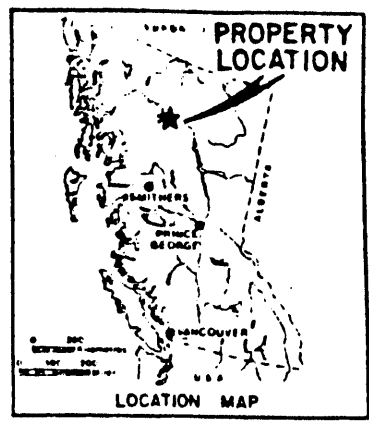
In any event, initial work will involve trenching to determine the shape of the veins and style of mineralization; drilling should begin by month-end.

The program will test the area west and north of the A vein with the emphasis on locating bonanza type orebodies similar to major epithermal gold districts in Canada and the United States. The company is confident the program will develop additional reserves, noting it was only through diligent detailed work that Serem came up with a minable orebody.

The Baker mill has a production capacity of approximately 120 tons per day but studies have shown that capacity could be doubled for a capital outlay of approximately \$500,000.

Recoveries in the early stage of production at Baker were less than satisfactory and Multinational estimates there could be approximately 14,000 oz. of gold in mine tailings. Du Pont's environmental record at Baker was exemplary and Multinational feels there would be few hurdles to overcome in this area if sufficient reserves were discovered to reactivate the operation.

Mr. Clancy says that after paying Du Pont, Multinational will have about \$850,000 in its treasury. A U.S. subsidiary of Nissho Iwai has agreed to purchase 680,000 shares at 75¢ with a warrant attached for a similar amount at \$1.40 within 12 months. The agreement allows the subsidiary to assign 50% of the private placement to Nissho Iwai Canada. He confirms that Teck's association with Multinational could result in it operating any reactivated mining venture at Toodoggone, adding that close association was probably a factor in Du Pont choosing to go with Multinational.

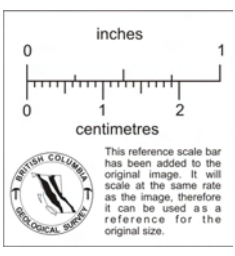
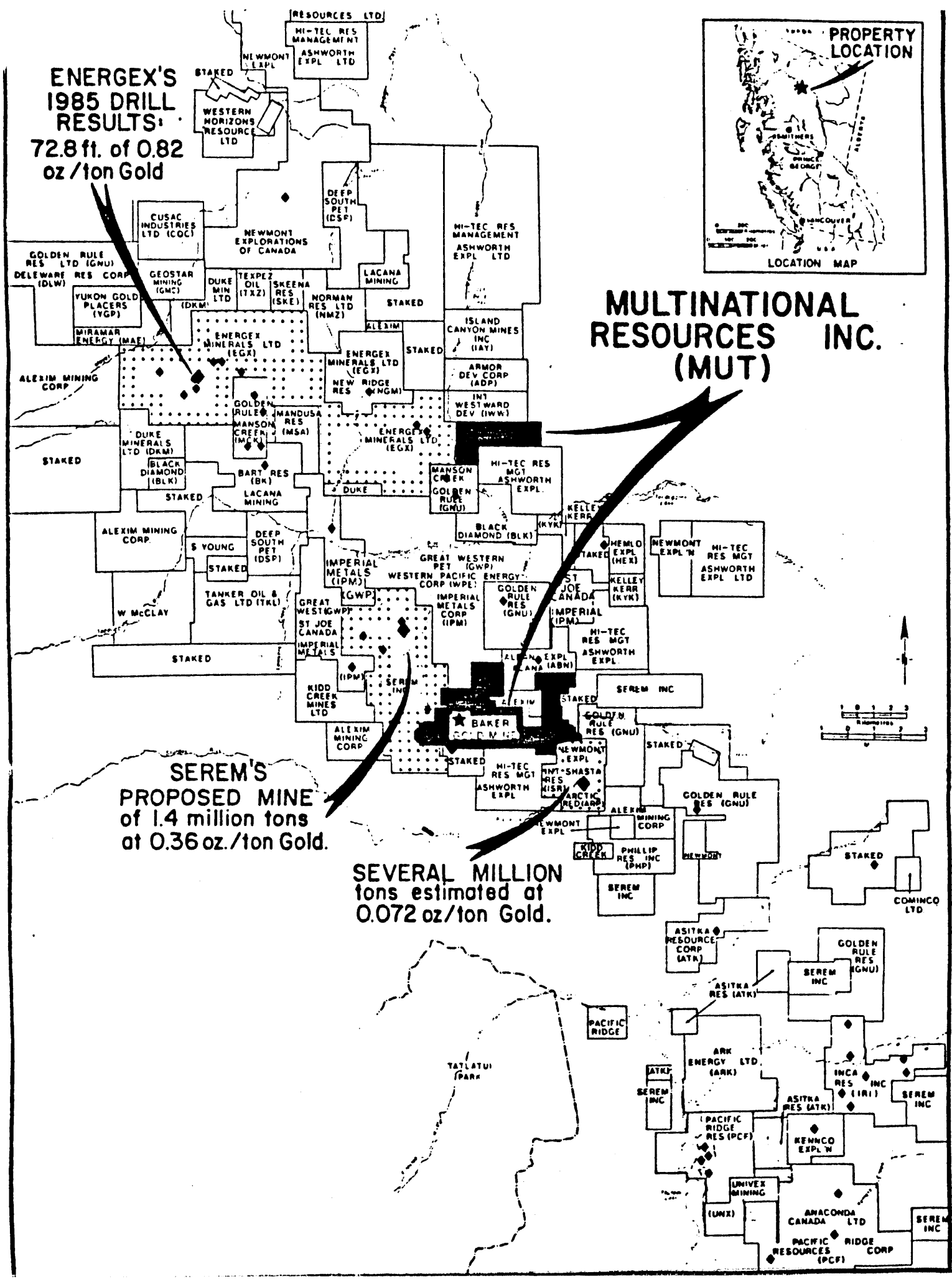


**ENERGEX'S
1985 DRILL
RESULTS:**
72.8 ft. of 0.82
oz/ton Gold

**MULTINATIONAL
RESOURCES
(MUT)**

**SEREM'S
PROPOSED MINE**
of 1.4 million tons
at 0.36 oz./ton Gold.

**SEVERAL MILLION
tons estimated at
0.072 oz/ton Gold.**



A summary of significant intersections in holes A85-02 to A85-05 is as follows:

GCNL 100 141 (1985 July 23)

ADDITIONAL DRILL RESULTS FROM TOODOGGONE PROJECT

DRILL HOLE	FROM (m)	TO (m)	INTERVAL (m)	GOLD ASSAY (gm/tonne)	INTERVAL (ft)	GOLD ASSAY (oz/ton)
A85-02	12.68	35.67	22.99	4.69	75.4	0.14
Includes	12.68	16.18	3.50	9.51	11.5	0.28
& Includes	29.18	35.67	6.49	9.69	21.3	0.28
A85-03	11.67	25.51	13.84	8.94	45.4	0.26
Includes	11.67	13.41	1.74	13.68	5.7	0.40
& Includes	21.51	25.51	4.00	19.61	13.1	0.57
A85-04	9.00	22.50	13.50	6.22	44.3	0.18
Includes	9.00	14.50	5.50	7.45	18.0	0.22
& Includes	21.50	22.50	1.00	25.10	3.3	0.73

Arne O. Birkeland, P.Eng., president, reports that a total of 11 diamond drill holes have been completed as the Phase I drilling on the Thesis III zone. Preliminary assays have been received for holes A85-02 through A85-05. The initial hole, A85-01, was reported to contain 72.8 feet of 0.82 oz/ton).

Drill hole A85-01 was drilled as a 5m subparallel step out from hole A84-10 which, as previously reported had a low core recovery of 30% and intersected from surface to an inclined depth of 16.7m (54.8 ft.)

0.94 oz/ton gold over 55 feet). Drill holes A85-02 and A85-03 were drilled on the same section line as hole A85-01 and hole A85-04 was a 12m step out drilled parallel to hole A85-01. Hole A85-05 was a further 25m step out from, and parallel to, hole 85-04.

A drill hole plan with typical cross-sections will be prepared and presented as soon as results are available from the balance of the Phase I Thesis III drilling. *074E 079*

Drilling of several other zones on the A1 property is progressing. A total of 11 holes have been completed on the BV Zone and a further 7 holes have been drilled on the Bonanza Ridge Zone. Delineation drilling of the Thesis III Zone has resumed.

In hole A85-05 there is no significant intersection. (SEE ASSAY RESULTS OVERLEAF PAGE ONE)

MULTINATIONAL RESOURCES INC. (MUF-V) *074E 026*

BAKER MINE PROPERTY - Du Pont of Canada Inc. and Multinational Resources Inc. have reported an agreement PURCHASE AGREEMENT COMPLETED granting Multinational the right to explore and an option to purchase the former producing Baker Mine and adjoining property in the Toodoggone Gold Belt area in B.C., 300 km north of Smithers, B.C. (SEE MAP OVERLEAF PAGE TWO).

The agreement covers approximately 180 claims, and all exploration results including options on an existing mill and mining camp operation. Du Pont will receive \$50,000 on closing, \$50,000 on Nov. 30, 1985 and a 2 1/2% net smelter return royalty. Du Pont will also receive payments for the concentrating plant when Multinational exercises the purchase option.

Multinational president, William Clancey, said his group is planning an immediate three-phased exploration program involving \$1,000,000 in expenditures, primarily drilling.

Multinational already holds 38 claims to the northeast of their Du Pont acquisition.

The property comes equipped with an 80-man camp, an 100-ton per day mill, plus airstrip. Former Du Pont geologist, F. Marshall Smith, P.Eng., will consult to Multinational and has outlined five veins for drilling from Data in the Du Pont files. Mr. Smith stated, "I strongly believe that the Chappelle property has the potential for development of more of the small tonnage high-grade deposits, similar in style, but significantly larger in size than the A vein, previously mined by Du Pont."

Du Pont of Canada Exploration Limited developed a reserve on the A vein of about 70,000 tons with an average grade of 0.90 oz. gold/t. and 19 oz. silver/t. by 1980 which reserve was mined and milled.

Mr. Smith notes the past work has located three veins with intense wallrock alteration and vein filling indicative of only partially unroofed mineralized shoots. They appear to be the upper low-grade portions of significant mineralized zones. Each has the width and length to make an economic reserve if the grade of the vein is similar to the A vein. Past drill testing of these zones appears to have intersected the nearly barren first stage quartz filling. To the west of each of the drilled areas is a significant target for location of gold bearing quartz below the low-grade cap. There are at least four other known vein/alteration zones on the property with the potential of hosting economically significant mineralization.

The first phase drilling, budgeted at \$100,000, should commence as soon as possible. If the first phase is successful the second phase, budgeted at \$300,000 should commence during 1985 and finish in 1986. The third phase is suggested to be about \$500,000.

MANDARIN CAPITAL CORPORATION (NCC-V)

PRIVATE PLACEMENT FINANCING UNDERWAY - Mandarin Capital Corporation is currently conducting a financing to raise \$7,189,875 by way of private placement through its agent, Yorkton Securities Inc. The financing, to be placed among institutional investors in Europe, consists of 2,075,000 units of one common share and one share purchase warrant at \$2.20 per unit to raise \$4,565,000 initially.

Warrants attached to the shares will entitle the holders to purchase 1,037,500 shares at \$2.53 per share for a period of one year to raise an additional \$2,624,875.

Mandarin Capital Corporation intends to use the funds to finance its joint ventures in the far east and to provide capital for investment opportunities in the Peoples Republic of China.

GCN L #141 23 JULY 85

MULTINATIONAL RESOURCES INC. (MUF-V)

Chappelle
94E/6E (094E 026)

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Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Scottie Gold Mines 104B/11E 104B 074	The company's gold-silver mine was recently placed in production. Total: \$7.5 million	7,500			
Teck Corp	Construction is slated to begin on the Bullmoose coking coal mine in northeast BC in the spring of 1982. It is designed to supply 1.7 million tons of coal annually, beginning in late-1983. Total: \$220 million		110,000	110,000	
Westmin Resources 92AF/12E 92AF 071 072	The shaft is being sunk for development of the Creek zone copper-lead-zinc deposit near the Myra and Lynx mines at Buttle Lake, BC. Production is expected by 1983 and ore will be milled at the existing concentrator. Total: \$15 million	5,000	5,000	5,000	

The Baker Mine Operation. (071/12E)
 D.A. BARR, T.T. DROWN, T.W. LAW, G.A. McCREARY, W.W. MUIR, J.M. PAXTON, and R.L. ROSCOE, Du Pont of Canada Exploration Ltd., Vancouver, B.C. 94E 01 (074E 036)

This paper reviews the exploration, development and subsequent production following the serendipitous discovery of high-grade epithermal gold-silver mineralization in 1969. This discovery was made in a remote location, during a regional geochemical reconnaissance program designed to search for porphyry copper mineralization in the Cassiar-Omineca Mountains. Exploration and development in the 1971-79 period included geological, geochemical and geophysical surveys, trenching, 6638 m of surface and underground drilling in 77 holes and cross-cutting, drifting and raising on the principal gold-silver bearing vein. This led to the delineation of 100,000 tons grading about 0.9 oz gold per ton and 18 oz silver per ton to an average depth of 40 m below surface.

A production decision in early 1980 led to the establishment of a 100-ton-per-day mining operation with all supporting infrastructure transported to the site by a Hercules aircraft.

The operation relies on its own Twin Otter aircraft for personnel mobilization and supply of small items. Periodic Hercules campaigns supply major items including fuel.

The mining operation has included both open-cut and cut-and-fill methods. The milling operation, reviewed in greater detail in a separate paper, employs a conventional cyanide-leach process with cyanide destruction. The end product is dore bullion.

The fly-in operation, initially structured on a 21-day-in and 7-day-out basis has been modified to a 14-day-in and 7-day-out basis with no loss in efficiency and with a significant increase in employee satisfaction. The operation, which earned the B.C. Small Mines Safety Award in 1982 during its first full year of operation, emphasizes safety and process hazard awareness. It has also carried out its own wildlife studies and shown that industry and wildlife can co-exist in harmony.

Every effort is being made to extend the life of the operation either by discovery of additional on-property ore reserves or by encouraging mining companies exploring nearby properties to consider the potential advantages of utilizing existing infrastructure at the Baker Mine.

Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Equity Silver (continued)	Regional exploration		100		111
	Replace mill equipment	155	6		6
	Buy on-stream analyzer	200			
	Additions to flotation	200			
	Mill expansion				2,500
	Replace plant equipment	121	300	70	280
	Move carpenter shop	55			
	Replace misc. equipment	41	177	39	363
	New warehouse storage	50			
	Buy computer facilities		75	75	
	Replace telephone system	20			
Total: \$11.64 million					
Esso Minerals Canada	Having just bought the Byron Creek colliery in southeastern BC, Esso plans to expand it.	35,000	35,000		
	Total: \$70 million				
Fording Coal Ltd	The \$115 million coal mine expansion at Elkford is well under way.	38,000	26,000	20,000	
	Total: \$84 million				
Lornex Mining Corp Ltd 92117W 07AISE002	The \$160 million expansion of the copper mine at Logan Lake, BC, is complete. Project included upping the milling rate to 80,000 tpd and purchasing additional pit equipment.	78,300			
	Total: \$78.3 million HIGHLAND VALLEY				
Noranda Mines Ltd 82M19W 082M 141	The Goldstream copper-zinc mine near Revelstoke is scheduled to be in production late in 1982 at a rate of 1350 tpd. Total cost of the project is estimated at \$62 million.	27,600	16,300		
	Studies have started on modifications to the ore handling and processing systems at the Granisle mine.	300	300		
	Total: \$44.5 million				
Norco Resources	A hydraulic and longwall coal mine is planned at Bowron River, near Prince George, BC. Output will be sold to Taiwan Power Co.	40,000	41,000		
	Total: \$81 million				
Placer Development Limited 93K/3E 093K 006	The bulk of spending at the Endako moly mine will be for upgrading the mill.				
	Replace mobile equipment	50	1,291	1,511	
	Upgrade and replace process equipment	536	1,815	1,040	
	Complete flotation expansion	185			
	Complete roaster expansion	1,697			
Total: \$8.125 million					
Ruth Vermont Mine Limited 82K15W 082KN007	This silver-lead-zinc producer was reopened this summer in southeastern BC.	4,000			
	Total: \$4 million				

\$000s to be spent

Company	Purpose of expenditure	Beyond			
		1981	1982	1983	1983
BP Canada	Plans are being made for the Sukunka coal mine development near Chetwynd, BC. Total: \$400 million			400,000	
Carolyn Mines Ltd 92H111W 092HNW003	The Ladner Creek gold mine development was completed this year. Total: \$10 million	10,000			
Cominco Ltd 82F19E 082FNE052	The modernization and associated metallurgical projects at the Trail smelter will receive the bulk of spending — \$355 million. Trail modernization Sullivan mine and mill Minor projects Total: \$443 million	85,000 7,000 12,000	105,000 10,000 12,000	160,000 40,000 12,000	
Crows Nest Resources Ltd	The Line Creek coal mine at Sparwood is nearing production set for next year. Total: \$120 million	70,000	50,000		
Dankoe Mines Ltd 82E14E 082ESW002	Spending is modest at the silver mine near Keremeos, BC. Total: \$750,000	250	250	250	
Denison Mines Ltd	With the promise of a rail line to northeastern BC, development of the Quintette coal deposit is planned by 1985. Total: \$700 million		100,000	100,000	500,000
Dickenson Mines Limited KAM-KOJIT 82F(14U) 082F14U	The silver-lead-zinc mine near New Denver, BC is receiving several improvements. Conversion to central diesel plant for mine and mill plus upgrading and increasing hydro plant. Replacing mill equipment and upgrading capacity 60 per cent to 200 tpd Total: \$550,000	100	300	150	
Dimac Resource Corporation 83M13E 083M13E	This small tungsten mine was recently placed in production near Clearwater, BC. Total: \$2.5 million	2,500			
DuPont Canada Inc. 077E 086	The Baker gold mine at Chappelle, BC, is in production. Total: \$6 million	6,000			
Equity Silver Mines Ltd 93L11W 093L 001	This newly-opened silver mine is planning expenditures of about \$7 million for mining and \$3 million for milling. Replace pit equipment Total: \$10 million	477	695	4,673	855

MINING JOURNAL

94E/6E

CMJ Capital Spending Report

BRITISH COLUMBIA \$2.996 billion

Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Afton Operating Corporation 92110E 092INE023	Mobile equipment for open pit copper mine	3,500	3,500		
	Systems improvements at mill	750	750		
	Systems improvements at smelter	750	750		
	Total: \$5 million				
BC Coal Ltd	The \$278 million Greenhills coal mine is expected to begin production in mid-1983 at a rate of 1.8 million tonnes/year.	63,000	100,000	60,000	
	Expenditures at Sparwood include \$17.6 million for pit equipment, \$13 million for land acquisition and residential construction and \$1.6 million for a new lab.	53,000	46,000	28,000	10,000
	Construction at the Harmer mine includes a new dry and office and maintenance shop extension.	9,458	7,635		
	Cost of increasing the throughput of Westshore terminals and upkeep.	43,000	74,000	38,000	
	Total: \$472.093 million				
BC Hydro	The price tag of the Hat Creek coal mine and generating plant due to come on stream in 1988 has risen to \$5 billion, with roughly 45 per cent of the cost being for the mine.	32,000	32,000	32,000	129,000
	Total: \$2.25 billion				
Bethlehem Copper Corporation 92110E 092ISE001	Spending at this open pit copper mine has nearly doubled this year over last.				
	Replace mining equipment	4,554	2,117	1,468	
	Construct tailings dam	7,316	2,376		
Total: \$17.831 million					
Brenda Mines Ltd 924116E 092INE047	A new mining shovel and mill equipment were added at this copper-moly producer.				
	New mining shovel	2,000			
	Classifying and flotation equipment	4,250			
	Normal equipment replacement	3,500	4,000		
Total: \$13.75 million					

Two stages of mineralization are recognized.

(1) Quartz — carbonate — pyrite with minor chalcopyrite — common propylitization = 1st generation mesothermal.

(2) Crustiform and colloform argentiferous galena, sphalerite, pyrrargyrite, and native silver within a quartz — calcite — barite — jasper gangue; wall rock alteration is minor = 2nd generation epithermal = economic mineralization of area.

A lateral epithermal zoning outwards and eastwards from a pluton to the west is suggested by a progressive change from west to east from Au-Cu mineralization to Cu ± Ag to predominantly Ag mineralization.

SUMMARY

In summary, the geologic environments, structural styles, and alteration and sulphide assemblages associated with high-level precious metals and base metals deposits in central and northern BC are slowly but surely emerging as bone fide exploration targets and undoubtedly many more deposits are yet to be discovered.

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(3) Sedimentary — Volcanic Division — composed of interbedded tuff, sandstone, and conglomerate.

(4) Volcanic Flow Division — uppermost unit composed of andesitic and dacitic flows.

This 'Goosly Sequence' is flanked by shallow dipping Tertiary andesites and basalts. Two stock-like intrusions crosscut the 'sequence'. A quartz monzonite stock (K-Ar age date 55.8 ± 2.3 Ma) with sparse copper-molybdenum mineralization cuts Mesozoic strata 400 to 600m west of the ore zones and is thought to be contemporaneous with or younger than the main mineralizing event. A gabbro — monzonite complex (K-Ar age date 48.4 ± 1.9 Ma) intrudes Mesozoic strata immediately east of the Main Zone and WTR Zone and is believed to be post ore.

Main Zone ores are fine-grained, generally occurring as disseminations; whereas, Southern Tail Zone ores are coarse-grained and occur predominantly as veins. Sulphides are best developed in zones of intense fracturing and brecciation, but, in general, are restricted to a tabular fracture zone which roughly parallels stratigraphy. However, copper-silver sulphides occur throughout the stratigraphic column.

The WTR Zone is a northerly extension of the Main Zone and appears to be more massive in nature. In addition to high-grade assays of Cu, Ag, Au (up to 4.8 ppm) and Zn, visible molybdenite and scheelite were observed.

The Tourmaline Zone occurs in the hangingwall over a surface area of approximately 1000m x 600m. Pyrite is ubiquitous with minor amounts of chalcopyrite, sphalerite, galena and tetrahedrite in veins.

It is postulated that sulphides were deposited syngenetically within the pyroclastic division and that a contemporaneous or younger major structural break (or breaks), roughly parallel to stratigraphy, together with intrusion and hydrothermal alteration and mineralization by the quartz monzonite stock, resulted in a remobilized and overprinted mode of mineralization consisting of massive sulphide-type and high-level porphyry-type.

At least three stages of alteration have been recognized — an early pervasive sulfidation phase characterized by pyrite, chalcedonic silica, and muscovite, a contact phase created by intrusion of the gabbro-monzonite complex adjacent to the Main Zone producing pyrrhotite, andalusite, scorzalite, corundum, and sillimanite in a contact aureole about 90m wide, and a late phase characterized by quartz, sericite, chlorite and tourmaline.

The potential for more ore at Equity Silver is considered very good.

BIG MISSOURI PROSPECT

The Big Missouri precious and base metal prospect is located 25km northeast of Stewart and is currently being evaluated for its potential open pit extraction of precious metals by Westmin Resources (formerly Western Mines Limited).

Between 1938 and 1942 Cominco Ltd produced approximately 850,000 tons of ore containing 58,384 oz of Au, 52,677 oz of Ag, 2712 lb of Pb, and 3920 lb of Zn from a 60m wide zone with an average grade of 0.117 oz/ton Au and 0.9 oz/ton Ag.

Geology

Two main rock units separated by an angular unconformity crop out on the property.

(1) Lower — northwesterly trending Lower Jurassic Hazelton Group flows and volcanogenic sediments.

(2) Upper — tightly folded immature sediments of the Middle to Upper Bowser Group.

The Hazelton Group is greater than 3000m thick, with the top half having formed as a result of subaqueous volcanism in which highly explosive ash flow and air fall deposition was followed by quieter effusions of thick andesitic lava flows and pyroclastic flows. Within green andesites, 1 to 2m thick gold-silver and lead-zinc bearing chert layers were precipitated as chemical sediments originating from fumarolic centres active at periods during andesitic volcanism. Fissures in the andesites acted as conduits for metal-rich brines, and alteration of country rock, in the form of 'envelopes' of sericite, quartz and pyrite is common. The pyroclastic layers above the chert layers allowed fluids to discharge further creating a more extensive hangingwall alteration.

The Coast Plutonic Complex crops out west of the Salmon Glacier and includes the Texas Creek, Boundary, and Hyder Plutons ranging in age from Lower Jurassic to Cretaceous.

Mineralization

The most abundant base metal sulphides are galena and sphalerite with accessory chalcopyrite. Associated precious metals include polybasite, pyrrargyrite, electrum, native silver and native gold. They occur as disseminations, as veinlets, and as lenses within chert horizons, and there appears to be a distinct association of precious metals with galena and/or sphalerite. Quartz, carbonate and up to 15% fine-grained black carbon are the common gangue minerals.

Conclusion

A syngenetic, epithermal mode of mineralization related to volcanism is postulated for the Big Missouri deposit.

PREMIER DEPOSIT

The historic Premier Mine is located 5km south of the Big Missouri property. Production until 1953 totalled 4.7-million tons of ore yielding 1.8-million oz of gold, 41-million oz of silver, and important lead-zinc byproducts. The recovered grade was 0.38 oz/ton Au and 8.7 oz/ton Ag for an overall silver:gold ratio of 25:1.

Mine workings exist over a 2000ft vertical interval and a maximum width of 50ft. A syndicate under the name British Silbak Premier, is currently re-exploring and re-evaluating this important gold-silver deposit.

Mineralization

Pyrite, sphalerite, galena, and chalcopyrite occur telescopically within an extensive northeasterly elongated replacement shear zone in silicified and chloritized volcanic and volcanoclastic rocks localized along a system of complexly intersecting shears over 1675m in length and 185m in width. Individual ore shoots, with uniform plunges to the west, are found as isolated or overlapping enechelon pipe-like lenses. A true bonanza of native gold, electrum, argentite, pyrrargyrite, polybasite, and native silver occurs in a gangue of quartz, calcite, barite, and adularia. Rare amounts of mercury and scheelite have been noted.

The mineralized veins appear to have been localized in a cataclastite zone adjacent to the Texas Creek Pluton (situated to the west), and a particular volcanic conglomerate appears to have been most amenable to deformation, alteration, and mineralization. The so-called 'Premier Porphyry' is actually epithermal metasomatically altered and intensely fractured by the Texas Creek Pluton. The overlying Betty Creek Formation is believed to have acted as an impervious barrier to ore solutions (Barr 1980).

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DOLLY VARDEN — TORBRIT

The Dolly Varden-Torbrit silver deposits are located 27km north of Alice Arm and are currently being re-explored and re-evaluated.

Total production from mines in the area up to 1959 (including Wolf, North Star and Torbrit) is estimated to be over 20-million oz of silver and 10-million lb of lead from 1.4-million tons of ore with an average grade of 15.45 oz-ton Ag and 7.8% Pb. Reserves are in the neighbourhood of 1-million tons grading 8.9 oz/ton Ag. There is no gold.

Mineralization

Mineralization is contained in steeply dipping quartz veins, varying up to 15m in width, which have intruded a sequence of interstratified and interfingering clastic and pelitic sedimentary rocks and mafic volcanics of Jurassic Age (Hazelton Group).

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(2) **Lawyers.** The Lawyers Au-Ag prospect is located 12km north of the Baker Mine. Fine-grained acanthite, electrum, native silver with minor pyrite, chalcopyrite, galena, sphalerite and tetrahedrite occur in a gangue of predominantly amethystine to white quartz and adularia with minor calcite intrusive into the Upper Volcanic subdivision of "Toodoggone" trachytes.

Secondary minerals include malachite, chalcocite and cerussite. The structurally controlled mineralized zone varies from 60 to 75m in width and has been partially drill tested over a north-south length of 610m and a vertical depth of 60m. Typical open spaced epithermal textures are observed in the fissure zone. Grades of mineralization are erratic with some nearby float assaying over 20 oz/ton Au and 700 oz/ton Ag.

Other Prospects. Other active prospects in the area include Cliff Creek, Metsantan, McClair, Saunders, Shas, Fin, Dryborough, Kerness, and Attycelly.

Summary

In summary, it must be concluded that the Toodoggone area represents a rich polymetallic epithermal mineral 'Province'.

CAPOOSE PROSPECT

The Capoose precious metals 'bulk' silver and base metals prospect is located a few kilometres north of Fawnie Nose, approximately 110km southeast of Burns Lake.

Geology

The Fawnie Range, in the vicinity of the Capoose property, is composed of a complexly fault broken conformable sequence of metamorphosed interbedded meta-greywacke, argillite and pyroclastic volcanic rocks and flows of rhyolitic and andesitic composition (of probable Upper Hazelton Group Age?) unconformably overlying andesitic rocks of the Takla Group.

The eastern side of the Capoose property is underlain by sediments and maroon tuffs of probable Upper Jurassic Age (Hazelton Group?). Belemnites and pelecypods found in the sequence have not yet been positively identified and are only indicative of a broad Jurassic to Cretaceous Age. In places, belemnites have been replaced by pyrite.

Conformably overlying a limey argillite unit with an attitude of 170°/20°W is an acidic unit consisting of rhyolitic pyroclastic and flow rocks. Phenocrysts of highly embayed quartz are set in a cryptocrystalline groundmass of quartz and feldspar. Flow banding averages 135°/15°W with a strong vertical jointing at 090°, parallel to the major structural zones. Local 'balling' or pisolitic formation within rhyolite has produced beds with 'balls' up to 30cm in diameter.

Alteration and Texture

The most striking feature of the metamorphosed rhyolitic and andesitic units, in the vicinity of mineralization, is the ubiquitous presence of amber brown coloured garnets occurring as disseminations, as fracture fillings, as vein fillings in quartz, and as replacement nuclei.

X-ray diffractometry and emission spec data indicate the composition of the garnets to be approximately $Sp_{63}Al_{29}Gr_8$ (ie Mn-rich). Garnets range from fresh to totally altered or replaced by a mixture of quartz ± sericite ± opaques. Hydrothermal solutions have cracked the garnets and they have subsequently been healed by sulphides (mainly pyrite). The process of 'garnetization' is postulated to have involved growth by nucleation and dispersion. A dispersion rim of predominantly quartz and/or sericite within replaced garnets is common. The textures suggest that crystallization took place rapidly under strong chemical or energy gradients. Dendritic growth textures are also exhibited.

It is further postulated that growth was diffusion-controlled as a result of the composition of the large crystals (ie garnets) differing appreciably from the groundmass (qtz ± fsp). The skeletal texture of garnets implies difficulty in nucleation.

Globular to botryoidal and fracture filling hematite is common in rhyolitic rocks. Epidote and chlorite are common alteration products in the andesitic rocks.

Structure

The predominant structures in the area are east-west faults exhibited by small linear depressions on Fawnie Range. Diamond drilling has also identified numerous fault gouges. Broad warping of thin bands in the argillite unit occur.

Mineralization

Three zones of precious ('bulk-silver') and base metals mineralization have been identified.

Zone 1. Galena, pyrite, pyrrhotite, chalcopyrite, arsenopyrite and sphalerite occur as disseminations (esp galena), as replacement of garnets (nuclei and attendant dispersion halos), and as fracture and/or vein fillings within garnetized and silicified rhyolite tuffs, breccias and flows and minor interbedded andesitic rocks in a steeply west dipping structurally controlled zone. Tetrahedrite, pyrargyrite, electrum, native gold, and cubanite have also been reported. Precious metals also occur within galena and sphalerite. Pyrite is ubiquitous and may have formed throughout the mineralizing event.

Zone 2. Located immediately to the west of Zone 1, this is similar style to Zone 1 with possibly a little more arsenopyrite.

Zone 3. Located to the north of Zone 1, this is also similar style to Zone 1 with more 'massive' to vein-type textures.

In all three Zones, Garnet replacement and mineralization are closely related.

Although it is much too early to talk about average grades, an estimate for such a 'bulk' silver type of mineralization might be 45 gm/tonne Ag with additional values in Au, Cu, Pb, and Zn. Much higher grades exist locally. It is interesting to note that a sample collected by myself assayed 0.03% Mo and 0.03% W.

Summary

It is postulated that a magmatic source provided heat and mineralizing solutions intrusive into rhyolitic and andesitic rocks, possibly near an old volcanic centre, resulting in replacement of garnets by sulphides and formation of mineralized veinlets and possibly more massive bodies of mineralization.

EQUITY SILVER MINE

The Equity Silver copper-silver-gold-antimony high-level volcanogenic deposit, located 35km southeast of Houston, is currently in production (open pit) with reserves estimated at about 28-million tonnes grading 106.3 gm/tonne silver, 0.384% copper, 0.96 gm/tonne gold, and 0.85% antimony.

Three principal mineralized zones — Southern Tail, Main and WTR — trending for some 2400m along a major NNE-SSW structural break have been outlined.

Tetrahedrite, chalcopyrite, pyrite, sphalerite, galena, arsenopyrite, magnetite and specular hematite with associated tourmaline, andalusite, scorzalite, pyrophyllite, sericite, quartz, dumortierite and corundum occur as stockworks, as disseminations, and as massive 'pods' within a window of a steeply west dipping sequence of intermediate to acidic pyroclastic and volcanoclastic sedimentary rocks of Mid to Upper Mesozoic Age. The 'Goosly Sequence' consists of the following (from the oldest to youngest).

(1) **Clastic Division** — composed of a lower polymictic conglomerate and an upper chert pebble conglomerate, thought to be correlative with the Skeena Group.

(2) **Pyroclastic Division** — a heterogeneous sequence of interbedded dust, ash, and lapilli tuffs, breccia, and reworked pyroclastic debris. These units are host to the copper-silver ores and have been extensively altered. The Pyroclastic Division is thought to be correlative with the Kasalka Group of Upper Cretaceous Age but further age dating will be required to confirm this.

northwesterly trending belt at least 90km in length and 15km in width.

At least three principal subdivisions are recognized.

(1) Lower Volcanic. Andesitic volcanic rocks consisting of maroon and green porphyritic flows and pyroclastics.

(2) Upper Volcanic. Intermediate alkalic assemblage including trachytes, crystal and lithic tuffs with intercalated dust tuff and quartz feldspar porphyries. Welded tuffs exist locally. The characteristic orange colour of the trachytic rocks has resulted from oxidation to hematite while the rock was still hot — possibly during late stage pneumatolysis. A coeval period of explosive volcanism and intrusion of syenomonzonite bodies was accompanied by brecciation along zones of weakness (predominantly large scale faults and attendant splays) resulting in silicification and precious and base metal deposition to varying degrees.

(3) Upper Volcanic — Sedimentary? Lacustrine volcanic sediments and possibly younger andesitic flows. Minor quartz feldspar porphyries.

A subaerial to shallow water environment of deposition of 'Toodoggone' volcanic rocks is postulated to have occurred in a northwesterly trending line of volcanic centres.

To the west, flat-lying to gently west dipping Upper Cretaceous to Tertiary pebble conglomerates and sandstones of the lower Tango Creek Formation of the Sustut Group unconformably overlie Takla Group and 'Toodoggone' volcanic rocks.

Structure

'Toodoggone' volcanic rocks dip gently (15 to 30°) to the west. The most obvious and probably most important structures in the area are long northwesterly trending fault systems (eg McClair system). Attendant with these larger faults are abundant splays. Northerly trending faults are also common.

Repeated, extensive normal block faulting from Jurassic to Tertiary time (over lengths of greater than 60km) provided the necessary channelways for mineralizing solutions to penetrate. Prominent gossans often are associated with structural zones but may or may not contain sulphides other than pyrite.

Mineralization

Four main types of polymetallic mineral deposits are recognized, of which two are pertinent to this paper.

(1) 'Porphyry' $Cu \pm Mo \pm Ag \pm Au$. Mainly associated with Omineca Intrusions (186 to 200 my). Chalcopyrite, pyrite, with or without molybdenite, occur as fractures, as disseminations, or in quartz veins within intrusive rocks and host volcanic rocks (mainly Takla Group andesites). The silver (>.1 oz/ton) and

gold (>0.015 oz/ton) byproducts from this type may be significant. Ex: Kerness, Fin (ex-Pine), Riga, Pillar, Rat, Mex.

(2) Precious and Base-Metal ('Geothermal') Epithermal $Au + Ag \pm Cu \pm Pb \pm Zn$.

(a) The Fissure — Vein Type is associated with predominantly silicified zones (quartz veins and/or old volcanic centres) related to repeated, extensive normal block faulting and possible tensional fractures formed during late doming.

Recurrent broken faults guided intrusions, hydrothermal ('geothermal') activity, and important later mineralizing solutions. An episodic, near-surface sealing cap, or 'low pH cap', consisting of mainly illite and sericite located in the hangingwall may also have acted as a trap for mineralizing solutions.

Hydrostatic boiling is a key to mineral deposition and may occur anywhere in the system depending on the salinity and temperature of the water. In terms of exploration guides, it will be important to determine by laboratory studies (ie fluid inclusion studies) if indeed boiling has occurred.

Principal ore minerals, occurring in open space fillings, include fine-grained argentite (acanthite (>80% Ag), electrum (>20% Au), native gold, native silver, and minor amounts of chalcopyrite, pyrite, galena, and sphalerite. Rare constituents include bornite, polybasite, stromeyerite, and secondary chalcocite, cerussite, malachite, and covellite. Gangue minerals include amethystine to white quartz, chalcedony, adularia, albite, calcite, hematite, Mg-rich siderite, ankerite, chlorite, kaolinite, and rarely barite and fluorite.

Mineralization tends to be non-uniform (ie occurs in shoots) and rarely exceeds more than 20% of the vein system. Base metals are deposited earlier than precious metals. Acanthite and electrum occur in clouded areas which may exhibit boiling textures caused by episodic pressures. Sharp-edged breccia fragments are sometimes strongly replaced by quartz, adularia or sericite. Several episodes of fracturing occurred as evidenced by breccia fragments being enclosed within later mineralized veins.

Preliminary chemical data suggests the following: host 'Toodoggone' rocks are quartz normative; K_2O/Na_2O ratio increases toward mineralization; and sulphur values are very low (<.04%).

Trace elements, including Cu, Pb, Zn, Ag, Au, Hg, Sr, Ba, Mo, Sb, Se, Te, Th, U, W, As and Bi are all low, except of course in the mineralized zones where slight anomalies are noted. There is an increase in Si, H_2O and K and a decrease in Al, Fe, Na, Ti, P_2O_5 and Ba, in zones of mineralization.

The Ag:Cu ratio of this type is approximately 25:1. Ex: Chappelle, Lawyers, Metsantan, McClair, Cliff Creek, Shas, Saunders?

As suggested by Larry Buchanan, with Fischer-Watt Mining Co, deposits of this type may be vertically stacked with barren zones in between ore-bearing zones and thus the depth potential must be explored for.

(b) Hydrothermally Altered and Mineralized Type. This is associated with major fault zones and possible post subsidence of volcanic centres followed by a doming of caldera cores. Pyrite is the most common sulphide present with minor amounts of galena, sphalerite, and rarely molybdenite and scheelite. This type is probably somewhat older of contemporaneous with fissure-type mineralization. Volcanic centres are strongly leached and sulfotrically altered to varying intensities consisting of clay minerals and silica with some areas containing alunite (eg Alberts Hump and Kodah). Epidote is a common alteration product. The 'low pH cap' mentioned earlier may now overlie areas of mineralization. Ex: Kodah, Alberts Hump, Saunders, Chappelle.

Mineral Prospects

The two most significant properties to date are the Baker Mine and the Lawyers prospect. 94E16E024E 026

(1) Baker Mine (ex-Chappelle). Camp and mill facilities at the Baker Mine are complete and production was scheduled for early April 1981 at a rate of 100 tons/day. During the fall of 1980 surface cut mining down to about 6m was carried out and since then underground development has been in progress from the 55 Level. Mineable reserves are 100,000 short tons containing 0.92 troy oz of gold and 18.7 troy oz of silver per ton.

Seven quartz vein systems mostly occupying fault zones have been identified in the area of the mine, with the main vein (Vein A), consisting of two or more subparallel veins traced over a length of 435m, a width of 10 to 70m, and a vertical depth of at least 150m.

Individual veins within the system vary from 0.5m to greater than 9m in width. A variety of quartz vein textures and cross-cutting relationships indicate a complex history of mineralization with multiple depositional stages.

Fine-grained acanthite, pyrite, electrum, chalcopyrite, bornite, native gold, sphalerite, galena, chalcocite, covellite, polybasite and stromeyerite occur within the highly fractured and brecciated quartz system intrusive into Takla Group andesite and 'dacite'.

Higher grade mineralization is associated with grey quartz which occasionally contains visible acanthite (Ag_2S).

Alteration minerals include pervasive laumontite, chlorite, pyrite, anhydrite and silica.

It is interesting to note that one sample of high-grade ore assayed 0.23% Mo. Tellurium values range between 16 ppm and 38 ppm.

Selected precious metals deposits of Northern British Columbia

Previous knowledge and understanding of high-level 'geothermal' deposits in northern BC has been limited or restricted to historical descriptions such as that of the Premier Camp near Stewart. More recent geologic theory and understanding, together with a tremendously increased economic value of precious metals, has resulted in the discovery of several new gold and/or silver deposits or districts in BC. Some may be referred to as 'geothermal' or epithermal and others as volcanogenic. Most are high-level and exhibit many features characteristic of similar type deposits in Colorado, Nevada, and Mexico.

Five of these areas are: the Toodoggone District, Capoose Prospect, Equity Silver Mine, Big Missouri — Premier Deposits, and the Dolly Varden — Torbrit Deposits (Figure 1).

TOODOGGONE AREA

The Toodoggone area is situated approximately 300km north of Smithers and is one of the most isolated areas, geographically speaking, in the province. Access is restricted totally to aircraft. A 1600m gravel airstrip capable of accommodating a Hercules aircraft provides the only access for the Baker gold-silver mine and several other prospects in the area.

Early mining dates back to the early 1930s when placer claims near the junction of Belle Creek and the Toodoggone River were worked. Exploration remained quiet until the late 1960s when numerous companies began searching for the large tonnage, low-grade porphyries (copper \pm molybdenum). Numerous claims were staked, the most significant to date being the Chappelle claims which include the Baker Mine recently brought into production by Du Pont of Canada Exploration.

The 1970s saw little exploration, with the exception of the Baker Mine and the Lawyers gold-silver prospect; but 1980 heralded the beginning of an era for this gold-silver 'Province'. Currently there are over 4000 active units within the Toodoggone area, with approximately 3500 of those being staked over the past year.

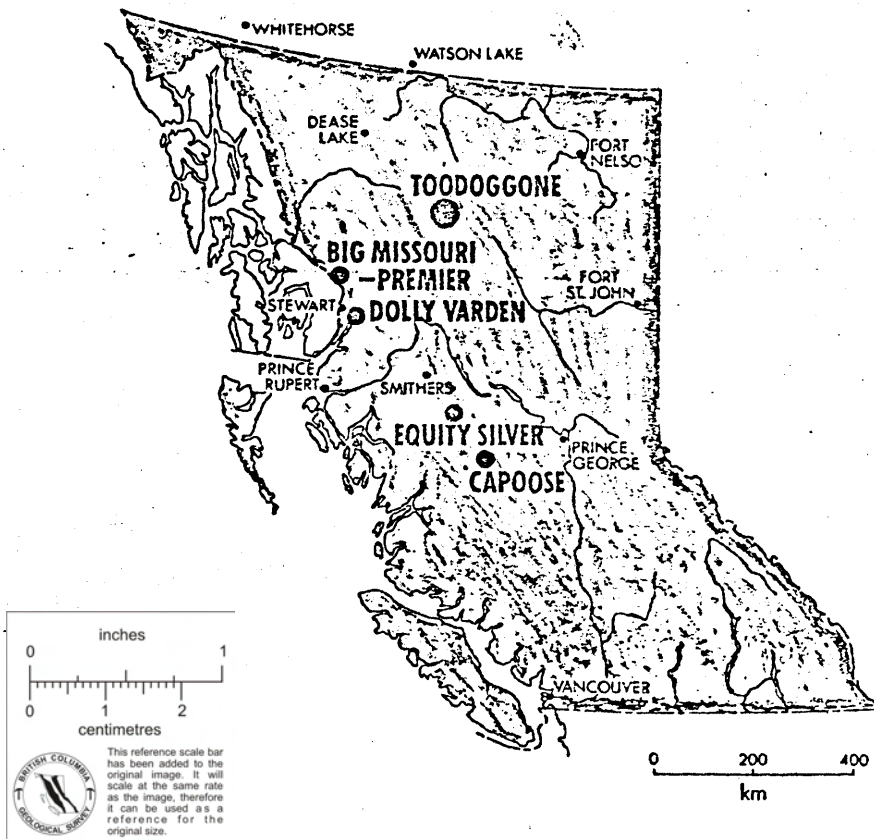
Property work of varying degrees has been carried out on such prospects as Baker (ex-Chappelle), Lawyers, McClair, Metsantan, Saunders, Fin (ex-Pine), Kerness, Shas, Attycelley and Firesteel.

Geology

The Toodoggone area lies within the eastern margin of the Intermontane Belt. The oldest rocks are wedges of crystalline limestone up to 150m or more thick. These have been correlated with the Asitka Group of Permian Age. The next oldest rocks belong to the Takla Group of Upper Triassic Age and consist of andesitic flows and pyroclastic rocks. The Omineca Intrusions of Jurassic and Cretaceous Age (K/Ar Age 186 my to 200 my, obtained by the GSC) range in composition from granodiorite to quartz monzonite. Some syenomonzonite bodies and quartz feldspar porphyry dykes may be feeders to the Toodoggone volcanic rocks which unconformably overlie the Takla Group.

'Toodoggone' rocks consists of a pile of complexly intercalated volcanic and volcanic-sedimentary rocks of Lower to Middle Jurassic Age, 500m or more in thickness, resting on the west flank of 'basement' rocks. They extend over a

Figure 1. Selected precious metals deposits of northern BC



B.C. shaping up as significant gold producer

94E/6E 094E 026

By David Duval

VANCOUVER — Mining may soon replace forestry as B.C.'s largest industry. It's also becoming "little business" in the province since smaller companies are playing ever more important roles in bringing new mines into production.

No longer is it beyond their capabilities to raise \$10-20 million for a mining venture. Although much of this funding is available through Canadian financial institutions and private groups, Europeans are also contributing large amounts for a piece of the action.

While the trend in new mines appears to be towards the development of smaller mining operations (mostly in the precious metals sector) the majors were responsible for nearly all of the large capital expenditures made by the industry during 1980. And these companies will continue to lead spending in the foreseeable future analysts agree.

In the Highland Valley, **Teck Corp.** spent about \$150 million bringing its Highmont mine into production at 25,000 tons per day, while nearby, **Lornex Mining** budgeted \$160 million to increase its capacity 68% to 80,000 tons per day beginning in July, 1981. **Cominco's** huge Valley Copper deposit, situated near **Lornex**, is expected to be developed at a cost of \$500 million or more in the near future. The company recently acquired an additional 26% equity interest in **Bethlehem Copper** raising its interest to 65%. **Bethlehem** has a 5.1% interest in Valley Copper Mines and a 20% interest in the billion ton Lake Zone deposit which straddles both companies' border.

Above the Arctic Circle on **Little Cornwallis Island**, **Cominco** is spending \$150 million to develop the Polaris mine. The operation will treat 2,000 tons daily and it will be one of the larger zinc-lead producers in the world.

Placer busy

Amax of Canada, owned by the huge U.S. molybdenum producer **Amax Inc.**, is reopening its Kitsault molybdenum mine situated on Alice Arm in B.C. at a cost of \$145 million. Expected to come on-stream by July 1981, the operation will have a throughput of 12,000 tons per day.

Owned 70% by **Placer Development, Equity Silver Mines** \$107 million **Sam Goosley** project near **Houston** began production in September. With a mill rate of 5,000 tons per day. Equity is designed to

produce over 5.6 million oz. silver, 14.1 million lb. copper and 10,900 oz. gold annually.

Elsewhere in the province, **Placer** increased molybdenum output by more than 300,000 lb. per year at its Endako mine. Cost of the project was \$12.5 million. The **Gibraltar Mines'** East Pit orebody was prepared for mining in a \$40 million program. **Canada Wide Mines**, the **Esso Minerals Canada** subsidiary, reopened the Granduc copper mine near **Stewart** at a cost of \$20 million in October of last year. An improvement in the mining method is expected to enhance the profitability of the mine. A production rate of 4,000 tons daily is scheduled.

Noranda Mines is also getting into the act with plans for a copper-zinc mine in the Goldstream Valley, 80 km north of **Revelstoke**. At a capital cost of \$62 million, it will produce 75,000 short tons of copper concentrate and 11,600 tons of zinc concentrate annually, starting in the third quarter of 1982.

Meanwhile, mill capacity is being expanded at **Noranda's Bell Copper** division. An increase to 17,000 tons per day is planned for this year, part of a \$19 million program. At the **Boss Mountain** division near 100 Mile House mill rate is to be increased from 1,800 to 3,000 tons per day by early 1982. The \$12.5 million program is intended to reap profits from projected price increases for molybdenum in the future.

New gold mines

The province may soon rank as a significant gold producer with a number of new mines coming on stream. **Carolyn Mines** and its joint are planning production in early 1981 from the \$20.4 million Ladner Creek gold project near **Hope**. Mill capacity is designed for 1,500 tons per day. At a smaller price tag, **Du Pont of Canada Exploration** has allotted \$12 million to bring its high grade Baker gold-silver deposit at **Chapelle** into production at 100 tons per day early in 1981. **Scottie Gold Mines**, managed and controlled by **Northair Mines**, has plans for a 200 ton per day gold-silver operation at Stewart scheduled for production by mid-year.

Late last year, **Scottie** secured \$15 million in financing to develop the property. Payback period is estimated to be less than a year. Some of the smaller companies are taking

advantage of the low capital cost involved in developing small tonnage but high grade precious metal deposits around the province. Among these companies is **United Hearne Resources** and its joint venture partner **Taurus Resources**. In a 60-40 split, they are constructing a 150 ton per day mill at their gold prospect in the **Cassiar** area of B.C. **Cusac Industries** has also set up a 30-50 ton portable mill in the same area. Even more significant is **Nu Energy Developments'** Erickson gold mine joint venture, now being expanded to 200 tons per day at a cost of \$450,000.

Near **Stewart**, **British Silbak Premier Mines** is working to a resumption of production based on a 100 ton mill rate for its gold-silver mine, South of Golden, B.C. **Ruth Vermont Mines** expects to produce 500 tons daily from its precious metals property starting in April.

Dekalb Mining reopened the OK Copper Mine in the Highland Valley at 700-800 tons per day last year. About 200,000 oz. silver and 3,300 oz. gold are expected from the mine annually. **Mosquito Creek Gold Mining** and **Peregrine Petroleum** are operating their gold mine near **Wells** at 100 tons per day and **Robert Mines Boundary Falls gold-silver property** expects to produce at the same rate.

The Yukon is also reaping the benefits of higher metal prices with **United Keno Hill Mines** deciding to reactivate the Venus property near **Carcross**. Nearly \$7 million will have to be spent to bring the former gold-silver prospect into operation at 100 tons per day.

Near **Faro** **Cyprus Anvil Mining** has announced a \$240 million eight-year program to develop the Grum and Vangorda deposits east of the **Faro mine**. Modifications are planned to the mill as part of the program which will see open pit life in the **Anvil District** extended to 1997.

Klondike fever has hit both large and small companies alike with **Copperfields Mining Corp.**, **Canada Tungsten**, **Queenstake Resources**, **Forum Resources** and **Crescent Mines** all involved in placer operations around **Dawson City** and throughout the Yukon. An important \$10 million underground explo-

ration program is being conducted by **Hudson Bay Mining and Smelting** on its Tom claims near **Macmillan Pass**. Most analysts believe the lead-zinc-silver prospect will become a producer. In the same area, **Amax of Canada** is contemplating a production decision for its Maetung deposit straddling the **Yukon-N.W.T.** border near **Macmillan Pass**.

VSE listed Cadillac Explorations intends to develop a silver-lead-zinc mine in the **Nahanni** district of the **N.W.T.** by spending \$35 million for a 1,000 ton per day mining operation. Production is scheduled to begin in late 1981.

Jaridge Explorations

Jaridge Explorations has agreed to acquire a 70% interest in five mining claims in **Lincoln County, Nevada**. Payment of \$5,000 has been made as part of the deal. Once matters pertaining to the lease and title of the property are taken care of, a more definitive arrangement will be reached, with **Jaridge** responsible for 50% of future expenses as well as for any expenses already incurred by **Midpines Explorations, Inc.**, which holds the remaining 50%.

On Aug. 31, **Jaridge** had working capital of \$1,297, slightly higher than \$100,500 a year earlier.

exhausted.

Noranda Mines continued its \$19-million project at the Bell Copper Division near Granisle, seeking to expand mill throughput from 15,000 to 17,000 tons/day by 1981. Despite lower molybdenum prices, a \$12.5-million program was announced at its Boss Mountain molybdenum mine, near 100 Mile House, which will increase mill rate from 1800 to 3000 tons/day by early 1982. 93K 13E

Placer Development completed work to increase molybdenum output by more than 300,000 lb annually at its Endako mine. The \$12.5-million project included 093K 04E expanding the rougher flotation circuit, adding a new roaster and a new plant to produce lubricant-grade molybdenum. A \$40-million program at Placer's Gibraltar mine to prepare the Gibraltar East orebody for Stage Two mining was also completed, facilitating transfer of mining from the Pollyanna pit. 93B 19W
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Lively progress for Canadian mining

A steady pattern of growth has characterized the mining industry in recent years and 1980 proved to be no exception.

General economic indicators pointed to a year of slow growth with the US recession having a big impact on Canadian industry. But the mining industry pushed ahead regardless — carrying on with massive expansion programs and announcing new developments across the country.

The trend in the provinces hasn't changed much from previous years, with copper projects leading the way in British Columbia, and uranium and potash continuing strongly in Saskatchewan. Golds were in the forefront in Ontario and Quebec with a lot of old-timers making comebacks.

Total capital requirements of the non-fuel mineral industry from 1980 to 1990 according to the Department of Energy, Mines and Resources will be more than \$42-billion, roughly 6% of total business investment in that period. In current dollars, assuming an average rate of price increase of 6.2% annually over the ten-year period, this \$42-billion mushrooms to \$63.5-billion.

While activity in the minerals sector is providing significant stimulus to the Canadian economy in general, problems with taxes, excessive regulations, rising costs and lack of skilled labour still cloud the future. The softer prices for many metals in the latter half of 1980 may have dampened prospects for some potential new mining projects, but on the whole, the industry is healthy and the outlook is good.

A brief survey covering new Canadian mine developments and major expansion follows. Refer to similar article in *Western Miner* Dec '79 for additional information on many of the on-going projects.

BRITISH COLUMBIA

Prominent in the expanding mining industry are developments in British Columbia. Here, capital expenditures exceeding \$700-million in the next few years are slated for the Highland Valley region alone.

The \$150-million Highmont project of Teck Corporation will come on-stream late in December 1980 at a rate of 25,000 tons/day and Cominco Limited's 85%-owned Valley Copper Mine is expected to be placed in production at a

cost of \$400- to \$500-million. Cominco's recent purchase of a controlling interest in Bethlehem Copper Mines (raising its equity from 39% to 65%) paves the way for a production decision on the 112,000 tonnes/day project. (Bethlehem has a 5.1% interest in Valley Copper Mines and a 20% interest in the Lake Zone deposit which straddles the Bethlehem-Valley border.)

Nestled between these two, another copper giant Lornex Mining Corporation is spending \$160-million on an expansion program to increase its daily milling rate from 40,000 to 80,000 tons/day by July 1981.

Elsewhere in the province, several new mine projects are making headway. Amax of Canada Limited is spending \$145-million to reopen its open pit molybdenum mine near Kitsault by July 1981. Throughput will be 12,000 tons/day.

Equity Silver Mines' 107-million Sam Goosley project near Houston came on-stream in September at a rate of 5000 tons/day. Owned 70% by Placer Development, the mine will produce 5,680,000 oz silver, 14,109,000 lb copper and 10,900 oz gold annually.

A new mine announcement in 1980 came from Noranda Mines Limited which intends to develop a copper-zinc mine in the Goldstream Valley, 80km north of Revelstoke. Estimated to cost \$62-million, the mine will begin producing 75,000 short tons of copper concentrate and 11,600 short tons of zinc concentrate annually starting in the third quarter of 1982.

The former Granduc Copper mine was reopened in October by Canada Wide Mines Limited, a subsidiary of Esso Minerals Canada. The company spent \$20-million to rehabilitate the mine, which will treat 4000 tons/day.

Among the golds, Carolyn Mines Limited and its joint venture partners the Aquarius Group expect production early 1981 from their \$20.4-million Ladner Creek gold project near Hope. The mill will treat around 1500 tons/day.

Du Pont of Canada Exploration is spending \$12-million to place its high grade Baker gold-silver property at Chapelle into production early 1981, at 100 tons/day. And Scottie Gold Mines, managed and controlled by Northair Mines, secured a \$15-million financing to bring its property near Stewart on-stream by 1981.

The 200 ton-day operation will produce 4500 oz gold and 2600 oz silver per month when in full production.

Spiralling prices for precious metals prompted several junior companies to enter producing ranks with small-scale operations, some using small portable mills to process the ore.

In the Cassiar area, a 150-ton mill is being built by United Hearne Resources (60%) and its partner Taurus Resources (40%), while Cusac Mines has plans for a 30-50 ton/day portable mill on its property in the same area. One producer already in the area, Nu Energy Development is expanding its joint venture Erickson gold mine from 100 to 200 tons/day at a cost of \$450,000.

Mosquito Creek Gold Mining Company and its partner Peregrine Petroleum poured the first brick at their 100 ton/day gold mine near Wells in May 1980. The Boundary Falls gold-silver property of Robert Mines was scheduled to come on-stream in the fall at the same rate and British Silbak Premier is resuming production at 100 tons/day at its gold-silver property near Stewart. A lead-silver-zinc mine south of Golden is being brought back to life by Ruth Verront Mines. The company plans a 500 ton/day operation beginning April 1981.

DeKalb Mining Corporation, a wholly-owned subsidiary of DeKalb AgResearch Inc of DeKalb, Illinois, reopened the OK copper mine in the Highland Valley in 1980, renaming it the Highland Valley mine. Milling capacity at the trackless underground operation is 700 to 800 tons/day for annual production of 11-million lb copper, 200,000 oz silver and 3300 oz gold.

Several major expansions were carried out during the year. In the Kootenay area, Cominco Limited is moving ahead with its \$420-million, eight-year expansion and modification program at Kimberley and Trail (the program began in 1977). A new zinc pressure leach plant was officially opened in October.

At Newmont Mines Limited's Similkameen Division, a \$23.4-million project was completed. The work included installation of a new primary crusher and conveyor to transport ore from the Copper Mountain orebodies starting July 1981; the same time as the Ingerbelle ore is

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The Baker mine site



Sandy McLean, senior geologist, examines diamond drill core samples at the mine site

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Du Pont of Canada's major mining venture

Du Pont of Canada Exploration Limited is undertaking its first major mining venture as it begins development of its Baker gold-silver property 170 miles north of Smithers in British Columbia.

The Vancouver-based mining arm of Du Pont of Canada Inc will be joining producer ranks early in 1981. The 100 ton/day operation is expected to cost \$12-million and will include an open pit

and underground mine, a 120-ton conventional cyanidation mill, and will create 40 permanent jobs, rising to 80 during the peak construction period.

On-site work is already gearing up with about 12 people currently working to upgrade the Sturdee River airstrip and the eight mile road from the airstrip to the mine. The property is located in a relatively remote and mountainous

region and is entirely dependent on air support.

'Orders have been placed for most of the major equipment, some of which has already been delivered to the mine', reports David A Barr, vice-president, Du Pont of Canada Exploration.

Engineering and design work has been carried out by Kilborn Engineering and the contract to construct the mill buildings and tailings system has been awarded to Dillingham Corporation Canada Limited.

During the construction period, materials will be airlifted by Hercules and smaller aircraft from Smithers to the Sturdee Valley airstrip and transported by road to the mine.

Accommodation and camp facilities are presently being built at the Penticton plant of Atco Pacific Limited. Excavation and foundation work will begin early July and the pre-assembled camp will be airlifted to the site. The mill building is expected to be closed in by mid-September.

Du Pont of Canada Exploration has been exploring and developing the property since 1974 under an agreement with Kennco Explorations (Western) Limited which made the initial discovery in 1969. About \$2-million has been spent on diamond drilling and development work to date, according to Mr Barr.

A 20-ton Mack truck offloading from the Hercules aircraft at Sturdee River airstrip





Gold and Silver

The property, which has been known as Black Lake or Toodoggone River and later as the Chapelle property, was recently renamed the Baker mine, in memory of the late Arthur H Baker, formerly a vice-president of Du Pont of Canada Inc and president of Du Pont of Canada Exploration Limited.

Surface/Underground Mining

The mine is to be developed by a combination of surface and underground methods. The open pit will be partly mined out in 1980 and underground mining by cut and fill stopping will be under way by late October, Mr Barr reports. He estimates that about 75% of the mining will be underground, with the remainder coming from the open pit.

Adits have been collared at the 5420ft and 3538ft levels and some 325ft of drifting and raising has been completed. There is currently about 4000 tons of ore stockpiled ready to be put through the mill.

Mineable reserves are 100,000 short tons containing 0.9 oz/ton gold and 19 oz/ton silver, sufficient for a mine life of approximately three years.



Equipment is gathered at Smithers ready to be airlifted to the mine

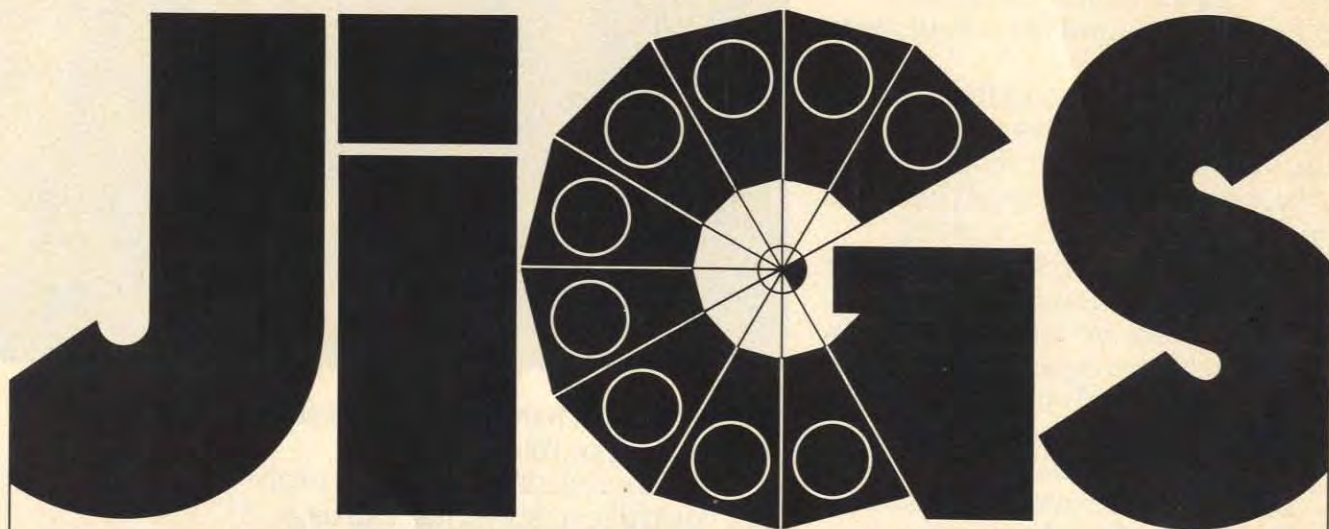
A total of seven quartz vein systems have been investigated on the property. Six of these lie within an area of 0.3 miles² and one lies about 1.5 miles east of the main vein A. Vein A is part of a quartz vein system composed of two or more subparallel veins which trend northeasterly, dip from 80° southeast to about 70° northeast. The quartz vein system has been traced for a strike length of 1400ft across a width varying from five to 25ft. Drilling indicates the vein system persists for at least 500ft vertically from

the surface.

Further exploration work will be carried out in conjunction with the mining operation, Mr Barr said. Work will consist mainly of diamond drilling and will be concentrated on the main vein and in the vicinity of the other veins.

Milling

Milling of the ore, which is to begin in January 1981, will consist of crushing, grinding, cyanidation, filtration and



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Some of the 27 accommodation units being built at Atco Pacific's Pentiction plant



Inside one of the accommodation units

precipitation using conventional gold recovery techniques to produce bullion containing both gold and silver. The bullion will be sent to another refinery for separation of the metals.

Work on the tailings pond, located 1600ft southeast of the mill will begin in summer. The tailings pond and dam will cover about 5.5 acres and will be capable of storing 100,000 short tons of tailings.

The power generation equipment will be located in an annex to the mill building which will house the three

500 kW diesel electric generators, a standby heating boiler, vacuum pumps and air compressor.

The year-round operation will require some 400,000 gallons of diesel fuel annually. It is expected that four round trips a week by small aircraft plus 14 round trips every two months by Hercules for the transport of fuel oil will be carried out.

Employees will be flown in to work for 15 to 21 days and will be flown out for seven days time off. Living

accommodation will be provided for the full construction and operating workforce and it is proposed to have additional recreational facilities in the site.

Although there is no road to the site at present, the Ministry of Energy, Mines and Petroleum Resources has considered extending the road from Moose Valley, which could eventually provide access to the mine from Fort St James north to Germansen Landing in the Sturdee Valley.

WM

MINING PROPERTIES

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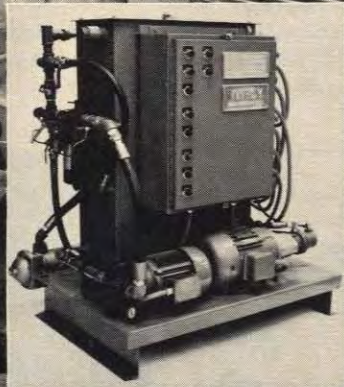
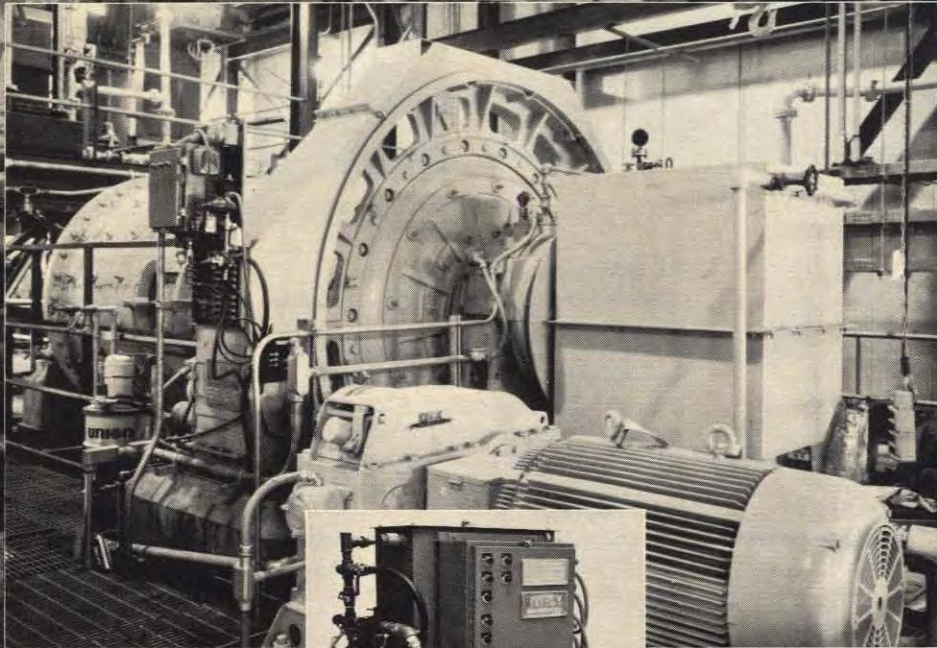
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CHAPPELLE
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Dupont - Chappelle

I spent August 8th, part of the 9th, and all day on the 12th at Dupont's Chappelle camp. Tom Drown was the geologist in charge. Dupont was diamond drilling the gold-silver bearing quartz vein under an option agreement with Kennco. This summer they flew in a 4x4 pickup via helicopter to transport men and equipment to the camp from the airstrip (5 miles) and to the drill sites. At the time of my visit, Dupont had just completed their program of 15 diamond drill holes totalling nearly 7000 feet on the main quartz vein (Vein A). This summers' program was designed mainly to test the southwestern extension of the vein by using both BQ and NQ size core. Dupont planned to drill another 1000 feet on their "North Quartz" vein located approximately 3000 feet to the northeast of Vein A. Electrum and argentite occur in a quartz vein which has a strike length of approximately 950 feet and a width which varies between 5 feet and 45 feet. The program appears to have reached a stage where underground exploration and development might be considered for next year.

Black Lake

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