MEMO

To: Dave Lefebure
From: Gerry Ray
Re: *Recent visit to the Golden Bear mine, NW B.C.*
16th September 1997

Dear Dave,
Between the 12th and the 15th of September I made a second visit to the Golden Bear Mine as part of my Sediment-hosted, disseminated gold Project. Work was partly hindered by the inclement fall weather. The exploration office has shut down (they drove out with me today) and the remainder of the staff are preparing for the official mine opening ceremony on Wednesday the 17th. To date, the recent heap leaching operation has produced between 20 000 and 25 000 oz of gold. The mine will shut down for the winter break in mid October.

It was an excellent and worthwhile visit and the following was achieved:
1. Met exploration geologist Andrew Hamilton and had numerous long talks with him regarding the geology, controls etc.

2. Collected 18 rock samples (54 bags in all as each one is subdivided into assay, whole-rock and thin section-microprobe samples). These were taken from on surface and from 7 drillholes. They come from the Grizzly, Kodiak A, Kodiak B and Ursa deposits as well as the Totum Silica Zone. I couldn't collect more due to bad weather and weight limitations on the aircraft.

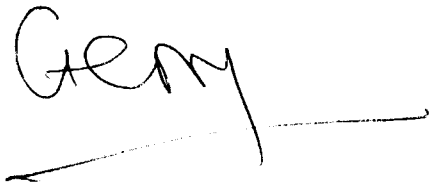
3. Despite weather, managed to spend 4 hours looking at the newly opened Ursa pit and wandering over the Totum Silica Zone.

4. I was given access to a great deal of confidential data, including reports, drill-sections and geochemical data. Andrew Hamilton has told me that there is much unpublished data at their Vancouver office which I can use.

5. Having Andrew Hamilton here to explain the geology (he wasn't here when I and Howard Poulsen first came) has given me a different impression of the ore deposits than before. There is no stratiform Carlin-type ore known here. The deposits are all narrow, high grade and fault controlled. They resemble more the footwall-feeder type ore that underlies some Carlin deposits. The question is: were the fluids confined wholly to the faults or did some permeable beds take up the fluids to form stratiform ore. The lack of known stratiform deposits suggests the former but the presence of the Totum Silica Zone indicates that some beds at least were selectively replaced. To date, NA Metals have concentrated on looking for fault controlled ore, and judging by their success, this has been justified. But I still have a feeling that low grade and invisible stratiform ore could be present in this camp.

6. Attached are some rough, confidential notes I made from NA Metals data and my own observations.
Yours

Gerry



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From: Gerry Ray
16th Sept 1997

GEOLOGY AND MINERALIZATION OF THE GOLDEN BEAR MINE AREA

Location.
Golden Bear mine is located in the Atlin Mining Division near 132 17' W and 58 13' N. The area lies on the Tulsequah (104K) and Bearskin Lake (104K/1) mapsheets. It is situated in the Tatsamenie gold camp approximately 140 km west of Dease Lake in NW BC and 100 km east of Juneau, Alaska. Access is gained by air or by road off of the Telegraph Creek road.

Property includes a CIL gold mill rated at 500 tonnes per day which worked the refractory ore from the Bear Main deposit from 1989 until the ore was finished in 1994. 6 781 698 grams (218 040 oz) of gold were recovered from 535 277 tonnes (590 041 tons) of ore.

Since 1993, there has been the discovery of the Kodiak A and Ursa oxide gold deposits and the Grizzly refractory mineralization averaging 22 g/t/Au. In addition, the Kodiak B oxide zone has been defined.

Mineable reserves for the Kodiak A & B and Ursa are 1.5 m tonnes grading 5.1 g/t Au. Production scheduled for May 97 using open pit and underground mining methods and heap leach technology.

Exploration History.
In 1979 and 1980, Chevron Minerals Ltd. conducted an exploration program for bulk mineable gold deposits. A program led by L.A. Dick focused on As and Sb-bearing alteration zones in the Tatsamenie Lake area. In 1981, Chevrons staked ground and conducted reconnaissance soil sampling which revealed some Au anomalies. Follow-up work resulted in the discovery of rock outcrop assaying up to 24 g/t/Au.

In 1982, outcrops over the Bear Main zone were trenched and from 1983 to 1985 drilling was conducted on the zone and other mineralised areas discovered further north, including the Kodiak A, and B and Totem silica zones. A total of 119 surface diamond drill holes were completed up to this time.

In 1986, North American Metals Corp. became joint venture partners with Chevron. Underground and underground development of the Bear Main deposit started. In 1988, Homestake Mining (BC) acquired a major interest in North American Metals and became an active participant in the mining project.

In 1992, exploration began to be focused on the Fleece Bowl and Totem areas. In 1993, Wheaton River Minerals Ltd. acquired Homestake's interest in the Golden Bear property.

Previous Work

Area was mapped by Souther (1971). The results of more recent mapping around the mine area were completed by Oliver and Hodgeson (1989, 1990), Oliver (1993, 1995), Bradford and Brown (1993a, 1993b) and McBean and Reddy (1993). Other studies at the mine were completed by Schroeter (1985, 1986, 1987).

(A) Grizzly Deposit

Lies 400m below, and on the same structure as the Bear Main Deposit. The geology is similar to the overlying Bear Main. Get a number of fault-bound slices that make up a north-striking, steep east dipping carbonate lens up to 70m thick. The lens is bounded to the east and west by highly altered Stuhini Group volcanic. The dominant structure is the Footwall fault which forms the western boundary of the carbonate lens with the volcanics. It comprises a 1-10m thick gouge zone of mostly volcanic origin. Within the carbonate lens are fault blocks of carbonate and lesser amounts of volcanics in an anastomosing system of shears. The margins of the volcanic blocks are gougy whereas the carbonate blocks are brecciated and crackled. The cores of the blocks show little brittle deformation.

Primary carbonate lithologies are: dolomite with chert nodules (DOCH), bedded, silty limestones (LMST), and chert (CHRT). DOCH is most abundant and CHRT least common. Some post mineralization basaltic dikes are present as irregular swarms along the fault structure.

Grizzly mineralization

Gold is strongly associated with fine grained dark grey pyrite in gouge or in the siliceous matrix of the carbonate breccias. Microprobe work on similar material in the overlying Bear Main (Oliver, 1996) note two pyrite populations: a fine grained arsenian pyrite which carried significant gold, and a coarser, euhedral, brassy coloured pyrite which is barren. Cannon (1996), using SEM techniques, also detected arsenian and non-arsenian pyrite in the Grizzly Zone. He also note the presence of 5-20 micron grains of electrum. The Grizzly is calculated to be 149 008 tonnes grading 20.47g/t/Au, cut (Craig et al., 1997).

(B) Kodiak A Deposit

Is located 2.5 km north of the Bear Main open pit at an elevation of 1900m and open pit mining has recently commenced. The geology is dominated by two Permian limestone units. The oldest (LMST1) is a massive to medium bedded, creamy white to pale grey limestone (Cooley, 1996). This is overlain by LMBC, a dark to medium grey banded and locally crinoidal limestone. Locally, these limestones contain pale to dark grey "chert" but it is uncertain whether this is silicified limestone or sedimentary chert.

Two structures dominate the deposit, the Kodiak fault and an overturned anticline. The Kodiak fault is 3-35m thick, trends 340 and dips 55 degrees NE. It may represent a splay of the major Ophir Break which is located 100m further east. The Kodiak fault is

characterised by extensive breccias and orange to red hematitic gouge. The overturned anticline is NE trending and SE verging. It lies west of, and appears to be cut by the Kodiak fault. The Kodiak A deposits appears to lie where the anticline and Kodiak fault intersect. The area is marked by extensive crackle, brecciation and silicification. The silicification predates the latest movement on the Kodiak fault as silicified limestone clasts are found in gouge along the fault (Pigage, 1994).

Kodiak A Mineralization

Gold occurs in strongly crackled, brecciated and silicified carbonates in the footwall of the Kodiak fault. Ore zone reaches 40 m thick, has a 160 m strike length and 60m downdip. The gold is disseminated throughout the deposit although areas with fault gouge can be enriched. No sulphides are seen macroscopically although the silicified carbonates that host the gold are often hematitic and visually resemble jasperoid. SEM work by Cannon (1996) shows that the gold is fine (920 - 960 fineness) and occurs in grains < 20 microns in diameter. This gold most often occurs with Fe-oxide-stained muscovite along microfractures. Other metallic phases were either absent or very rare (Cannon, 1996). The Kodiak A has mineable reserves of 824 000 tonnes grading 3.3 g/t/Au with a ore to waste ratio of 1:1.

(C) Kodiak B Deposit

This blind deposit is located 2 km north of the Bear Main open pit where it lies between 35 and 135m below surface. It was discovered in 1984 by Chevron Minerals Ltd., whilst they were conducting exploratory drilling along the Ophir Break. Using different criteria, estimated insitu reserves range from approximately 172 000 tonnes grading 10.24g/t/Au to 141 000 tonnes grading 8.51 g/t/Au.

Kodiak B Geology

The main geological features are Permian carbonate units and the N trending, steep easterly dipping Fleece fault. Cooley (1996) notes a massive to medium bedded cream colored limestone (LMST1), a dark to medium gray banded and locally crinoidal limestone (LMBC) and a thick bedded to massive dolomite with irregular chert lenses (DOCH). On the east, hangingwall side of the Fleece fault, LMST1 and LMBC are dominant with both units being crackled and silicified. There are also locally breccias consisting of siliceous clasts cemented with calcite. Only DOCH has been intersected in the footwall.
The Fleece fault ranges from 3 to 12m in thickness. It is a broken, gougy zone that includes fault blocks of all the carbonate units as well as some heterolithic carbonate breccias (HLBX) that formed during fault movement. Also, in the southern half of the Kodiak B deposit the fault zone contains a thin wedge of altered mafic volcanics (MFCA). A strongly altered dike of intermediate composition is present in the footwall rocks where it is cut by the Fleece fault. The dike strikes NE and dips gently NW.

Mineralization in the Kodiak B deposit

Gold occurs in two tabular orebodies, named the Main and Footwall zones, that are mainly hosted by DOCH units in the footwall of the Fleece fault. The larger Main Zone has a 160m strike length, extends 90m down dip and is 2 to 30m thick. It has a similar shape as the nearby Kodiak A deposit and mainly lies adjacent to the Fleece fault, except at its southern and northern ends. However, the highest gold grades are found in rocks close to the fault. The smaller Footwall Zone averages 3 to 4 m thick and has strike and downdip lengths of 40m. Although the Main Zone is subparallel to the N trending Fleece fault, the Footwall Zone strikes 330 degrees.

Both zones are marked by strong brecciation and crackle textures; clasts are moderately milled and have an orange-tan color. Higher gold grades are associated with stronger brecciation and they decline in areas with less deformation which also coincides with increasing distance from the Fleece fault. Sulphides are mostly absent but can reach 4 percent in volcanic rocks and 2 percent in the carbonates. They occur as very fine grains, disseminations or fracture coatings, particularly to the south of the deposit in a fault sliver of volcanic rocks.

(D) Ursa Deposit

It lies 3.3 km north of the Bear Main open pit at an elevation of 1780m. Area was originally staked and explored by Chevron Minerals Ltd. in 1982; work was concentrated on the West Wall fault, the westernmost margin of the Ophir Break and the nearby Totum Silica Zone. In 1992, North American Metals Corp. conducted an exploration program in the area; one grab sample of heterolithic breccia from a structure, the Ursa fault, assayed 7.17 g/t/Au (Jaworski and Reddy, 1993). In 1994 and 1995, drilling outlined the Ursa deposit which is calculated to have mineable reserves of 511 000 tonnes grading 7 g/t/Au with a waste to ore ratio of 6.6:1.

Ursa Deposit Geology

Deposit is hosted by massive to thin bedded Permian carbonates and is structurally controlled by the Ursa fault. Cooley (1996) notes that the carbonates comprise dark to medium grey and locally crinoidal limestones (LMBC), a thick-bedded to massive dolomite with irregular chert lenses (DOCH), and a dark grey, thin-bedded and graphitic limestone (LMGT1).

The Ursa fault is a S to SW trending splay from the northerly striking West Wall fault, which lies a short distance east of the Ursa deposit. It places LMGT to the west against DOCH and LMBC on the east. At surface, the fault dips steeply west but at depth it rolls and is steeply east dipping. The fault is marked by a 1-2 m thick zone of heterolithic carbonate breccia. Splaying from the western side of the fault are sets of fracture zones that dip steeply NW and strike SE. These fractures are regularly spaced at approximately 30 m apart and are generally unmineralized (except in some instances immediately adjacent to the Ursa fault).

Intrusives rocks are rare. However, a few post-ore basaltic dikes are present. These are presumed to be Tertiary in age and they resemble the dikes seen in the Grizzly Zone.

Ursa Mineralization

Gold mineralization is associated with extremely brecciated and milled, strongly hematitic LMGT immediately adjacent to the Ursa fault. The mineralized zone is 10-15 m thick and has a strike and down-dip length of 100m. Some gold mineralization also extends a short distance westwards from the Ursa fault along the SE trending and NW dipping set of splay fractures. Subsequent movement along one of the fracture zone has resulted in normal, left lateral offset of both the Ursa fault and the Ursa deposit. Mineralized areas are commonly silicified, although some gold is found in unsilicified material. Gold appears to be associated with deep reddish-brown hematite staining that occurs along fractures and in breccia matrix. Sulphides are not generally seen in the mineralized zone and are rare (as very small isolated grains) in the surrounding rocks.

ICP analyses indicate the Ursa deposit contains high levels of Hg and Te. Cannon (1996), using SEM/microprobe techniques, detected rare and small grains of a bismuth telluride (possibly hedleyite or tellurobismuthite). No Hg-bearing minerals have been detected.

My notes on Golden Bear

1. Ore bodies are generally narrow (<40m) and steep dipping; they are found within, or footwall to steeply dipping, north striking faults of the Ophir Break.

2. Good correlation between fault brecciation and gold grades. Grades drop with less fracturing.

3. Gold generally hosted by silicified and brecciated carbonates and less in volcanics.

4. Two styles of mineralization (a) deeper? level refractory ore making up the Bear Main and Grizzly deposits to the south, and (b) oxide ore at ?higher structural levels comprising the Kodiak A, B & C zones and the Ursa to the north.

5. In refractory ore, the gold is mainly in micron arsenian pyrite. Less is known about gold and sulphides in the oxidized deposits although SEM work indicates a lot of the gold in these is enclosed in quartz and silica. In some oxidized ore the gold is on microfracures with muscovite.

6. Status of decalcified ore is uncertain. Small amounts are found in the Grizzly and Bear main and in these ores the gold grades are higher than in the silicified ore. Didn't see any reports of decalcified ore in the oxidized deposits.

7. Parts of the Ursa deposit have high Hg and Te. Bismuth tellurides have been detected.

8. To date, no Carlin-type stratiform deposits have been discovered and all the ore resembles more the feeder-type footwall ores at Carlin. Did stratiform deposits not form at Golden Bear because there was nothing to seal in the fluids and they were merely confined to the faults? However, the presence of the Totum Is zone suggests that some

stratiform (but barren) alteration did take place. Thus, non-visible, low garde and stratiform ore could be present.

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