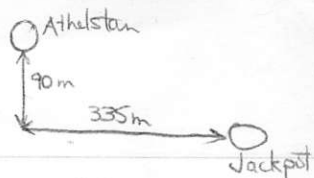


825623



Athelstan - Jackpot

(49°03.8', 118°33.7')

(Location Map)

Main Production

1901 - 1930

Total:

33,216 tonnes ore

180 kg Au

210 kg Ag

7.2 tonnes Cu

by 1942 - 91m shaft sinking, 570m tunnelling

Jackpot - 23 Samples

avg 0.127 oz/ton Au

(4.35 g/metric ton)

SX ore: 0.06 - 0.84 oz/ton

(2.1 - 28.8 g/metric ton) over

1.0 - 2.2 m widths.

Athelstan - 29 Samples

avg 0.105 oz/ton Au

(3.6 g/metric ton)

SX shear: 0.14 - 0.80 oz/ton

(4.8 - 30.5 g/metric ton)

over 0.3 - 2.0 m widths.

PI - structural
Hole

0+08E, 0+88S

0+80, 1+15S

Athelstan - Jackpot

$49^{\circ}03.8'$ $118^{\circ}33.7'$

Main production -

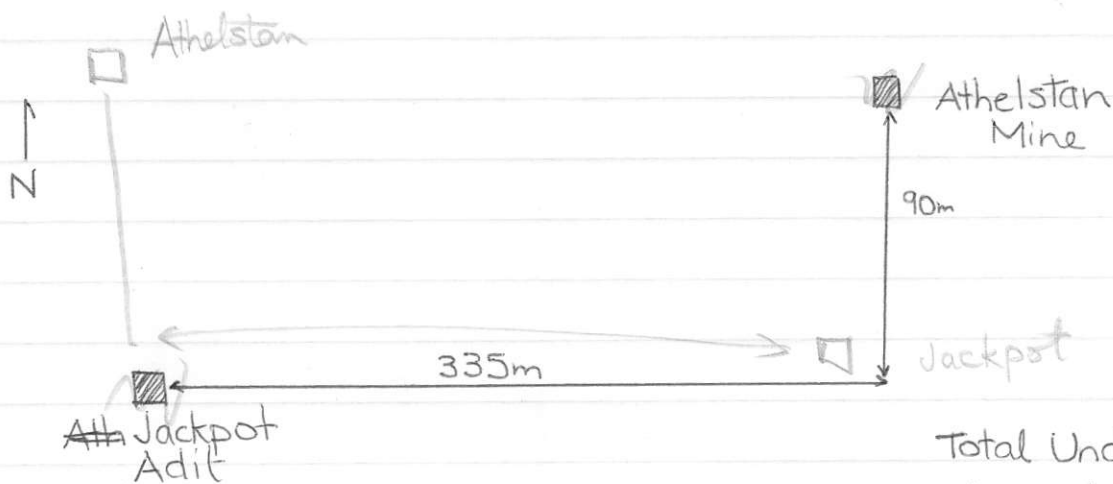
1901 - 1930

33216 tonnes ore

180 kg gold

210 kg Ag

7.2 tonnes Cu



Total Underground development by 1942:
91m shaft sinking
570m tunnelling

common ore minerals: py, aspy



form replacements in listwanites

McNaughton (1945): Jackpot (from mine workings) 2 ore bodies → crescentic in plan + plunged $10-40^{\circ}$ to E along long axis; $\sim 1-7.6$ m thickness, avg 3m. (stopped over length at least 30m length and at least 12m ~~thick~~ wide)

McNaughton (1945) cont.

: Athelstan → only 1 stope accessible, winze sunk into the floor to a depth of 3.6m was entirely in ore.

: chem. comp. rx → influenced ore deposition
⇒ more carbonate - more easily replaced by ore-bearing solutions than areas with appreciable amounts of serpentine.

Orebodies displaced by ^{NE striking 40-70°} NW dipping normal faults
(movement is thought to be minimal)

8 1/2 x 14 Athelstan-Jackpot Mine ... References ...

→ one of these faults is well exposed at the W. end of the large stope in the Jackpot Mine

Serpentine

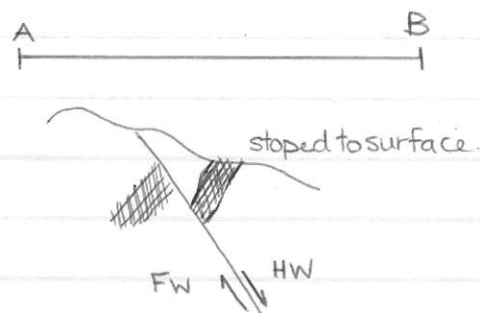
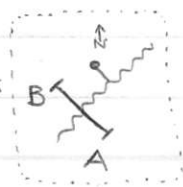
Listwanite - in serpentine adjacent to qz dior / qz fsp porph

QZ Dior → porphyritic phase: Qz-Fsp Porphyry

Augite Porphyrite Dykes: post mineralization



→ NE striking, NW (40-70°) dipping normal faults



→ another NW striking fault exposed at W end of the Athelstan Stope

Report on the Athelstan-Jackpot Property for Max Minerals Inc. by W McDougall, Dec 1986 (as amended Feb 16, 1987)

Arrowhead Resources - extensive work 1978, 1979, 1981

→ Surface + some underground work

→ 28 percussion holes, 3 short vertical DDH

serpentinite alt. to Listwanite → contains erratic but locally good Au values over an area 240m x 960m

?? much shearing → is gently dipping + generally ~~sub~~ // SE facing slope ??

(c. Dyakowski, president of Max Minerals)

Max Minerals - more detailed geochem + geophysics

Work History

1900-1940 separate owners, production from Athelstan and Jackpot

1960-1970 Sabina Mines

Colby Resources

Scurry Rainbow Oil + Gas

1978, 1980, 1981 Arrowhead (supervised by Dr. Alan Robert Grant)

Geol Mapping

Sampling - rx

Soil Sampling

Magnetometer Survey

~~VLF~~ VLF survey

25 perc. holes

3 ddh.

1982-1986

Boundary Expl. Ltd + Noranda-Kettle River JV Gp.
Prop N. of Athelstan, interesting drilling intersections

12 perc. holes, 8 encountered open stopes, no sign. result

surface sampling - returned good Au values.

serpentinite ?? open fold plunging E_{asterly} from 0-40°

Jackpot	2 lenses	:	up to 7.6m true thickness	} + other small lenses were mined at both locations
			horizontal dimensions ~12x30m	
Athelstan	main lens	:	12x18m	}
			true thickness 0.9 and 2.4m	

Au + Ag mineralization assoc. w massive aspy and py lenses within listwanite

Grant (1979) reports numerous mssx lenses, predominantly pyrrhotite, are found within the diorite stock. \Rightarrow some lenses contain argentiferous galena (Ag values range from 0.58-4.16 oz/ton)

Soils	Au ≥ 100 ppb	L300E	0+25N - 1+00N	\Rightarrow all ≥ 1000 ppb Au
		L250E	0+25S - 0+50N	
		L200E	0+25S (≥ 1000 ppb)	
		L150E	0+25S	
		L100E	0+00N	
		L050E	0+00N (≥ 1000 ppb)	} 0+50S
		L000E	0+25S (≥ 1000 ppb)	
		L050W	0+50S	
		L100W	0+50S - 0+75S	
			+ other isolated anomalies	

As	≥ 500 ppb	L300E	0+25N - 1+00N	} all ≥ 1000 ppm
		L250E	0+25N - 0+50N	
		L200E	0+25N	
		L150E	0+25N	
		L100E	0+00N	
		L050W	0+00N	
		L00W	0+25S	

As cont.

L300E	$0+50S = 0+75S$
L250E	$0+00 - 0+50S$
L100W	$1+00S - 1+25S$
L150W	$0+75S - 1+00S$
L200W	$1+00S$
L700E	$0+75N - 1+25N$
L100E	$1+25S$
L050E	$1+00S - 1+25S$
L000E	$1+25S$
L050W	$1+25S$

+ other isolated anomalies.

Geophysics

Magnetic Anomalies

- usually in serpentinite areas (appear as a series of lenses elongate in an east-west direction)

VLF EM-16

conductor: 1) strikes NE-SW direction (L1+50W, 1+50N to 1+50E, 5+25N)
terminates in high magnetic zone

2) crosses line 6+50W at 4+25N; strikes NE of line 4+00W, 6+40N; continues off the grid in both directions

3) } lie in area which has been mined + trenched
4) }

5) starts at 6+00W, 4+75N, strikes in easterly direction to line 4+00W, crossing it at 4+50N

this conductor straddles the magnetic high

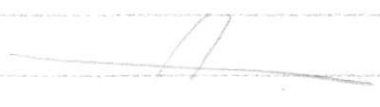


- Pulling casing unless hit lens.
-> check with Ian.

~ IW 500N - area of dior/gabbro.
(2 samp)

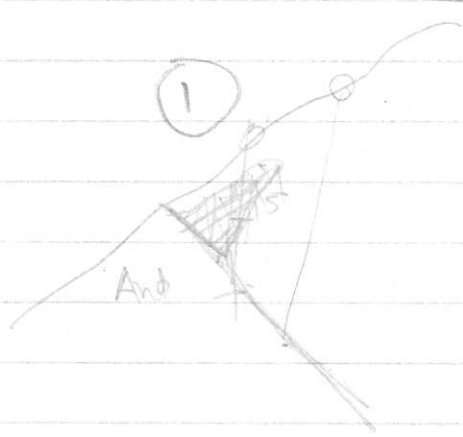
~ 450W 600N - dior.

BL-0505 IW - 0+50E
List. 2 samples



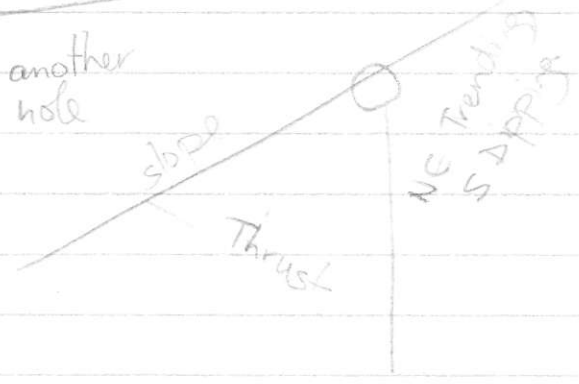
1st hole - close to thrust
(test hole) near mineralization
90°

thrust 50-60°
30° (Cam + Roy)
(Ian)



hole =
60-70°
Dip

another hole



draw X sections.

③

Fencing + NE dipping
structure w
thrust

④

Mid between Athelstan +
Jackpot.

Nov 89 JJ McDougall

MINERALIZATION - Slopes controlled + // to shearing (shearing - gently dipping, generally sub// to SE facing slope), however, some smaller steeply dipping mineralized zones were also mined
(∴ larger tabular lodes + possible vein-like "deposits")

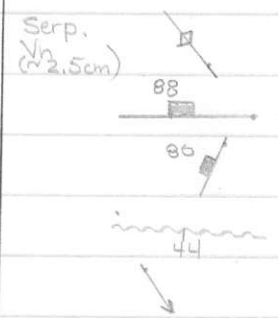
SERPENTINITE - tabular mass formed an open fold plunging easterly 0-40° (avg somewhat steeper than the slope of the ground).
• part of it thought to be stratiform in the Boundary district

MINERALIZATION - ore lenses in Jackpot crescentric in plan view and plunged 10-40° E along their longest axis (McNaughton)
⇒ if stratiform lenses, suggest shallow, E-plunging syncline
- ore displaced by NE striking normal faults that dip 40-50° NW.

- Theories: a) replacement deposits in talc-carbonate rocks (McNaughton, 1945)
b) sulfide fillings and deposition along pre-existing low angle shears (Grant, 1978)
c) syngenetic stratiform lenses (Seraphim)

N	E	Joints	Foliation	Fault	
0+35S	0+52W	124/62		298/14 ✓	
0+50S	0+50W	052/90			
1+00S	0+50W	215/52		274/54 ✓ 030/90 ✓ 084/10 ✓	
1+20S	0+45W	107/86		143/42 ✓ 316/80 ✓ 288/74 ✓	
1+00N	2+00E	023/88 270/90			
1+60S	0+10W	154/64		130/54 ✓ 058/12 ✓ 063/68 ✓	
			179/38 198/16 177/22		
1+38N	0+75W		178/28		

N	E	Joints (Vns)	Foliation	Fault
2+25N	1+50W	(280/34)		
3+95N	2+00W	(320/90) 268/88 ✓ 204/80 ✓		094/44 ✓ Slicks 38 → 146
1+25S	0+80W			063/60 ✓
0+50S	1+50W	(350/28)	350/28 285/50	325/54 ✓
0+52S	1+45W		028/30	
4+82N	4+00W	128/82 ✓ 031/83 ✓ 226/22 ✓		
5+12N	4+50W	198/62 104/88		
4+98N	4+45W			(145/74) 137/73 ✓ Slicks (71 → 224) 77 → 230



N	E	Joints (Vhs)	Foliation	Fault
4+98N	4+44W	220/74 262/25		
4+26N	3+45W		172/90	
5+00N	3+75W	052/88 147/90		
4+00N	0+98W	086/86		
1+74N	1+52E	199/68 -		
0+90S	0+00E	084/66 170/48	178/70 ?	
0+50S	2+45W	332/74 017/85 - 053/80 -		
0+04N	2+68E		280 ¹⁵⁰ /80 028/45	300/20 ? ✓
0+00N	3+00E			282/50 ✓ 284/70 ✓
2+50N	7+33E	034/80		

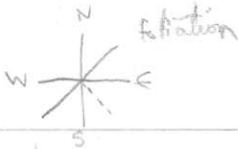
N	E	Joint (Vein)	Foliation	Fault
1+25N	2+94E	025/90 140/60 324/38 254/64		136/62 ✓
4+75N	4+00E			270/50 ✓ <small>slicks</small> 50 → 020 010/90 ✓ 228/40 ✓ 245/90 ✓
4+46N	3+95E	080/68		
4+12N	4+00E			270/40 ✓
6+18N	4+62E	100/52		286/65 ? ✓
3+15N	1+80E			
0+00N	3+00E	198 (198/68)		290/40 ✓ 198/68 ✓
1+60S	0+10W		240/50	356/72 ✓

FW + HW or ore bodies commonly follow well-defined fissures occasionally, fissures form the lateral limits of the ore bodies.

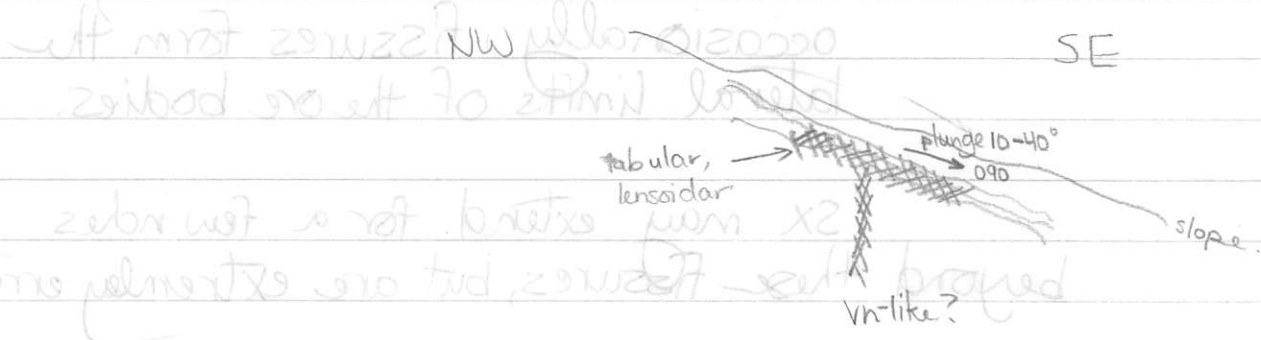
Sx may extend for a few inches beyond these fissures, but are extremely erratic

Nov. '89 J McDougall
for Toscana Res. Ltd.

Stopes (judging from available data) controlled + // to shearing [gently dipping larger tabular lodges]
However, some smaller steeply dipping mineralized zones also mined



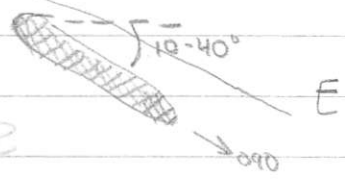
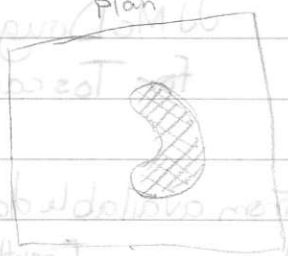
phosphorus zirconium ore to NW + WT
 zirconium - low wall
 NW SE



2x may extend for a few miles
 but are extremely narrow
 vn-like?

Foliation \approx NE strike / SE dip

Plan P8' vol



Stages of...
 NW SE

