# CORPORATION FALCONBRIDGE COPPER



DATE:A pril. 3, 1987À<br/>TO:D. H. WatkinsCOPIES À<br/>COPIES TO:L. D. Pirie, C. M. BurgePE<br/>FROM:A. J. DavidsonSUBJECT:QR Deposit

An excellent "tour" of the QR deposit core was arranged by Colin Burge on April 1. Reserves at QR are:

Main Zone	2.5 million tons @ 0.1 oz/ton Au (open pit)
West Zone	300,000 tons @ 0.25 oz/ton Au (ug)
MidWest Zone	650,000 tons @ 0.20 oz/ton Au (still open).

Dome Mines owns this deposit with no underlying options or royalties. They are still lukewarm about the deposit but apparently are commencing an in-house feasibility study. Only limited metallurgy has been done on the Main Zone with 95%+ recovery of the gold in a flotation concentrate. Dome may wish to consider a partner on this project.

## Location/Access

The property is located on the north side of the Quesnel River about 80km from Quesnel. Access is by logging roads to 8km from the property and then by 4WD road to the property. Dome is upgrading the last 8km this year. Power is available from the south side of the Quesnel River.

#### Geology

The deposit is located at the top of a pile of alkaline Triassic (Nicola?) basalt in a <u>carbonate rich</u> zone of basaltic breccias, epiclastics and silt and limestones. This carbonate rich zone has been altered to an epidote skarn by the intrusion of the alkaline QR diorite. Although Dome discuss this deposit as occurring in a propylitic alteration front around a porphyry, my interpretation of it is that it is a skarn deposit and that the major controls are the presence of a carbonate-rich horizon and the alkalic intrusion.

#### Mineralization

The gold mineralization is found in this epidote-pyrite skarn and the gold can be up to 1mm in size. Nugget effect is severe within the individual deposits but kriging indicates that the deposit as a whole is fairly uniform. Some narrow high grade intersections are 11m of 0.55 oz/ton and individual assays of up to 3 oz/ton have been received.

#### Deposits

The Main Zone (2.5 million tons @ 0.10 oz/ton Au) measures 300m along strike by 75m down dip by 40m thick. This Zone is open pittable, discordant to stratigraphy and dips between  $40-70^{\circ}$  north. It lies 500m east of the Mid West Zone and was discovered in 1977.

The Mid West Zone (0.65 million tons @ 0.20 oz/ton Au) measures 300m along strike by 100m down dip by 9-10m thick. Depth to the top of this zone is 200m, it dips  $80^{\circ}$  south (parallel to stratigraphy), lies 400m east of the West Zone and was discovered in 1986.

The West Zone (0.3 million tons @ 0.25 oz/ton Au) measures 400m along strike by 50m down dip by 5m thick. The Zone outcrops at one end but does reach 40m in depth, it dips  $80^{\circ}$  south and was discovered in 1983.

#### Potential.

The gold mineralization is restricted to the outer edge of the <u>skarnified</u> favourable carbonate rich horizon which itself is restricted to within 500m of the QR stock. However there is good potential to find additional lenses produced by downfaulting along N-S faults and by thrusting along two shallow thrust faults. There is also some potential that the West Zone may roll over to the west.

#### Economics

The economics of the QR deposit at present are favourable but are very dependent on the capital cost. Presumably one would mine the open pit portion first in order to minimize capital and preproduction costs and then mine both underground zones. In the attached DCF's I have included a DCF for the underground only, for the open pit only and for them combined with the open pit being mined first. In this scenario the project has an NPV of \$32 million and an IRR of 32.9%.

### Follow Up

If we wish to follow up this project with Dome to get an idea of their plans (and we probably should), Wally Bruce (V.P. Exploration) in Toronto is most familiar with the project. Meanwhile we are beginning a compilation to look for coincidences of the major criteria of this deposit i.e. alkalic intrusive, top of Triassic and carbonate rich/skarn horizon.

KAN

A. J. Davidson





Fig.1







DCF ANALYSIS: OR DEPOSIT MAIN ZONE

APRIL 2, 1987

MINERAL INVENTORY	TONNAGE	2.500	MILLION	TONS		
	COPPER	LEAD	ZINC	GOLD	SILVER	
GRADE				0.100		
	X.	۲.	X	Oz/T	Oz/T	
RECOVERY Z				95.0		
COMMODITY UNIT	16.	16.	16.	Oz.	Oz.	
PRICE \$US	\$0.620	\$0.235	\$0.470	\$400	\$5.700	
EXCHANGE RATE	1.400	1.400	1.400	1.400	1.400	
PRICE \$CAN	\$0.868	\$0.329	\$0.658	\$560	\$7.980	NSR
TREATMENT CHARGES \$CAN	\$0.423	\$0.300	\$0.336	\$19.41	\$1.257	TOTAL
CONTRIBUTION TO NSR/TON	\$0.0	\$0.0	\$0.0	\$51.4	\$0.0	\$51.4
% TOTAL NSR	0%	0%	07.	1007	0%	1007
PRODUCTION		ł	DCF RESU	JLTS		
<b>1500 MINING RATE</b>	TONS/DAY		10.0	X COST O	F CAPITAL	
\$25.0 OPERATING CO	ST \$/TON	1		NPV	IRR	
4.6 YEARS PRODUC	TION	1		\$15.5	27.0%	

OPEN PIT

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		PREPRO	DUCTION			PRODUCTI	ON					
X OF YEAR	IN PRODUCTION	0%	0%	100%	100%	100%	100%	57%	0%	0%	0%	0%
YEARS	IN PRODUCTION	0.0	0.0	1.0	2.0	3.0	4.0	4.6	4.6	4.6	4.6	4.6
	YEAR 1	2	3	4	56	6	67	8	9	10	11	
CASH FLOW:	BEFORE TAX ANI	) FOR 10	0 % OF PR	OJECT								
	CAPITAL	\$20.0	\$10.Ö	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
	TONS PRODUCED	0.0	0.0	0.5	0.5	0.5	0.5	0.3	0.0	0.0	0.0	0.0
	GROSS INCOME	\$0.0	\$0.0	\$28.1	\$28.1	\$28.1	\$28.1	\$15.9	\$0.0	\$0.0	\$0.0	\$0.0
	OPERATING COST	\$0.0	\$0.0	\$13.7	\$13.7	\$13.7	\$13.7	\$7.8	\$0.0	\$0.0	\$0.0	\$0.0
PROJ	ECT NET INCOME	\$0.0	\$0.0	\$14.4	\$14.4	\$14.4	\$14.4	\$8.2	\$0.0	\$0.0	\$0.0	\$0.0
PRO	JECT CASH FLOW	(\$20.0)	(\$10.0)	\$14.4	\$14.4	\$14.4	\$14.4	\$8.2	\$0.0	\$0.0	\$0.0	\$0.0

MINERAL INVENTORY    TONNAGE    1.000 MILLION TONS    UNDERGROUD      COPPER LEAD ZINC GOLD SILVER GRADE    0.215    0.217      X    X    DZ/T    DZ/T      RECOVERY X    95.0    DZ      PRICE \$US    \$0.620    \$0.235    \$0.470    \$400    \$5.700      ECOVERY X    95.0    DZ    DZ    PRICE \$US    \$0.620    \$0.235    \$0.470    \$400    \$1.400    I.400	DCF ANALYSIS: QR DEPUSIT	WEST & M	IDWEST		APRIL 2,	1987						
COPPER    LEAD    ZINC    GOLD    SILVER      GRADE    0.215    0.217    02/T    02/T      RECOVERY X    95.0    0    0    0.215      COMMODITY UNIT    1b.    1b.    1b.    02/T    02/T      PRICE \$US \$0.620    \$0.235    \$0.470    \$400    \$5.700    EXCHANGE RATE    1.400    1.400    1.400    1.400      PRICE \$CAM \$0.423    \$0.300    \$0.336    \$19.41    \$1.257    TOTAL    CONTRIBUTION TO NSR.0    \$0.0    \$110.4    ZOUTAL    ZOUTAL \$0.0    \$1000    PRICE \$CAM \$0.423    \$0.300    \$0.0 \$110.4    \$2.0    \$110.4    ZOUTAL    ZOUTAL \$0.0    \$100.4    \$2.0    \$110.4      Z TOTAL NSR    OZ    OZ    OZ    100Z    100Z    \$100Z    \$2.0    \$2.7	MINERAL INVENTORY	TONNAGE	1.000	MILLION	TONS				UNI	DER 6	ROUN	D
GRADE    0.215      X    X    02/1    02/1      RECOVERY X    95.0      COMMODITY UNIT    1b.    1b.    1b.    02.0      PRICE \$US    \$0.620    \$0.235    \$0.470    \$400    \$5.700      EXCHANGE RATE    1.400    1.400    1.400    1.400    1.400    Price      PRICE \$CAN    \$0.623    \$0.235    \$0.658    \$560    \$7.990    NSR      TREATMENT CHARGES \$CAN    \$0.423    \$0.300    \$0.325    \$10.41    \$1.257    TOTAL      CONTRIBUTION TO NSRITON    \$0.0    \$0.0    \$10.4    \$0.0    \$110.4      Z TOTAL NSR    \$02    \$02    \$02    \$02    \$1002    \$1002      PRODUCTION    !    DCF RESULTS		COPPER	LEAD	ZINC	GOLD	SILVER						
X    X    02/T    02/T      RECOVERY X    95.0      COMMODITY UNIT    1b.    1b.    1b.    02.      RECE SUS \$0.620 \$0.235 \$0.470 \$400 \$5.700      EXCHANGE RATE    1.400    1.400    1.400    1.400      PRICE \$6AN \$0.620 \$0.235 \$0.470 \$5.700      EXCHANGE RATE    1.400    1.400    1.400      PRICE \$CAN \$0.620 \$0.235 \$0.558 \$550 \$7.980 NSR      TREATMENT CHARGES \$CAN \$0.0 \$0.0 \$0.0 \$10.4 \$1.257 TOTAL      CONTRIBUTION TO NSR/TON \$0.0 \$0.0 \$0.0 \$110.4 \$0.0 \$110.4 \$0.0 \$110.4 \$0.0 \$110.4 \$0.0 \$110.4 \$0.0 \$110.4 \$0.0 \$110.4 \$0.0 \$100X      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      CONT 100X      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      PREPRODUCTION      VEAR    1	GRADE				0.215							
RECOVERY X  95.0    COMMODITY UNIT  1b.  1b.  0z.    PRICE \$US  \$0.620  \$0.235  \$0.470  \$400  \$5.700    EXCHANGE RATE  1.400  1.400  1.400  1.400   \$400  \$5.700    FRICE \$CAN \$0.868  \$0.329  \$0.550  \$7.980  NSR  \$7.980  NSR    TREATMENT CHARGES \$CAN \$0.423  \$0.300  \$0.336  \$19.41  \$1.257  TOTAL    CONTRIBUTION TO NSR/TON \$0.0  \$0.0  \$0.0  \$110.4  \$0.0  \$110.4    Z TOTAL NSR  0X  0X  100X  \$100X  \$100X    PRODUCTION  !  DCF RESULTS		X.	X	7.	Oz/T	Oz/T						
COMMODITY UNIT  1b.  1b.  1b.  0z.  0z.    PRICE \$US  \$0.620  \$0.235  \$0.470  \$400  \$5.700    'EXCHANGE RATE  1.400  1.400  1.400  1.400  1.400    PRICE \$CAN \$0.868  \$0.329  \$0.659  \$550  \$7.980  NSR    TREATMENT CHARGES \$CAN \$0.423  \$0.300  \$0.335  \$19.41  \$1.257  TOTAL    CUNTRIBUTION TO NSR/TON  \$0.0  \$0.0  \$10.4  \$0.0  \$10.4    Z TOTAL NSR  0Z  0Z  100Z  100Z  100Z    PRODUCTION  !  DCF RESULTS	RECOVERY Z				95.0							
PRICE \$US  \$0.620  \$0.235  \$0.470  \$400  \$5.700    EXCHANGE RATE  1.400  1.400  1.400  1.400  1.400  1.400    PRICE \$CAN \$0.868  \$0.329  \$0.658  \$550 \$7.980  NSR    TREATMENT CHARGES \$CAN \$0.423  \$0.300  \$0.336 \$19.41  \$1.257  TUTAL    CONTRIBUTION TO NSR/TON  \$0.0  \$10.0  \$0.0  \$110.4    X TOTAL NSR  0X  0X  0X  100X  0Z    PRODUCTION  :  DCF RESULTS  :  :  :    :	COMMODITY UNIT	16.	lb.	16.	Oz.	Øz.						
EXCHANGE RATE  1.400  1.400  1.400  1.400    PRICE \$CAN \$0.868  \$0.329  \$0.558  \$560  \$7.980  NSR    TREATMENT CHARGES \$CAN \$0.423  \$0.300  \$0.336  \$19.41  \$1.257  TUTAL    CUNTRIBUTION TO NSR/TON  \$0.0  \$0.0  \$110.4  \$0.0  \$110.4    Z TOTAL NSR  0Z  0Z  0Z  100Z  100Z    PRODUCTION  !  DCF RESULTS	PRICE \$US	\$0.620	\$0.235	\$0.470	\$400	\$5.700						
PRICE \$CAN \$0.868 \$0.323 \$0.658 \$560 \$7.980 NSR TREATMENT CHARGES \$CAN \$0.423 \$0.300 \$0.336 \$19.41 \$1.257 TUTAL CUNTRIBUTION TO NSR/TON \$0.0 \$0.0 \$0.0 \$110.4 \$0.0 \$110.4 2 TOTAL NSR 02 02 02 02 1002 02 1002 PRODUCTION ! DCF RESULTS 	EXCHANGE RATE	1.400	1.400	1.400	1.400	1.400						
TREATMENT CHARGES \$CAN \$0.423 \$0.300 \$0.336 \$19.41 \$1.257 TOTAL    CONTRIBUTION TO NSR/TON \$0.0 \$0.0 \$0.0 \$110.4 \$0.0 \$110.4    X TOTAL NSR  0X  0X  0X  0X  100X  100X    PRODUCTION  I DCF RESULTS	PRICE \$CAN	\$0.868	\$0.329	\$0.658	\$560	\$7.980	NSR					
CONTRIBUTION TO NSR/TON  \$0.0  \$0.0  \$10.4  \$0.0  \$110.4    X TOTAL NSR  0X  0X  0X  0X  100X  0Z  100X    PRODUCTION  !  DCF RESULTS	TREATMENT CHARGES \$CAN	\$0.423	\$0.300	\$0.336	\$19.41	\$1.257	TOTAL					
X TOTAL NSR  OX  DCF  PREVUITS  IDCF  CAPITAL  Standard	CONTRIBUTION TO NSR/TON	\$0.0	\$0.0	\$0.0	\$110.4	\$0.0	\$110.4					
PRODUCTION  I  DCF RESULTS    1000 MINING RATE TONS/DAY  10.0 X COST OF CAPITAL    \$60.0 OPERATING COST \$/TON  10.0 X COST OF CAPITAL    \$60.0 OPERATING COST \$/TON  NPV    2.7 YEARS PRODUCTION  \$4.3    1000 X OZ  1007    74X  07    74X  1007    74X  1007    74X  1007	7 TOTAL NSR	0%	0%	0%	100%	02	100%					
1000 MINING RATE TONS/DAY  10.0 X COST OF CAPITAL    \$60.0 OPERATING COST \$/TON  NPV    2.7 YEARS PRODUCTION  \$4.3    1000 MINING RATE TONS/DAY  NPV    2.7 YEARS PRODUCTION  \$4.3    PREPRODUCTION  \$4.3    1000 Y EAR IN PRODUCTION  Years in production    X OF YEAR IN PRODUCTION  00 You to you you to you to you to you you you you you you you you you yo	PRODUCTION		ł	DCF RESL	ILTS							
1000 MINING RATE TONS/DAY : 10.0 % COST OF CAPITAL \$60.0 DPERATING COST \$/TON : NPV IRR 2.7 YEARS PRODUCTION : \$4.3 16.1% PREPRODUCTION 0% 0% 100% 74% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% YEARS IN PRODUCTION 0% 0% 100% 74% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%										, ÷		
\$60.0 OPERATING COST \$/TON  Image: New image: Newimage	<b>1000 NINING RATE</b>	TONS/DAY		10.0	X COST 0	F CAPITA	L			• .		
2.7 YEARS PRODUCTION  i  \$4.3  16.1%    PREPRODUCTION    2 OF YEAR IN PRODUCTION  0%  0%  100%  74%  0%	\$60.0 OPERATING C	OST \$/TON			NPV	IRR						
PREPRODUCTION    PRODUCTION      X OF YEAR IN PRODUCTION    0X    0X    100X    74X    0X    0	2.7 YEARS PRODU	CTION	1		\$4.3	16.1%						
Z OF YEAR IN PRODUCTION  OZ  OZ  100Z  100Z  74Z  OZ		PREPRO	DUCTION			PRODUCTI	ON					
YEARS IN PRUDUCTION  0.0  0.0  1.0  2.0  2.7<	% OF YEAR IN PRODUCTION	0%	07.	1007	100%	74%	0%	07.	0%	07.	07.	0%
YEAR    1    2    3    4    5    6    7    8    9    10    11      CASH FLOW: BEFORE TAX AND FOR 100 % OF PROJECT      CAPITAL \$20.0    \$15.0    \$0.0	YEARS IN PRODUCTION	0.0	0.0	1.0	2.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7
CASH FLOW:    BEFORE TAX    AND    FOR    100    7.    OF    PROJECT      CAPITAL    \$20.0    \$15.0    \$0.0	YEAR	1	2	3	4	5	6	7	8	9	10	11
CAPITAL  \$20.0  \$15.0  \$0.0	CASH FLOW: BEFORE TAX A	ND FOR 10	0 % OF P	ROJECT								
TUNS PRODUCED0.00.00.40.40.30.00.00.00.00.00.0GRUSS INCOME\$0.0\$0.0\$40.3\$40.3\$29.8\$0.0<	CAPITAL	\$20.0	\$15.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
GRUSS INCOME\$0.0\$0.0\$40.3\$40.3\$29.8\$0.0	TONS PRODUCED	0.0	0.0	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0
UPERATING CUST \$0.0 \$0.0 \$21.9 \$15.2 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0 PRDJECT NET INCOME \$0.0 \$0.0 \$18.4 \$18.4 \$13.6 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0	GROSS INCOME	\$0.0	\$0.0	\$40.3	\$40.3	\$29.8	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
PRDJECT NET INCOME \$0.0 \$0.0 \$18.4 \$18.4 \$13.6 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0	OPERATING COST	\$0.0	\$0.0	\$21.9	\$21.9	\$16.2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
	PROJECT NET INCOME	\$0,0	\$0.0	\$18.4	\$18.4	\$13.6	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
PROJECT CASH FLOW (\$20.0) (\$15.0) \$18.4 \$18.4 \$13.6 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0 \$0.0	PROJECT CASH FLOW	(\$20.0)	(\$15.0)	\$18.4	\$18.4	\$13.6	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

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MINERAL INVENTORY	TONNAGE	2.500	MILLION	TONS							
	CODDED	1 5 4 5	7180	coi n	CTI 11CO			1.	. Or	PEN	Pir
GRADE	CUFFER	LEND	LING	0.100	DILVER			a	. Ur	DER	26ROL
	X	X	X	Oz/T	Oz/T					-	0
RECOVERY X		÷.,		95.0							
COMMODITY UNIT	16.	lb.	16.	Oz.	Oz.						
PRICE \$US	\$0.620	\$0.235	\$0.470	\$400	\$5.700						
EXCHANGE RATE	1.400	1.400	1.400	1.400	1.400						
PRICE \$CAN	\$0.868	\$0.329	\$0.658	\$560	\$7.980	NSR					
TREATMENT CHARGES \$CAN	\$0.423	\$0.300	\$0.336	\$19.41	\$1.257	TOTAL					
CONTRIBUTION TO NSR/TON	\$0.0	\$0.0	\$0.0	\$51.4	\$0.0	\$51.4					
X TOTAL NSR	0%	0%	0%	100%	0%	100%					
PRODUCTION		ł	DCF RESL	JLTS							
1500 MINING RATE	TONS/DAY		10.0	X COST C	F CAPITAL	-					
\$25.0 OPERATING C	OST \$/TON			NPV	IRR						
4.6 YEARS PRODU	CTION	•		\$32.0	32.9%						
	PREPRO	DUCTION			PRODUCTIO	N					
X OF YEAR IN PRODUCTION	07	0%	100%	100%	100%	100%	57 <b>%</b>	100%	100%	70 <b>%</b>	100%
YEARS IN PRODUCTION	0.0	0.0	1.0	2.0	3.0	4.0	4.6	5.6	6.6	7.3	8.3
YEAR	1	2	3	4	5	6	7	8	9	10	11
ASH FLOW: BEFORE TAX A	ND FOR 10	0 % OF F	ROJECT								
CAPITAL	\$20.0	\$10.0	\$0.0	\$0.0	\$0.0	\$0.0	\$10.0	\$0.0	\$0.0	\$0.0	\$0.0
TONS PRODUCED	0.0	0.0	0.5	0.5	0.5	0.5	0.3	0.4	0.4	0.3	\$0.0
GROSS INCOME	\$0 <b>.0</b>	\$0.0	\$28.1	\$28.1	\$28.1	\$28.1	\$15.9	\$40.3	\$40.3	\$29.8	\$0.0
OPERATING COST	\$0.0	\$0.0	\$13.7	\$13.7	\$13.7	\$13.7	\$7.8	\$21.9	\$21.9	\$16.2	\$0.0
PROJECT NET INCOME	\$0.0	\$0.0	\$14.4	\$14.4	\$14.4	\$14.4	\$8.2	\$18.4	\$18.4	\$13.6	\$0.0
PROJECT CASH FLOW	(\$20.0)	(\$10.0)	\$14.4	\$14.4	\$14.4	\$14.4	(\$1.8)	\$18.4	\$18.4	\$13.6	\$0.0

APRIL 2,1987

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DCF ANALYSIS: OR DEPOSIT COMBINED