CARGO GEOLOGY & HISTORY **REVISITED**



Bret Ferris

DISCLAIMER

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May 2015

Cargo: Why is it?

Cargo·was·the·name·of·an·early·pastoral·station,·part·of·the·older·Davy's·Plains·Run</mark>,·taken· up·by·William·Lawson,·with·headquarters·close·to·the·old·Orange-<u>Nanami</u>·Road·north·of·the· town·of·Cargo.·Gold·mining·in·the·late·1860s·led·to·the·establishment·of·the·township.¶

Alluvial·gold·was·first·discovered·at·Cargo·in·1868·in·Long·Gully</mark>,·which·prompted·a·rush·of· 500·miners.·The·Cargo·goldfield,·7·miles·by·5·miles,·was·proclaimed·in·1869·and·mines·were· open·in·all·gullies·leading·from·the·Ironclad·Range·overshadowing·Cargo.¶

The two main periods of mining activity were from 1869-1879 and from 1885-1899, when the town boasted three hotels, a bank, several businesses lining Belmore Street; three churches, Anglican, Catholic and Methodist; two schools, a flour mill, a hall, a racecourse and sporting grounds for tennis, cricket and football.

Cargo· was· the· stopping· place· for· Cobb· and· Co· Coaches· from· Orange· to· <u>Canowindra</u>.· Surveys· of· the· early· 1870s· tried· to· impose· a· grid· plan· on· the· unplanned· growth· of· the· goldfield·but·the·winning·main·street·and·gullies·defied·such·order.·Cargo·was·proclaimed·a· town·in·1885.·Closer·land·settlement·coincided·with·the·mining·period·and·many·miners·and· businessmen·settled·on·farms·around·Cargo·or·worded·on·large·pastoral·stations.¶

By·1969,·Cargo's·population·had·dwindled·to·160·but·there·has·been·renewed·interest·in·the·town·in·the·1980s·and·90s·as·people·are·attracted·to·it·peaceful,·rural·beauty¶

Things to see and do ¶



http://centralnswmuseums.orangemuseum.com.au¶



PROCLAMATION OF CARGO GOLDFIELD, Thursday, 11th February, 1869.

The fallowing is copied from Supplement No 32 to the New Somhh Wales Government Gazette, Thursday, 11th February, 1869.

PROCLAMATION

By His Excellecy the Right Honorable Somerset Richard, Earl of Belmore, a Member of Her Majesty's Most Honorable Privy Council in Ireland, Governor and Commander-in-Chief of the Colony of New South Wales, and Vice-Admiral of the same.

In pursuance of the provisions of the Gold Fields Act of 1866, I, Somerset Richard, Earl of Belmore, the Governor aforesaid, with the advice of the Executive Council, do hereby proclaim that the following shall be deemed a Gold Field within the meaning and for the purposes of the said Act, that is to say:-

County of Ashburnham, at Cargo. The Gold Field on Crown Lands within the following boundaries: Commencing at the north-western corner of portion 66-63, at Cargo, a conditional purchase of 100 acres by J. Hartigan; and bounded thence on part of the south by a line bearing west 3 miles; on the west by a line bearing north about 7 miles; on the north by a line crossing Bowan Creek, forming partly the north boundary of reserve from lease, No 33, pastoral district of Wellington, notifedd 7th September, 1853, bearing east 5 miles; on the east by a line bearing south 7 miles, crossing Bowan Creek; and on the remainder of the south by a line forming partly the north boundary of reserve from lease No 36, notified at the aforesaid date, bearing west 2 miles, crossing Cargo Creek, to the point of commencement;- to be called the "Cargo Gold Field".

Given under my Hand and Seal, at Government House, Sydney, this eleventh day of February, in the year of our Lord, one thousand eight hundred and sixty-nine, and in the thirty#second year of Her Majesty's Reign.

(L.S.) BELMORE

By His Excelleny's Command, WILLIAM FORSTER.

GOD SAVE THE QUEENL







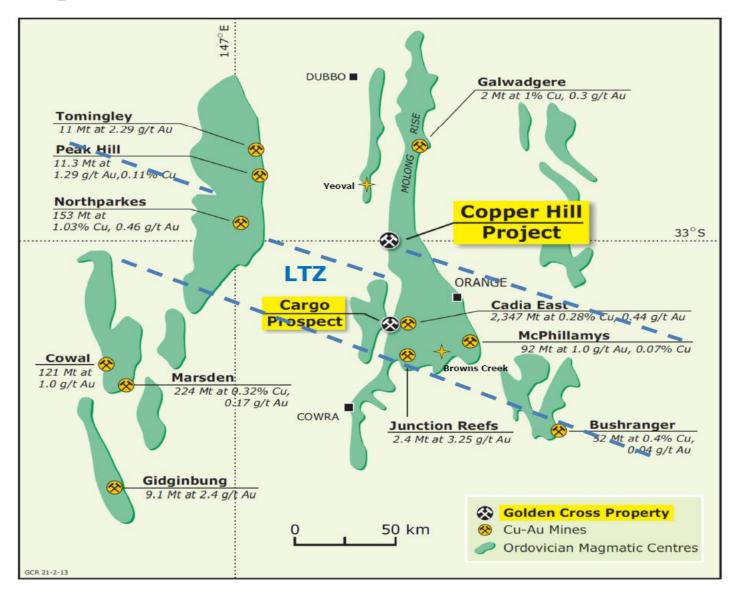


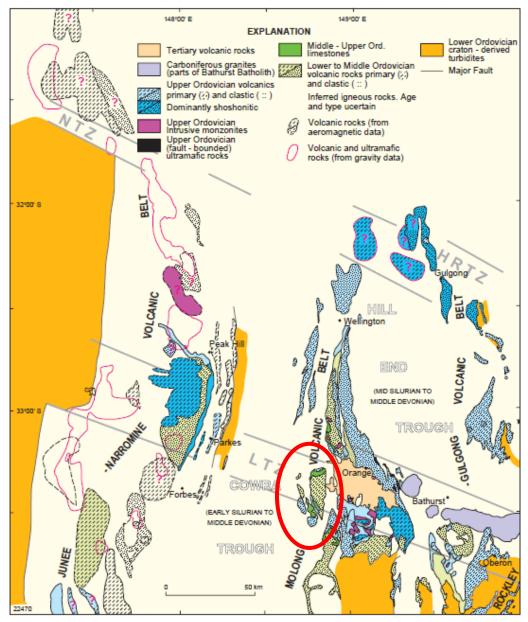
Ironclad: Bill Finlayson



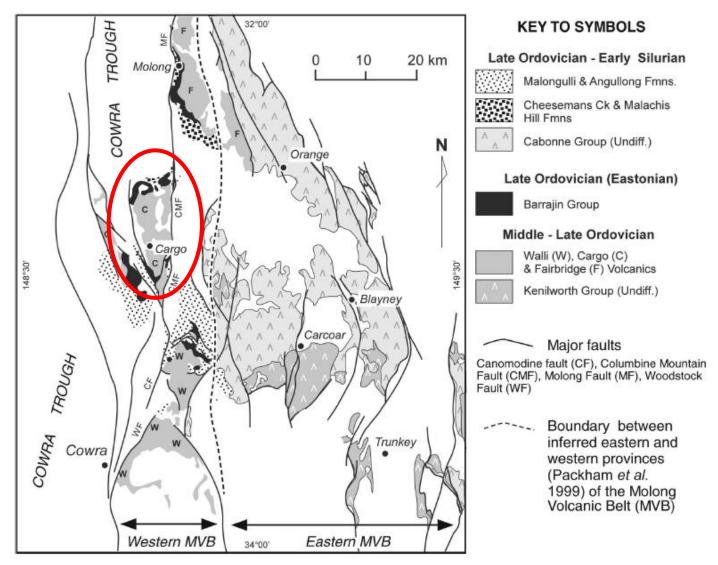


Cargo: Where is it?

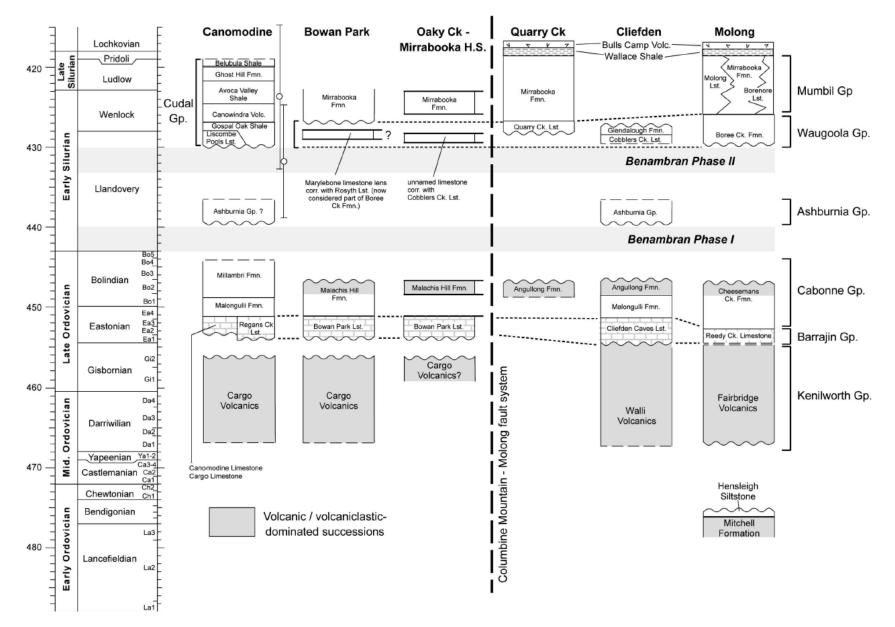




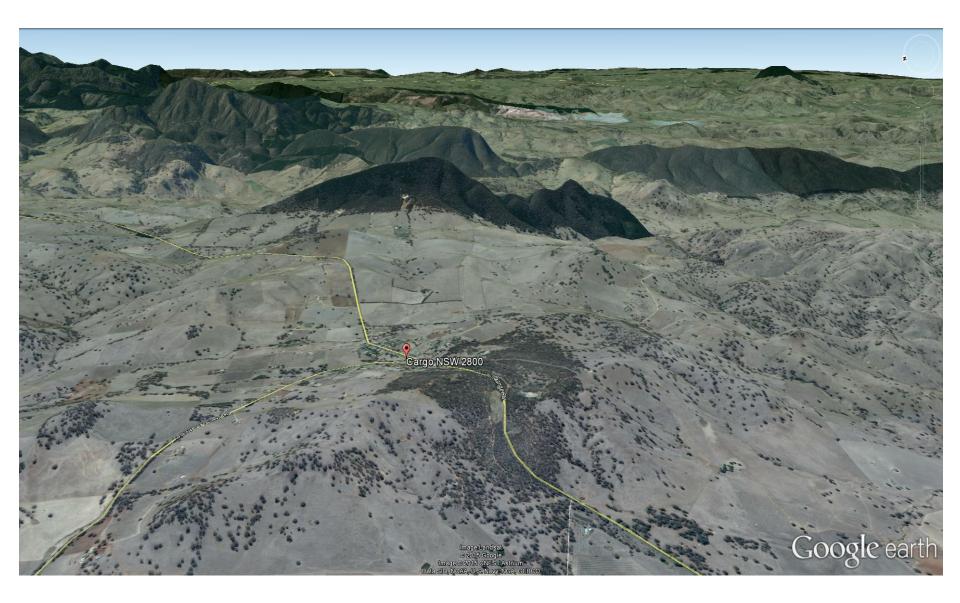
Dick Glen 1998 "Geology"



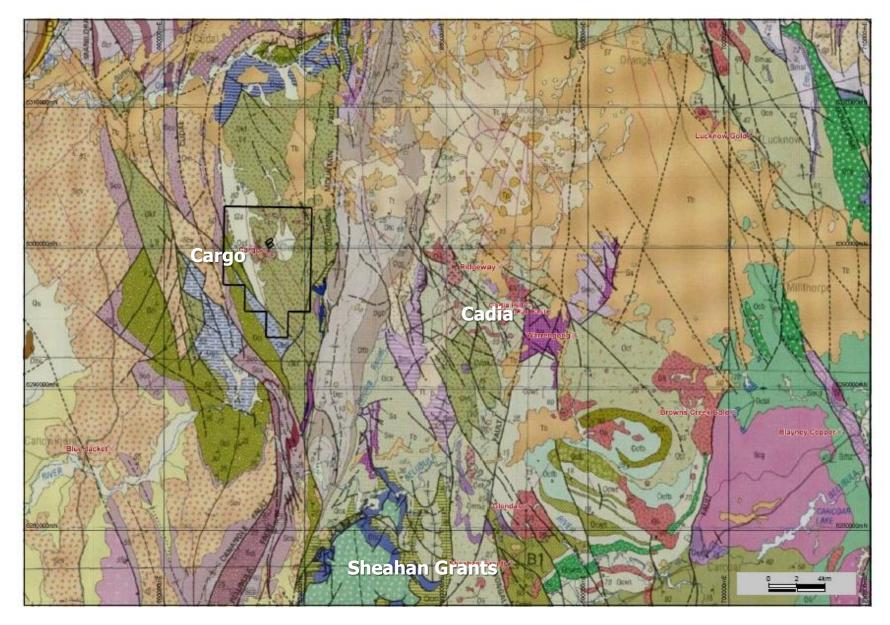
Caroline Simpson 2007 AJES 54 Western MVB Calk-alkaline Cu-Au-(Mo) Eastern MVB Alkali Porphyries Au-Cu [eg. Cadia East head grade is 1.20 gpt; Glendale 2 g/t; Browns Ck 6 g/t, Junction Reefs Skarns 3 g/t

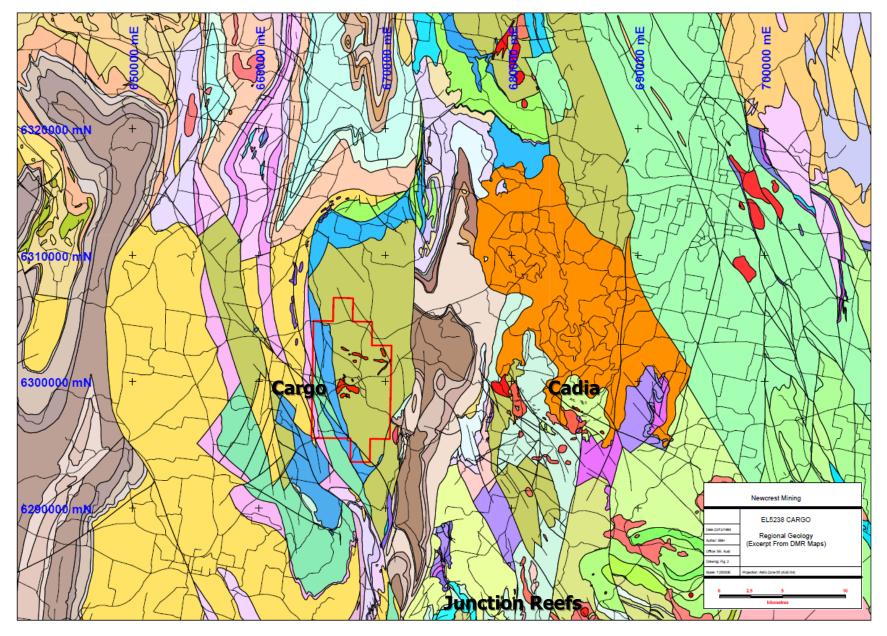


Caroline Simpson 2007 AJES 54

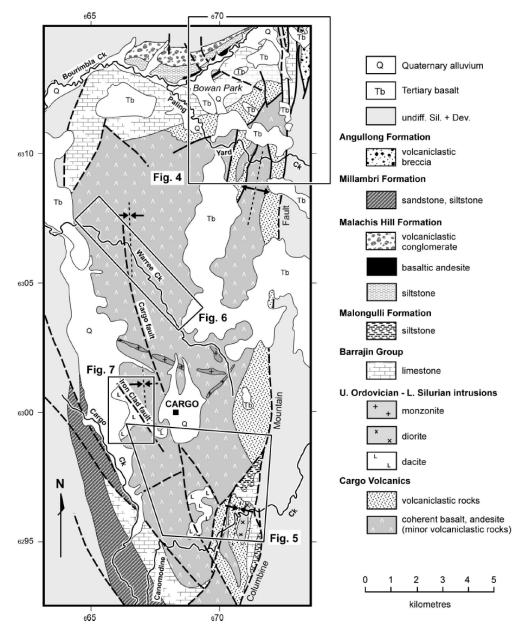


REGIONAL GEOLOGY

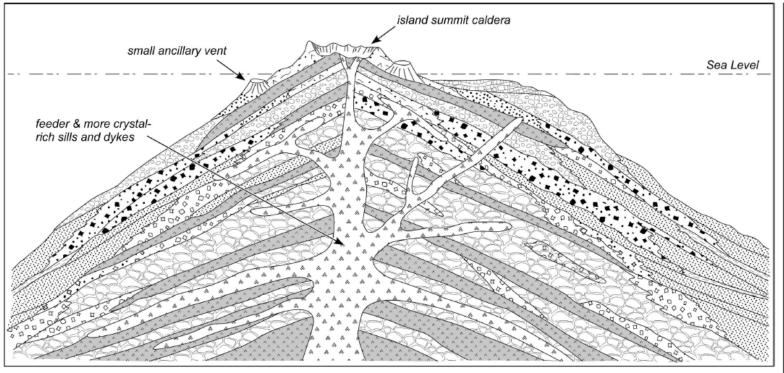




LOCAL GEOLOGY



Caroline Simpson 2007 AJES 54





carbonates

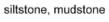


subaqueous re-sedimented pyroclastics



subaerial pyroclastics









pillow breccia

volcaniclastic conglomerate

volcaniclastic sandstone



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pebbly sandstone, polymictic volcanic breccia

re-sedimented hyaloclastite,



hyaloclastite

pillowed andesite



massive sparsely porphyritic andesite

540 8

ç

simpson er ai.



moderately porphyritic andesitic lava, dykes, sills, minor associated peperite

Stratavolcano: Caroline Simpson 2007 AJES 54

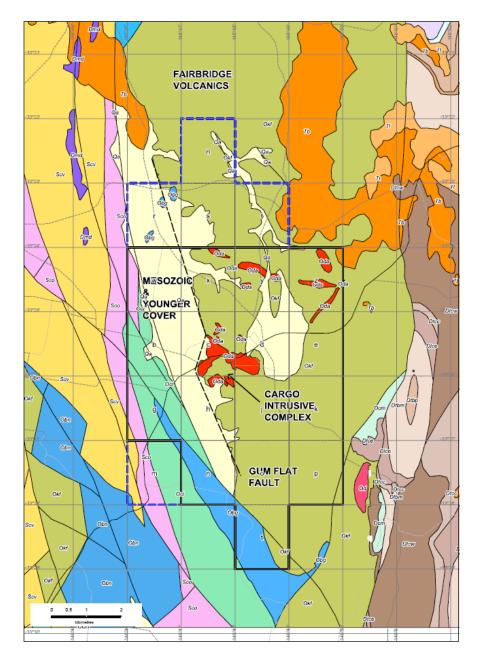
Take Caroline's Stratavolcano and

- Run some hot mineralising intrusives through it
- Alter the country rocks
- Erode it
- Fault it; Fold it
- Weather it

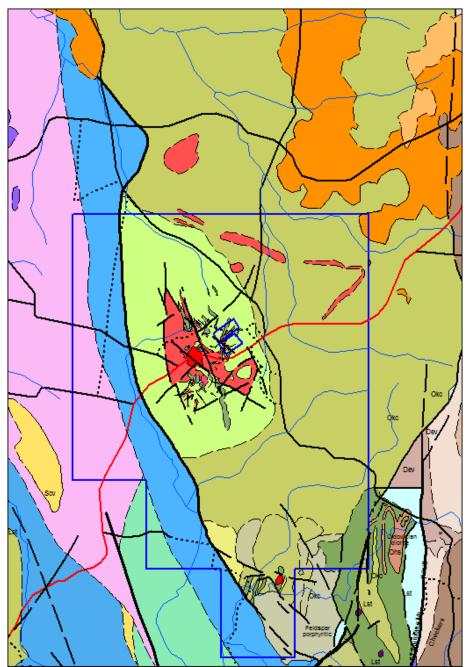
Outcrop at Cargo is poor [weathered altered, pyritic rocks] but thin soils, so where there are excavations = better exposure eg. Road Quarry [trenching?]

Caroline Simpson 2007 AJES 54

Published 100K



Peter White 1997



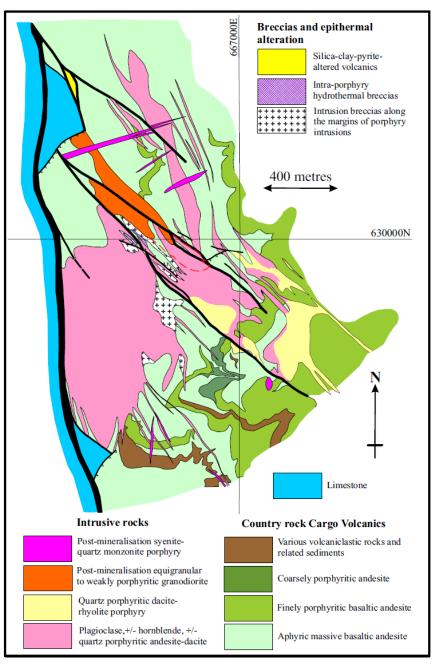
to a strange of the second secon the strategy and the state of the state Scale 1:2500 Callore Hining (Australia: Pty Ltd Appentix 2 Cargo Prospect peological map of a low raiting or low and PC pites

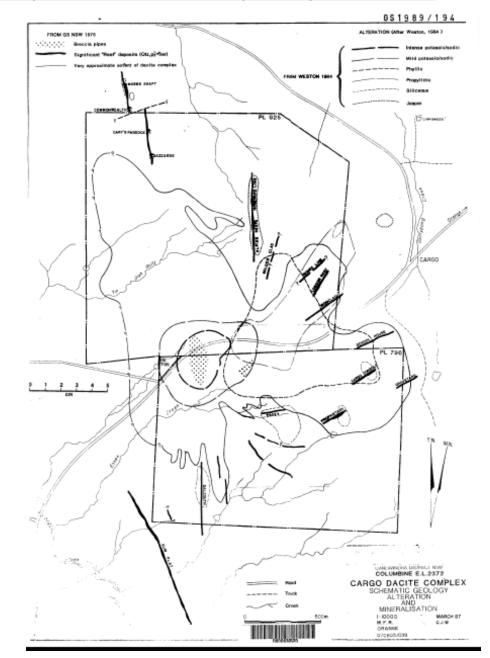
Calibre 2009 Detail

Mineralisation, alteration, and breccias 30 1000m Porphyry Cu, Au min 0.12 g/tAu in drilling. breccias with a matrix that comprise the margins of mor , vco Intrusive rocks Volcanic and sedimentary country rocks very fine grained basaltic and lastic rocks including both matri nict and monomict varieties. CYCOT

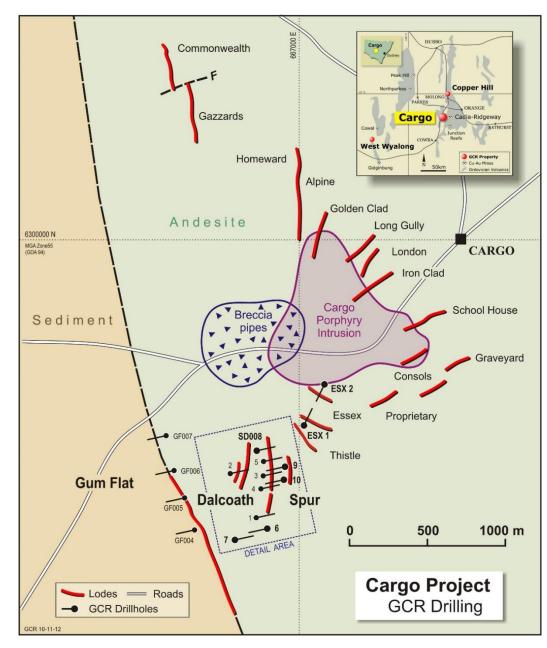
Calibre 2009 Detail - PDF

Calibre 2009 Synthesis

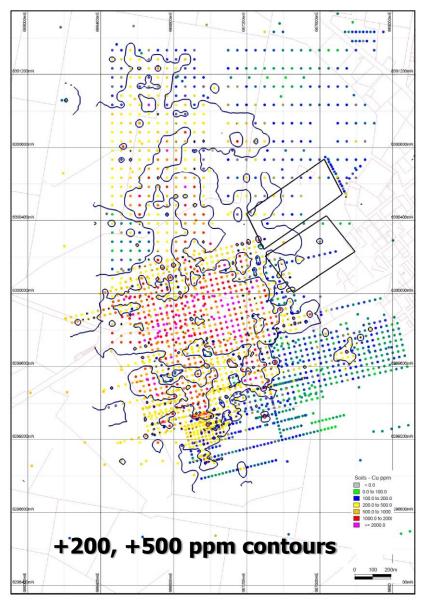


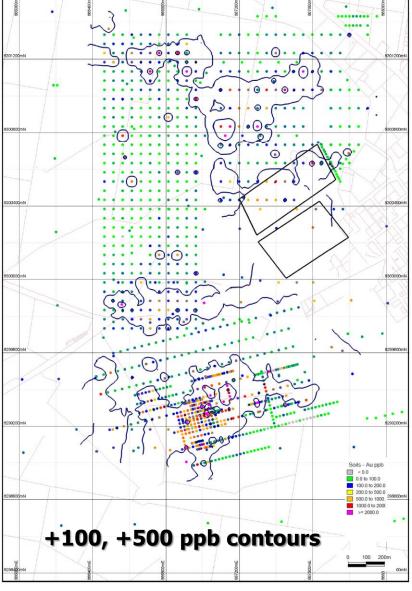


Back to the fundamentals



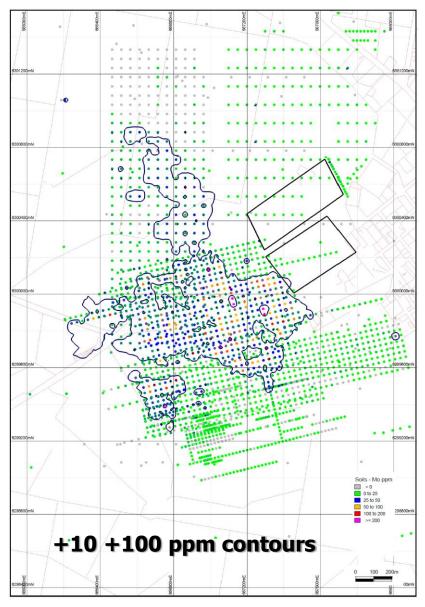
GEOCHEMISTRY

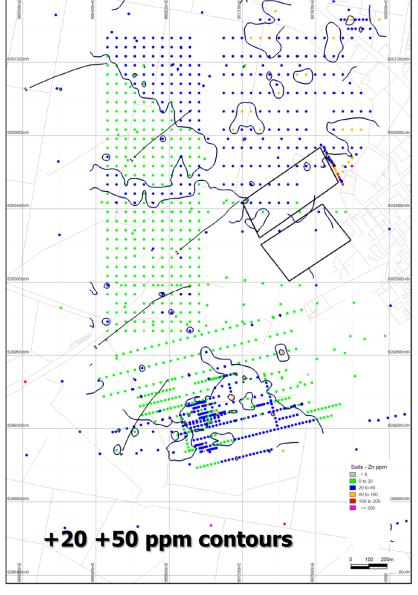




Soil Cu

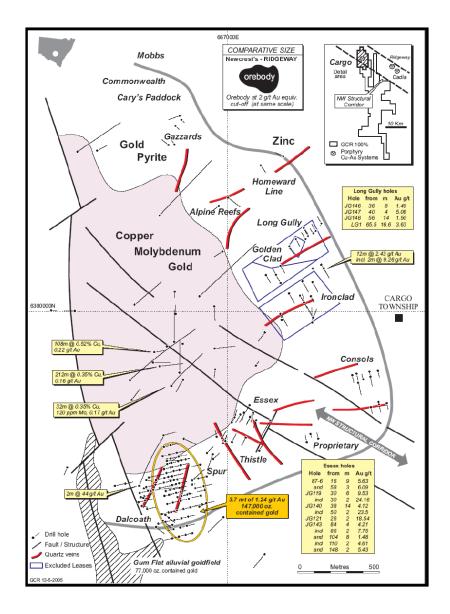
Soil Au





Soil Mo

Soil Zn



GEOCHEMICAL ZONATION?

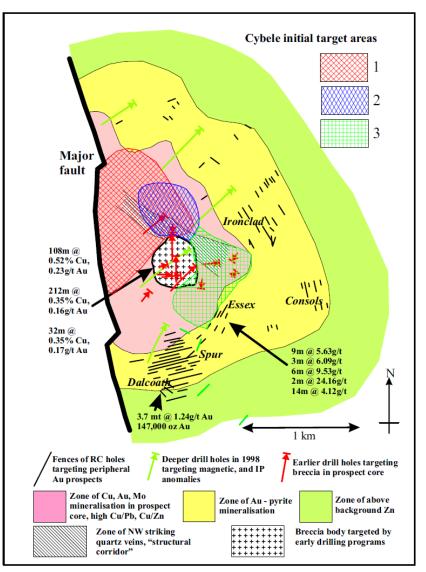
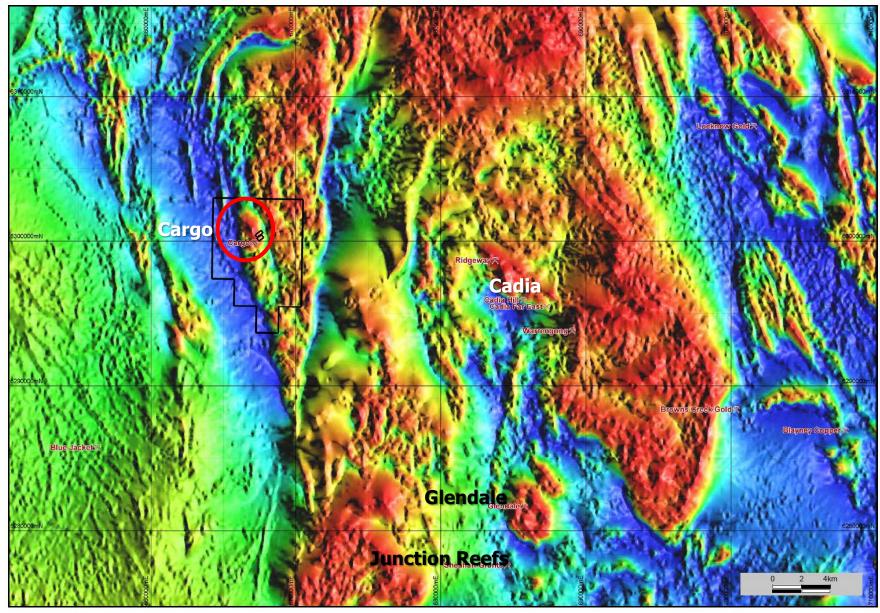
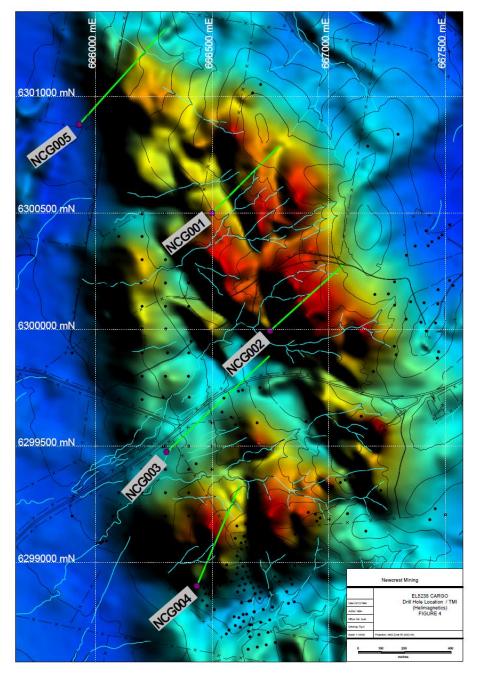


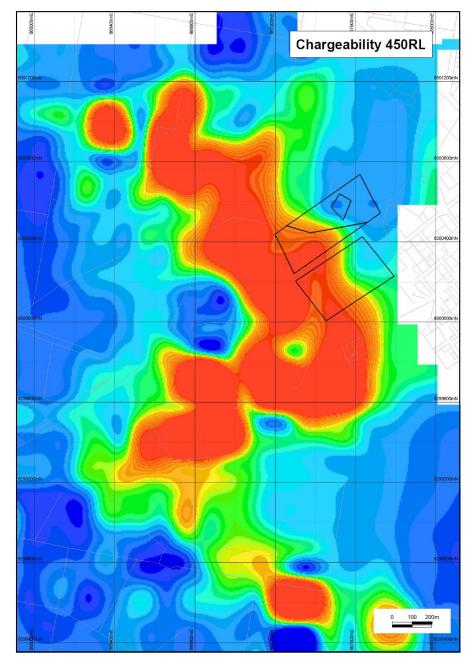
Figure 2: Summary of the key features of the Cargo Prospect as understood in June 2006. Early drilling tended to focus on breccias near the core of the prospect whereas later drilling concentrated in the peripheral parts of the prospect targeting Au-pyrite prospects and deeper coincident zones of higher magnetic susceptibility and IP/chargeability.

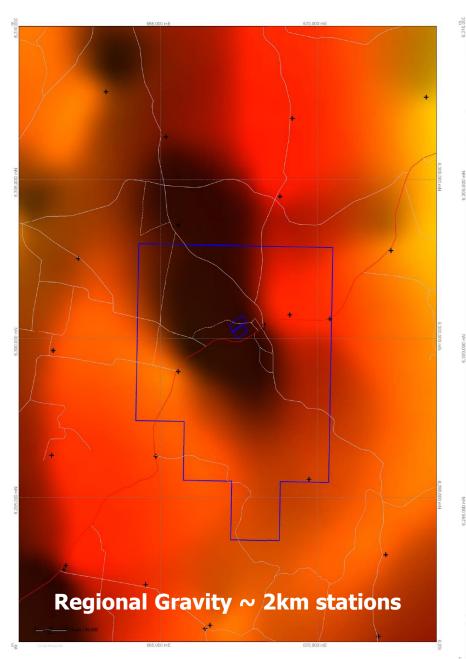
GEOPHYSICS

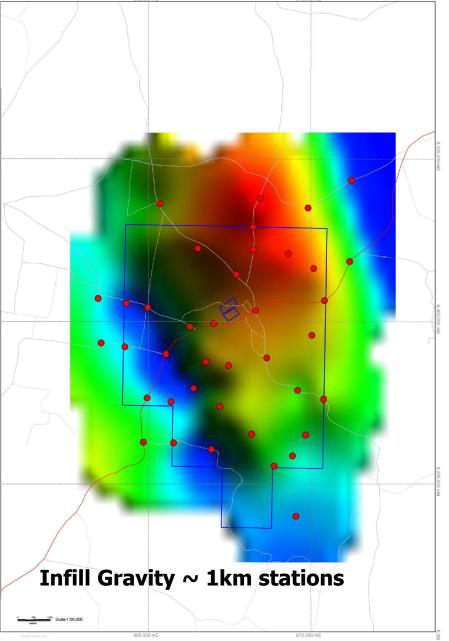


Published 250K Mag Extract



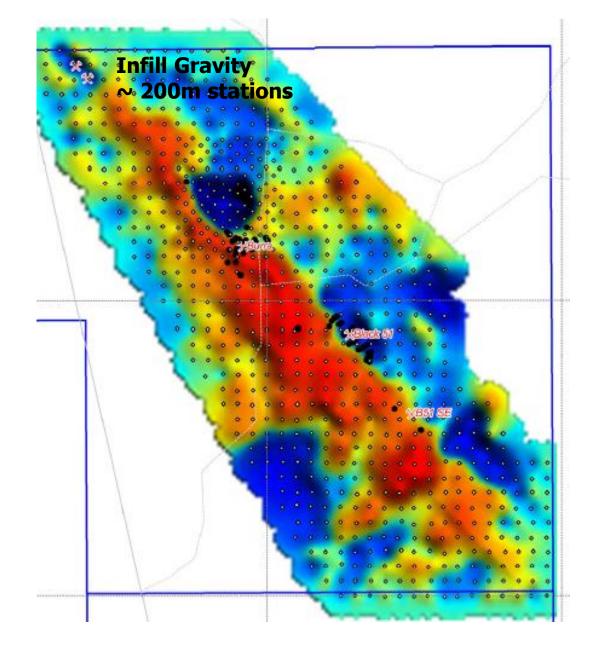






Can this resolution be achieved at Cargo?

[yes]



EXPLORATION

Year	Company	Tenement	Exploration Activity
1965-1966	Anaconda Australia	EL 27	Regional stream sediment survey.
1969-1970	Amax Exploration		Regional geological mapping, aeromagnetics and radiometrics. IP surveys.
1968-1978	Petra Chemicals Group and JV partners Command Minerals	AtoP 3317	First company to recognise porphyry copper potential. Various geological mapping, geochemical sampling and ground geophysical surveys (magnetics, IP). First drilling program comprising 142 percussion and five core holes (3,945m). Resource estimated as 27Mt @ 0.2% Cu (Richardson et al, 1977).
1975-1977	NSW Geological Survey		Included Cargo as part of a major study of the porphyry Cu-Au deposits of the Lachlan Fold Belt.
1982-1985	Metallic Resources		Gradient array IP survey
1986-1989	Amoco (Cyprus) - Metallic JV	PL's 795, 796 & 925; GL's 3694 & 5828; and ML's 960 & 1092	Geological mapping, geochemical sampling, and ground geophysical surveys (magnetics, radiometrics, IP and VLFEM). Drilling included 26 RAB holes (1,021m), 151 airtrack percussion holes (5,242.7m), 9 RC holes (613.3m) and 8 core holes (488.9m). Also metallurgical testwork and resource estimation of Spur-Dalcoath lodes.
1991-1994	CRA Exploration-Metallic-Arimco JV		Aerial photography, geological mapping, soil sampling, petrography and whole rock geochemistry. Drilling included 12 core holes (1,213.6m).
1994	Jason Mining-Metallic JV		Geological mapping of Spur-Dalcoath zone and geochemical (soils and rocks) and ground geophysical surveys (magnetics and IP).

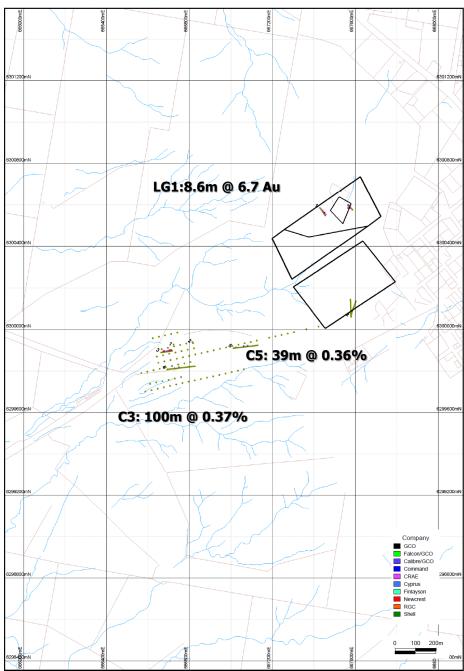
Early exploration

Year	Company	Exploration Activity
1997	Golden Cross- Imperial Mining JV	Recognised potential of large porphyry Cu-Au system encompassing high grade gold lodes. Geological mapping, geochemical surveys (soils and rocks) and RC drilling of various gold lodes. Resource estimated as 3.7Mt @ 1.24g/t Au.
1997-1998	Golden Cross- Imperial Mining - RGC JV	Drilled three core holes into central part of porphyry system.
1998	Golden Cross- Imperial Mining - Newcrest JV	Several IP surveys and aircore drilling, followed by a core drilling program (~3,000m).
2000-2001	Golden Cross	Geological mapping, 3D IP interpretation, review of previous drilling, and auger drilling.
2002-2005	Golden Cross -Falcon Minerals JV	Various geological mapping, geochemical sampling and ground geophysical surveys (IP), and 19 "deep" RC holes.
2005-2006	Golden Cross	Exploration reviews completed.
2006-2009	Golden Cross - Cybele/Calibre Resources JV	New geological model, accompanied by geological mapping and geochemical surveys. Drilling programs included six RC holes (1,360m) and four core holes (1,570m).
2010	Golden Cross	Three RC holes [331m] targeted gold potential of vein systems beneath Gum Flat alluvials.
2011-2013	Golden Cross	Review of all previous drilling recommended further drilling of the Spur-Dalcoath radial lodes and the gold-bearing eluvial deposits at Gum Flat.

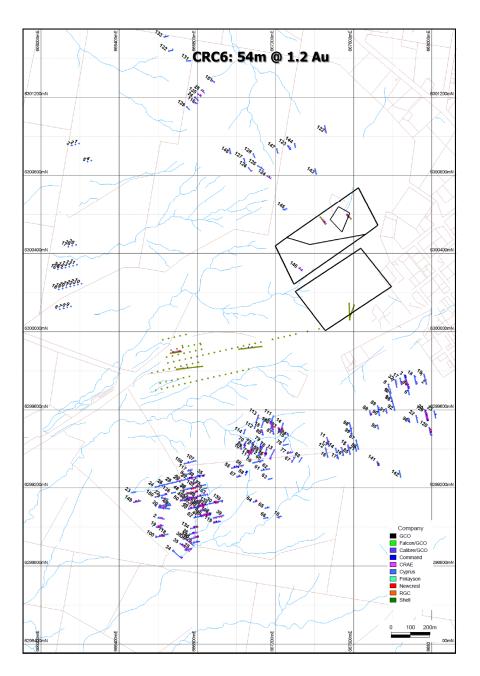
Exploration: Golden Cross & Partners

Drilling History

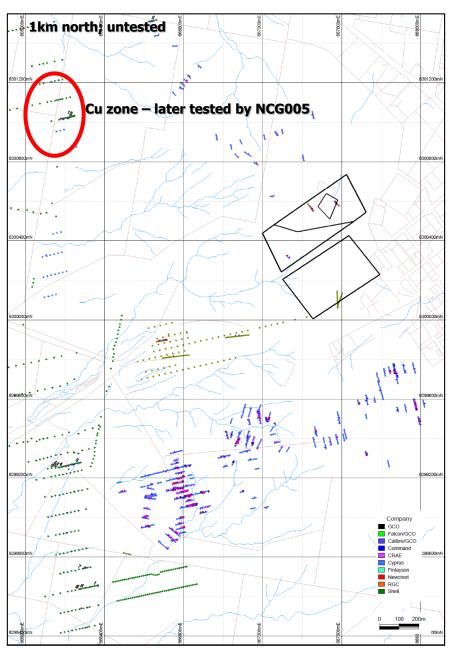
Campaign	Command		
Dates	1970-71		
Туре	Core	AT	
Holes	9	75	
Names	C1-5 LG1-2 DH1-2	PD	
Angle	60 (2 vert)	Vert	
Length average	132	32	
Length max	213	67	



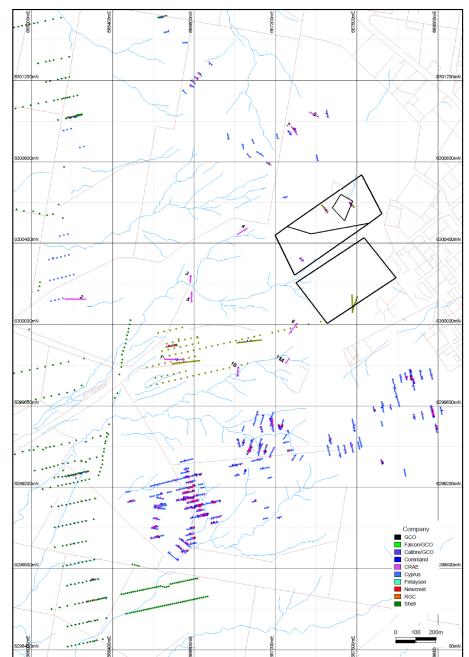
Campaign	Cyprus			
Dates		1987	-89	
Туре	AT	Core	RC	AT2
Holes	151	8	39	26
Names	САТ	87-X	CRC	СВ
Angle	40	50	55	Vert
Length average	34	61	72	39
Length max	50	74	129	60



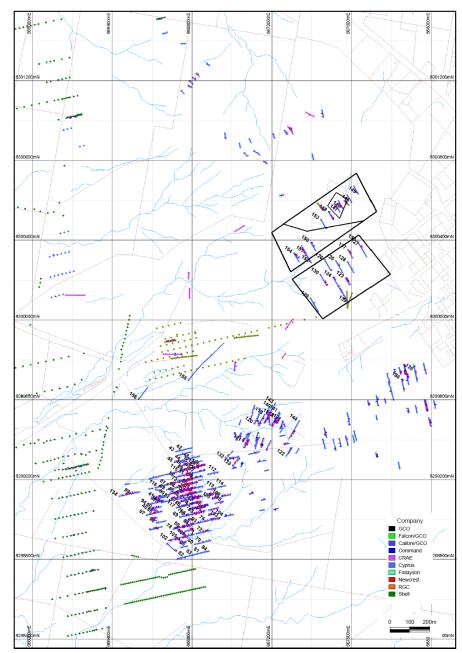
Campaign	Shell			
Dates		1987-88		
Туре	RAB	RC	Core	
Holes	541	11	10	
Names	CR	SHCRC	SHCD	
Angle	Vert	Vert	5 Vert	
Length average	36	46	80	
Length max	129	70	158	



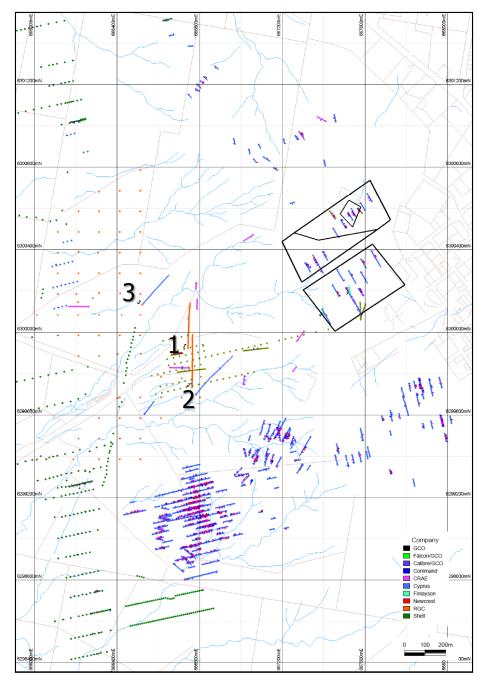
Campaign	CRAE
Dates	
Туре	Core
Holes	11
Names	CN
Angle	60
Length average	101
Length max	200



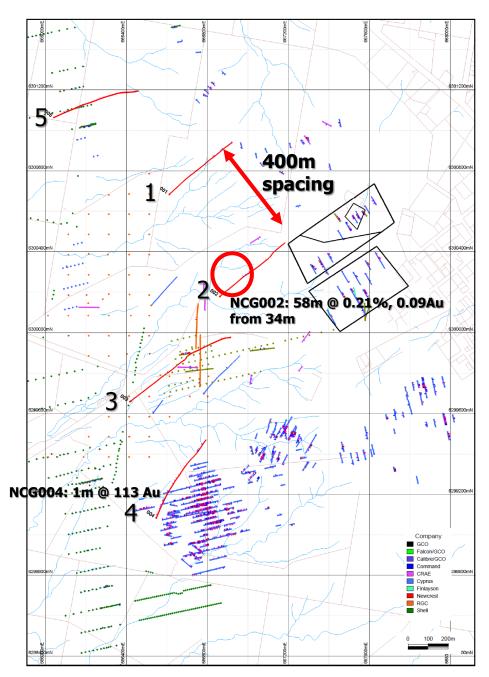
Campaign	Cyprus
Dates	1996-97
Туре	RC
Holes	119
Names	JG
Angle	50
Length average	88
Length max	180



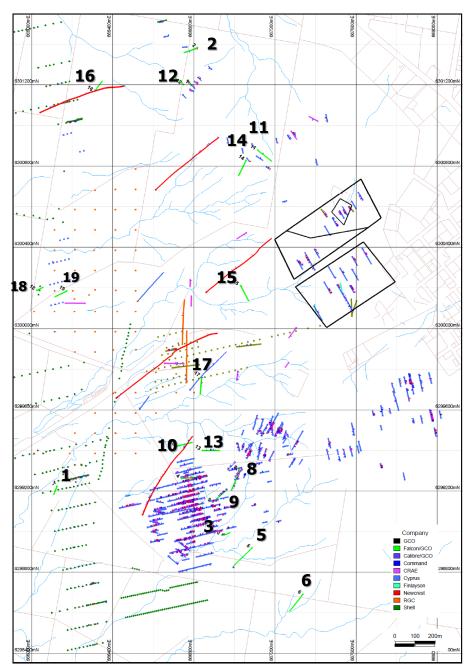
Campaign	RGC		
Dates	199	7-98	
Туре	RAB	Core	
Holes	67	3	
Names	CRAC CRD		
Angle	Vert	50	
Length average	28	435	
Length max	59	499	



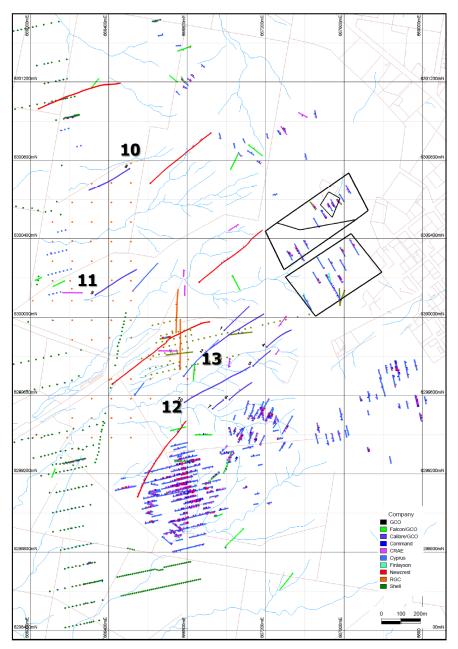
Campaign	Newcrest
Dates	1998
Туре	Core
Holes	5
Names	NCG001-005
Angle	50
Length average	761
Length max	1248



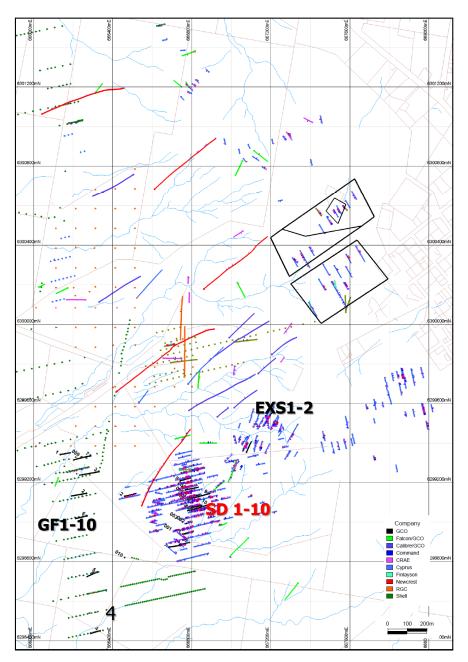
Campaign	Falcon
Dates	2003-05
Туре	RC
Holes	19
Names	FC
Angle	65
Length average	207
Length max	343



Campaign	Calibre		
Dates	2007-08		
Туре	RC	Core	
Holes	7	4	
Names	сүс сүс		
Angle	55	55	
Length average	262	444	
Length max	486	546	



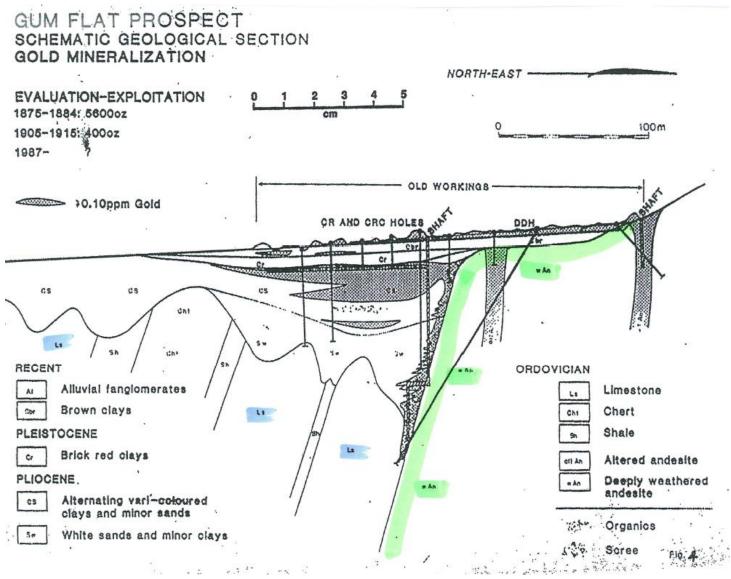
Campaign	Golden Cross			
Dates				
Туре	RC	Core	Core	
Holes	10	10	2	
Names	GF	SD	EXS	
Angle	60	60	60	
Length average	144	128	94	
Length max	170	202	95	



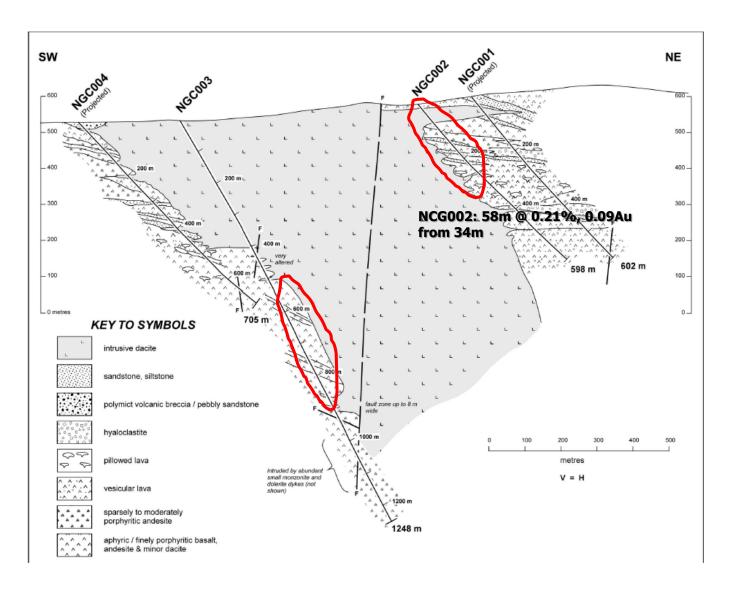
Company	Year	Holes by Type			Names	Angle	Length	Length		
		AT	RAB	RC	Core		Angle	av	max	
	1970	75				PD	Vert	32	67	
Command	1970-71				5	C1-5	50 [2 vert]		213	
command	1970				2	LG1-2	65	132	112	
	1971	-			2	DDH1-2	60		213	
	1987-88	151				CAT1-151	40	34	50	
Cyprus	1987-88				8	87-1-8	50	61	74	
Cypius	1987-88			39		CRC 1-39	55	72	129	
	1989	26				CB 1-26	Vert	39	60	
	1987-88		541			CR 1-541	Vert	36		
Shell	1987-88			11		SHCRC 1-11		46	70	
	1987-88	-			10	SHCD 1-10	5 Vert	80	158	
CRAE	1991-92				11	CN 1-11	60	101	200	
Cyprus	1996-97			119		JG 40-156	50	88	180	
RGC	1997-98				3	CRD 1-3		435	499	The first long holes
RGC		-	67			CRAC 1-67	Vert	28	59	
Newcrest	1998-99				5	NCG 1-5	50	761	1248	
Falcon	2003-05			19		FC 1-19	65	207	343	
Calibre	2007-08			7		CYC 1-7	55	262	486	
					3	CYC 10-13	55	444	546	
GCR	2009-11			7	\smile	GF 1-7	60	144	170	
	2011-12				10	SD 1-10	60	128	202	
	2012				2	EXS 1-2	60	94	95	
		252	608	202	49				TOTAL	1111

Drilling Stats: Mostly low quality AT/RAB . Only 11 long core holes

So whats going on?

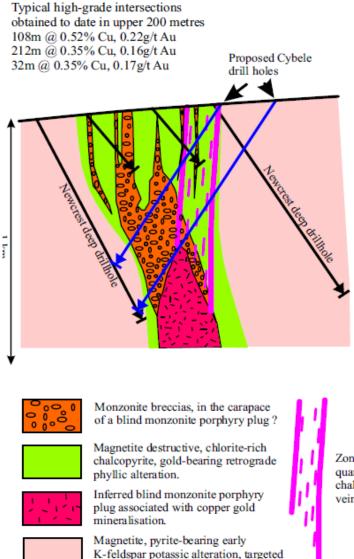


Shell: Gum Flat: Eluvials over younger limestone and Ord Volcs



Caroline Simpson thought Newcrest missed it?

Cargo inferred north-south cross section in July 06



...and so did Calibre 2008 [but we are getting deep >=600m] Zone of sheeted quartz +/- gold +/chalcopyrite veinlets

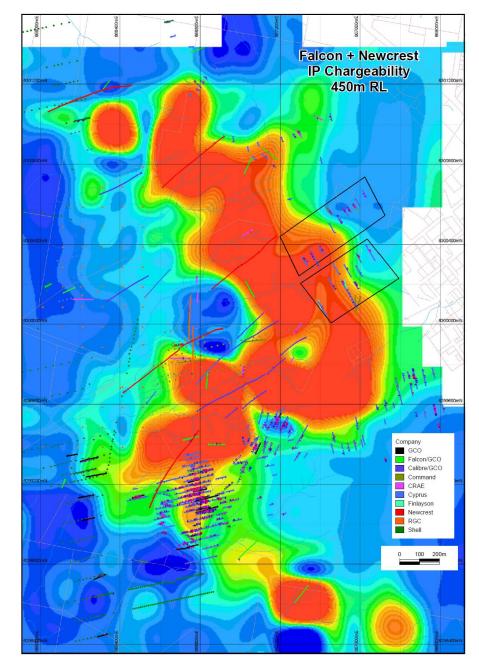
...and so did Newcrest!

Drill holes failed to intersect economic intervals of gold-copper mineralisation and are considered to fail in vectoring towards potentially better mineralised parts of the system.

Annual report to November 1999. Stuart Hayward

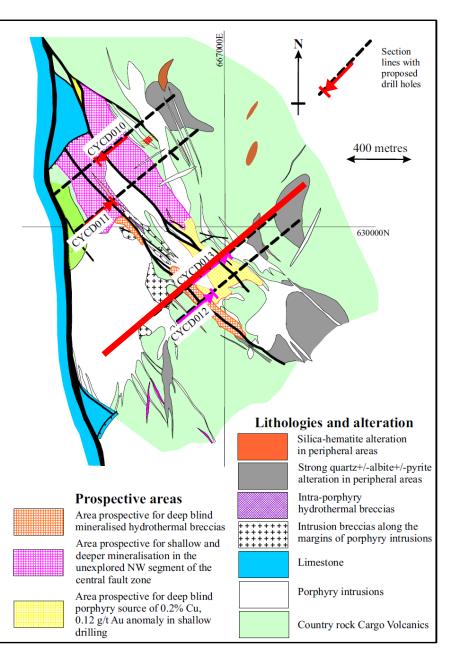
So what is going on?

IP suggest there is an under drilled pyritic zone?

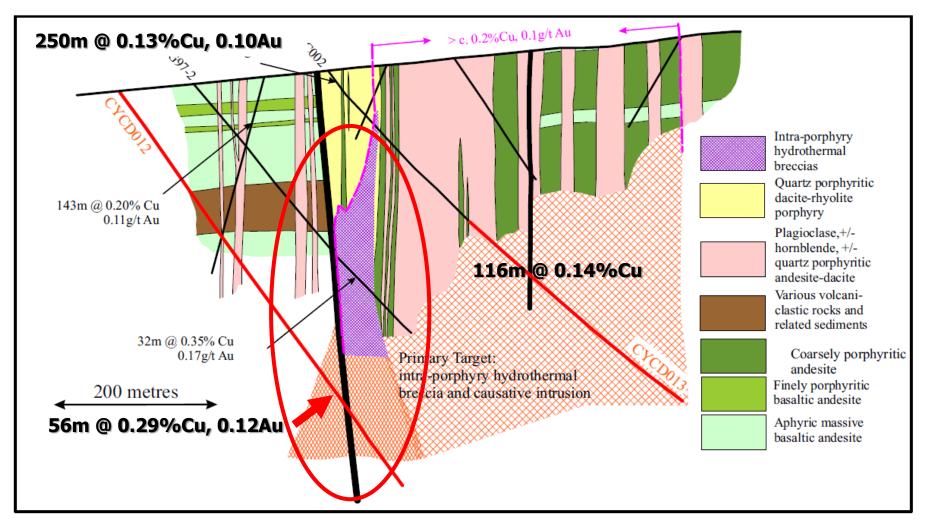


So what is going on?

Calibre [Cybele] 2009



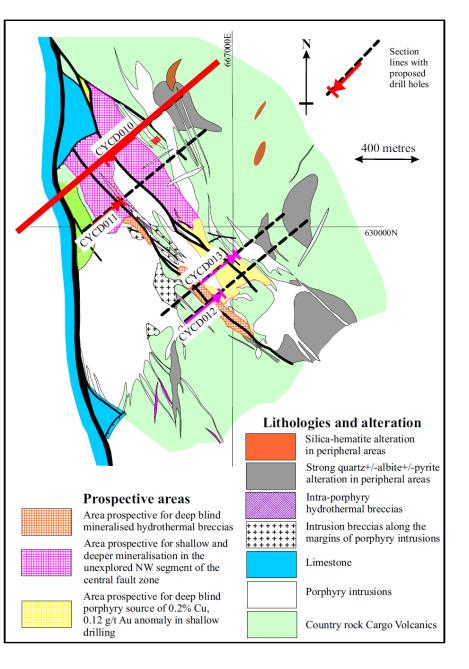
So what is going on?



Calibre confirmed low grades in the top ~400m, but not getting better: but more encouraging in the breccia zones

So what is going on?

Calibre [Cybele] 2009



So what is going on?

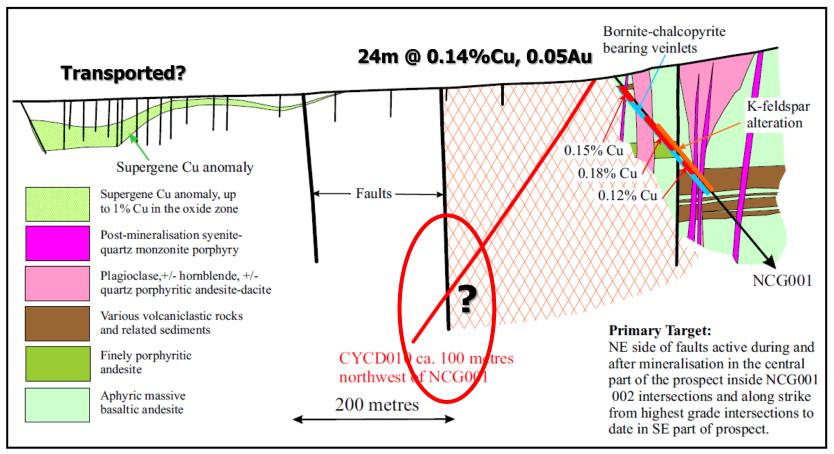


Figure 3: Section along NCG001 through the northwest part of the Cargo Prospect. CYCD010 is designed to test the area northeast of the faults active during and after mineralisation in the central part of the prospect, inside mineralised intersections in the upper parts of NCG001 and NCG002 (off section towards the southeast). The presence of faults likely to have been active during mineralisation in this area indicates that this is the most likely location of any higher grade material hosted in fracture networks created by the faults during hydrothermal activity. This area may also be the source of the extensive supergene Cu anomaly along the western side of the prospect.

Not much joy in the northwest either.....

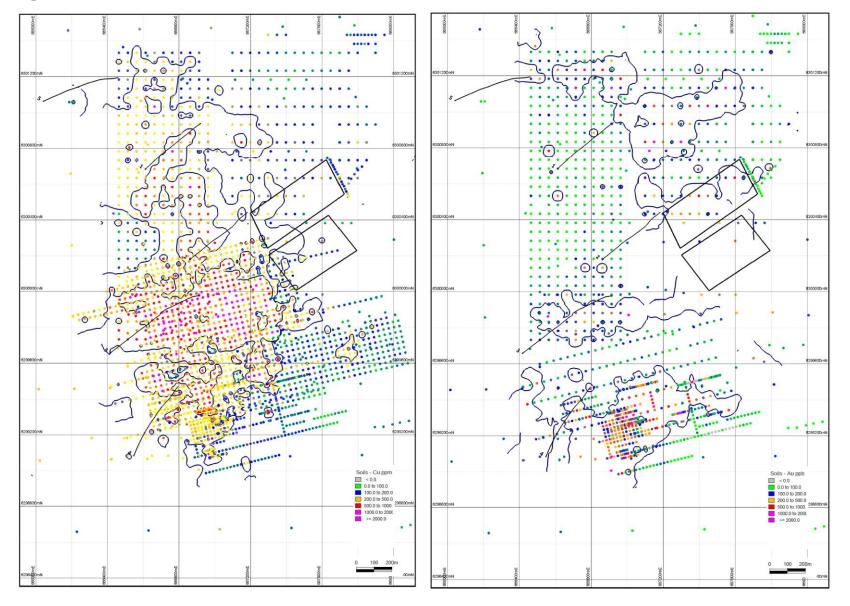
...Calibre gave up....."maybe"

occurred in the SE part of the Cargo Prospect. The extent, grade at depth, and origin of this hydrothermal breccia still remains unclear. This target, near the centre of the most strongly mineralised part of the prospect still remains partly untested. It is the most likely site for a deep blind higher grade porphyry ore body in the Cargo Prospect.

Annual report to November 2009. Andrew Allibone

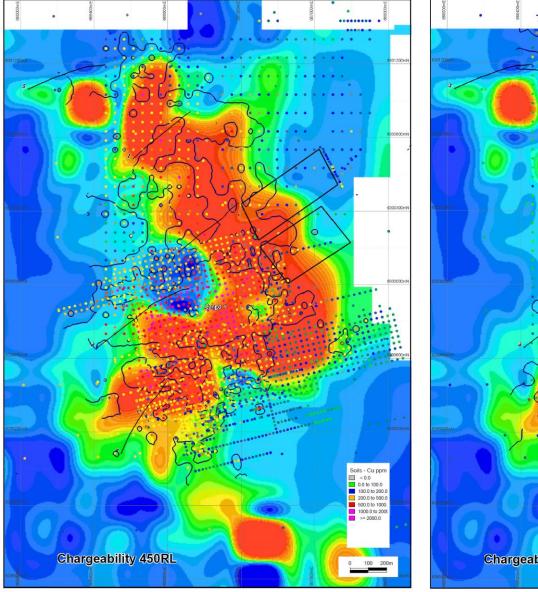
Deep Holes on Soil Cu

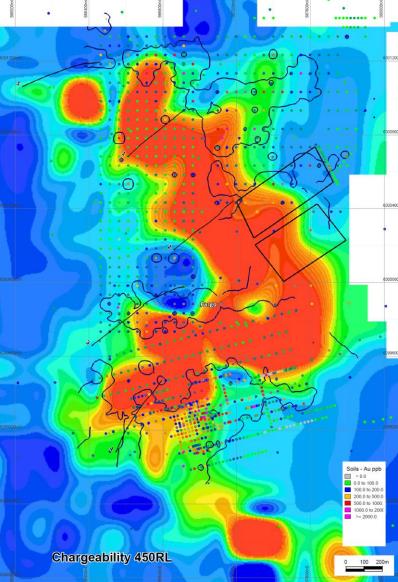
Soil Au



Deep Holes on Soil Cu + Charge

Soil Au + Charge





RESOURCES

Historical Estimates

- Eluvials
- Lodes

Basis	Zone		Gold Grade	Metal Content	Gold oz.
		Tonnes M	gpt	Kg Au	x 31.1
Eluvial/Alluvial					
Shell 1989		10-15	0.2- 0.25		77,000
Hardrock					
Cyprus 1988	Dalcoath/Spur	3.7	1.24		147,000

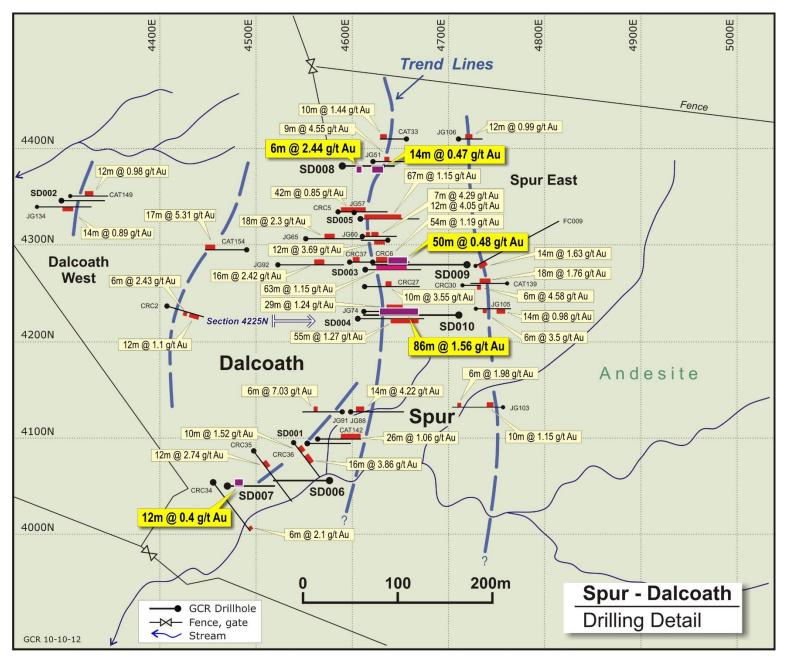
BUT.....Non-compliant! with modern guidelines

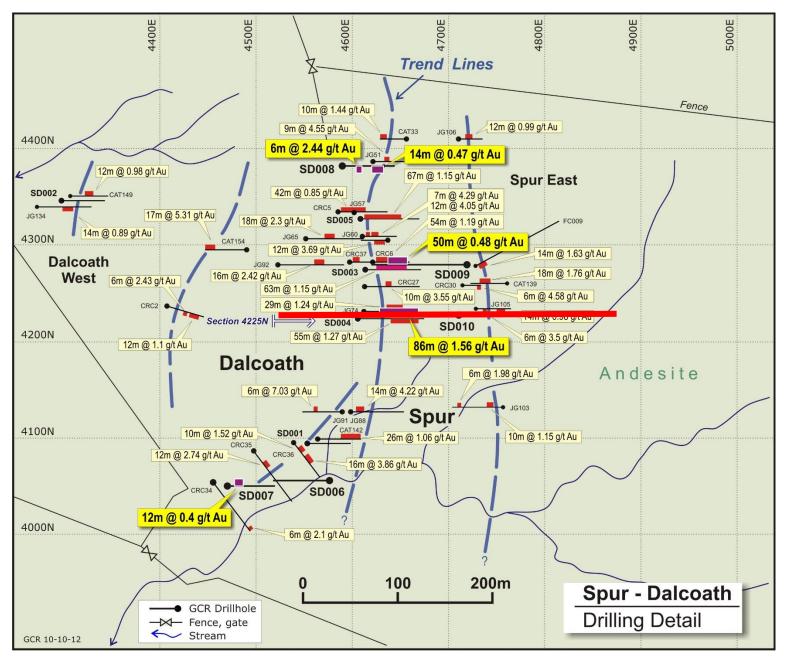
In 2012 Dalcoath looked like a good starting point to upgrade resources

- Extensive evidence of pitting
- Lots of historical drilling with good intercepts, but all RC – hard to extrapolate

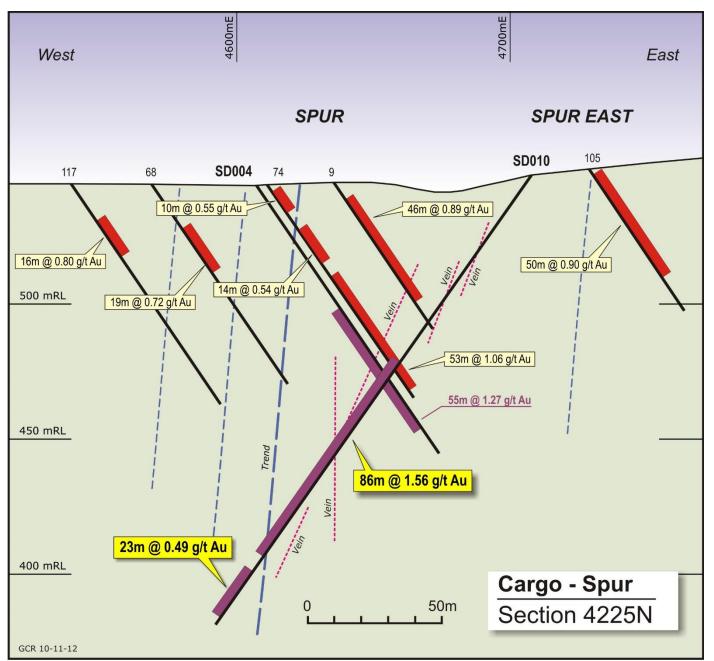








Sydney Mineral Exploration Discussion Group 28 May 2015 CARGO





SD010: Qtz-Carb vein @ 115.53 [8.94 Au]

SD010	114	115	1	0.49
SD010	115	115.3	0.3	0.26
SD010	115.3	115.7	0.4	<u>8.94</u>
SD010	115.7	116	0.3	0.53
SD010	116	117	1	0.16
SD010	117	118	1	0.74



Cargo: Spur Dalcoath Resource Estimate

Hellman & Schofield - May 2012 JORC 2004 Refer GCR ASX 21 May 2012

Total Inferred Resource at a cut-off of 0.8g/t gold (Number of decimal places does not imply precision)								
Zone	Cut-off grade	Volume (m ³)	TONNES (million)	SG	Gold grade g/t	Ounces		
SPUR EAST	0.8	274875	0.7	2.59	1.14	26,000		
SPUR	0.8	1198813	3.1	2.59	1.21	120,500		
DALCOATH	0.8	50812.5	0.1	2.56	1.07	4,500		
WEST DALCOATH	0.8	24687.5	0.1	2.66	1.29	2,500		
	1	I	4.0	2.59	1.19	154,000		

Total Inferred Resource at a cut-off of 0.8ppm Au -MATERIAL TYPE								
DESCRIPTION	Cut Off g/t Au	Tonnes (million)	SG	Gold g/t	Ounces			
OXIDE	0.8	0.2	2.30	1.29	6,500			
TRANSITION	0.8	1.1	2.40	1.27	45,000			
FRESH	0.8	2.8	2.70	1.16	102,000			
		4.0	2.60	1.19	154,000			

FUTURE?

ELUVIALS

- Revisit Shell 1988 work? Done with GF1-10
- Irregular, discontinuous
- Clay content
- Numerous places where drilling extends into andesitic basement east of fault

PORPHYRY

- Deep economic mineralisation discounted by NCM holes go deeper as suggested by Calibre?
- Spacing of deep holes ~200-400m. Cf. Ridgeway experience
- [search smedg.org.au for "Ridgeway" & John Holliday 1999]
- Need geological VECTORS mineralogy, isotopes etc
- Recent outcomes from Corbett & Menzies field course
- Where's the other half of Cargo? IS there one?

FUTURE?

- "RADIAL" LODES
- Small to moderate tonnages of 1-2 gpt
- eg. at Dalcoath-Spur
- Perodicity in high grade intercepts [example FC001]
- "Network" of wide ~6-10m spaced HG veins how to connect?
- [needs clinical, oriented core drilling]
- ~19 other lodes yet to be tested
- Aggregate to get moderate+ tons of 1-2 gpt ?
- Truck it to nearby plant?

Uelaid	Evana	Та	ما فحم ا	<u>Au</u>
Holeid	From	To	Lgth	avg
FC001	8	9	1	-0.01
FC001	9	10	1	0.08
FC001	10	11	1	0.06
FC001	11	12	1	0.19
FC001	12	13	1	0.13
FC001	13	14	1	0.6
FC001	14	15	1	0.29
FC001	15	16	1	0.96
FC001	16	17	1	<u>1.46</u>
FC001	17	18	1	<u>5.63</u>
FC001	18	19	1	0.06
FC001	20	21	1	0.54
FC001	21	22	1	0.36
FC001	22	23	1	0.04
FC001	23	24	1	0.04
FC001	24	25	1	0.02
FC001	25	26	1	0.02
FC001	26	27	1	1.13
FC001	27	28	1	0.06
FC001	28	29	1	0.56
FC001	29	30	1	0.81
FC001	30	31	1	0.77
FC001	31 32	32	1	0.84
FC001	32	33	1	<u>1.85</u>
FC001	33	34	1	2.2
FC001	34	35	1	1.21
FC001	35	36	1	0.48
FC001	36	37	1	0.38
FC001	37	38	1	0.88
FC001	38	39	1	0.63
FC001	39	40	1	0.31
FC001	40	41	1	0.02
FC001	41	42	1	0.05
FC001	42	43	1	0.11

The Cargo Cultbelievers?

- Bill Finlayson, John McCarron
- David Timms, Glen Twomey, Robyn Hee, Chris Torrey, Peter Silversmith, Mike Erceg, Peter White, Murray Flitcoft, Bruce Mowatt, Andrew Allibone, Stuart Hayward, Matt Alderdice, Kim Boundy.....
- Steve Collins, Dick England, Greg Corbett, Doug Menzies.....
-and many more

Google earth

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References

Ordovician convergent-margin volcanism and tectonism in the Lachlan sector of east Gondwana

R. A. Glen Geological Survey of New South Wales, Department of Mineral Resources, P.O. Box 536, St. Leonards, New South Wales 2065, Australia

J. L. Walshe Division of Exploration and Mining, CSIRO, P.O. Box 437 Nedlands, Western Australia 6009, Australia

L. M. Barron Ceological Survey of New South Wales, Department of Mineral Resources, P.O. Box 536, St. Leonards,

J. J. Watkins _ New South Wales 2065, Australia

Geology; August 1998; v. 26; no. 8; p. 751-754; 5 figures.

Volcanology, geochemistry and structure of the Ordovician Cargo Volcanics in the Cargo - Walli region, central New South Wales

C. J. Simpson ^a , R. J. Scott ^b , A. J. Crawford ^b & S. Meffre ^b

Alkalic porphyry Au–Cu and associated mineral deposits of the Ordovician to Early Silurian Macquarie Arc, New South Wales

D. R. COOKE^{1*}, A. J. WILSON^{1†}, M. J. HOUSE^{2‡}, R. C. WOLFE^{1§}, J. L. WALSHE³, V. LICKFOLD^{1¶} AND A. J. CRAWFORD¹

Australian Journal of Earth Sciences (2007) 54,

DISCOVERY OF THE CADIA RIDGEWAY GOLD-COPPER PORPHYRY DEPOSIT John Holliday, Colin ...

Orange in the central tablelands of NSW. The **Ridgeway** deposit lies 500m ... in this zone. The **Ridgeway** deposit is an upright ... to the ore. Conclusions **Ridgeway** was discovered not just www.smedg.org.au/Sym99cadia.htm