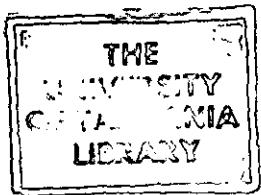


A STRUCTURAL, GEOPHYSICAL, ISOTOPIC AND
GEOCHEMICAL APPRAISAL OF THE CSA DEPOSIT, COBAR,
AUSTRALIA: IMPLICATIONS FOR THE DEFORMATION OF THE
COBAR BASIN AND MINERAL POTENTIAL.

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Thesis
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TABLE OF CONTENTS

	PAGE
TABLE OF CONTENTS.....	i
LIST OF FIGURES.....	iii
LIST OF TABLES.....	vii
LIST OF MAPS.....	vii
ABSTRACT.....	1
CHAPTER 1 INTRODUCTION.....	3
CHAPTER 2 REGIONAL GEOLOGY.....	8
2.1 STRATIGRAPHY.....	8
2.2 STRUCTURE.....	10
2.3 METAL ZONATION.....	11
CHAPTER 3 GENERAL CSA MINE GEOLOGY.....	26
CHAPTER 4 DETAILED CSA STRUCTURE.....	34
4.1 SURFACE GEOLOGY.....	34
4.1.1 WESTERN ZONE.....	34
4.1.2 EASTERN ZONE.....	36
4.2 UNDERGROUND MAPPING AT CSA.....	37
4.3 PREVIOUS STRUCTURAL MODELS.....	41
4.4 STRUCTURAL HISTORY AND RELATIONSHIP TO THE BASIN.....	41
4.4.1 THE D1 EVENT.....	42
4.4.2 THE D2 EVENT.....	42
4.4.3 THE D3 EVENT.....	43
4.5 OTHER DEPOSITS.....	45
CHAPTER 5 GEOPHYSICAL INTERPRETATIONS.....	64
5.1 SEISMIC DATA.....	64
5.2 GRAVITY DATA.....	64
5.2.1 THE ORIGINAL COBAR GRAVITY SURVEY.....	64
5.2.2 REPROCESSING THE DATA.....	65
5.2.3 DENSITY DETERMINATIONS.....	67
5.3 REGIONAL GRAVITY DATA.....	68
5.4 BASIN WIDE MODEL.....	70
5.5 MAGNETIC DATA.....	73
CHAPTER 6 ISOTOPE, FLUID INCLUSION AND CHLORITE DATA..	84
6.1 ISOTOPIC DATA.....	84
6.1.1 δS^{34} DATA.....	84
6.1.1.A THE CSA DEPOSIT.....	84
6.1.1.B THE Cu/Au DEPOSITS.....	85
6.1.1.C THE ELURA Pb/Zn DEPOSIT..	86

6.1.2	SOURCE OF SULFUR.....	87
6.1.3	OXYGEN, CARBON AND HYDROGEN ISOTOPE DATA.....	87
6.1.4	SOURCE OF O, C AND H.....	88
6.1.5	ISOTOPIC DATING.....	89
6.2	FLUID INCLUSION DATA.....	90
6.2.1	THE CSA DEPOSIT.....	90
6.2.2	THE Cu/Au DEPOSITS.....	93
6.2.3	THE ELURA Pb/Zn DEPOSIT.....	93
6.3	ALTERATION CHLORITES.....	94
CHAPTER 7 FRESH ROCK GEOCHEMISTRY.....		106
CHAPTER 8 ORE GENESIS.....		110
8.1	PREVIOUS MODELS.....	110
8.2	NEW PROPOSED MODEL.....	111
CHAPTER 9 CONCLUSIONS.....		115
ACKNOWLEDGEMENTS.....		119
REFERENCES.....		120
APPENDIX 1	WESTERN ZONE SURFACE STRUCTURAL DATA	
APPENDIX 2	EASTERN ZONE SURFACE STRUCTURAL DATA	
APPENDIX 3	UNDERGROUND STRUCTURAL DATA	
APPENDIX 4	DENSITY DATA	
APPENDIX 5	REGIONAL GRAVITY MODEL DATA	
APPENDIX 6	BASIN WIDE GRAVITY MODEL DATA	
APPENDIX 7	Cu/Au δ S34 DATA	
APPENDIX 8	CSA DEPOSIT SULFUR AND SELENIUM DATA	

LIST OF FIGURES

	PAGE
FIGURE 1.1	GEOLOGY OF THE COBAR MINING FIELD.....6
FIGURE 1.2	TECTONIC UNITS OF THE LACHLAN FOLD BELT. FROM SUPPEL AND SCHEIBNER (1990).....7
FIGURE 2.1	SCHEMATIC CROSS SECTION OF COBAR GROUP SEDIMENTATION. FROM BAKER (1975).....16
FIGURE 2.2	QUEEN BEE PORPHYRY.....17
FIGURE 2.3	FLOW BANDED RHYOLITE FROM THE PEAK DEPOSIT.....18
FIGURE 2.4	VOLCANIC BRECCIA FROM THE PEAK DEPOSIT.....19
FIGURE 2.5	CROSS SECTION 10 530N THROUGH THE PEAK DEPOSIT LOOKING NORTH. FROM HINMAN AND SCOTT (1990).....20
FIGURE 2.6	MAP OF INVERTED COBAR BASIN. FROM GLEN (1990)..21
FIGURE 2.7	ZONE 1 STRUCTURAL MAPS. FROM GLEN (1990).....22
FIGURE 2.8	CROSS SECTION OF THE COBAR REGION WITH DEPOSIT GROUPS, INFERRED STRUCTURE AND SOURCE OF MINERALISATION. FROM GLEN (1988).....23
FIGURE 2.9	COBAR TYPE DEPOSITS FROM ELURA TO NYMAGEE. FROM CONNOR (1985).....24
FIGURE 2.10	METAL ZONATION OF THE ELURA DEPOSIT IN PLAN AND SECTION. FROM SECCOMBE (1990).....25
FIGURE 3.1	CSA DEPOSIT CROSS SECTION LOOKING NORTH.....31
FIGURE 3.2	CSA WESTERN SYSTEM LONG SECTION LOOKING EAST WITH Cu AND Pb/Zn TRANSITION LINE.....32
FIGURE 3.3	SUMMARY DIAGRAM OF QUARTZ VEIN RELATIONSHIPS AT THE Cu/Au DEPOSITS. FROM GLEN (1987).....33
FIGURE 4.1	THE HIGHLY SILICIFIED ASHFALL TUFF (?) OR HIGHLY ALTERED SEDIMENTS WEST OF THE WESTERN SYSTEM, CSA DEPOSIT.....47
FIGURE 4.2	BEDDING AND CLEAVAGE STEREOONETS FOR THE SURFACE WESTERN ZONE.....48
	A) 110 BEDDING DATA AT 2.5, 5, 7.5, 10, 12.5, AND >15 % AREA. NOTE SMALL EFFECT OF REFOLDING BY D3 TO SOUTH.....48

	B) 48 CLEAVAGE DATA AT 5.5, 11, 16.5, 22, 27.5, AND >33 % AREA. NOTE TRENDS TO 060°, 090° AND 120°.....	48
FIGURE 4.3	WESTERN GOSSAN FOLDS AND SHEARS.....	49
FIGURE 4.4	MULLOCK PASS GEOLOGY LOOKING SOUTH.....	50
FIGURE 4.5	BEDDING AND CLEAVAGE STERONETS FOR THE SURFACE EASTERN ZONE.....	51
	A) 53 BEDDING DATA AT 6.5, 13, 19.5, 26, 32.5, AND >39% AREA.....	51
	B) 46 CLEAVAGE DATA AT 6, 12, 18, 24, 30, AND >36% AREA.....	51
	C) GIRDLES AND POLES. BEDDING (1) AT 79° TO 265°, EAST DIPPING CLEAVAGE (2) AT 83° TO 090°, CLEAVAGES (3) AT 85° TO 116°, (4) AT 89° TO 140°, (5) AT 88° TO 040°. NOTE SENSE OF MOTION.....	51
FIGURE 4.6	CLEAVAGE DIPPING TO 140° WITH DISPLACEMENT.....	52
FIGURE 4.7	CLEAVAGE DIPPING TO 120° AND BEDDING.....	53
FIGURE 4.8	CSA DEPOSIT UNDERGROUND STERONETS.....	54/55
	A) 811 BEDDING DATA AT 5, 10, 15, 20, 25, AND >30% AREA. NOTE FOLD ORIENTATION STRIKING NNW.....	54/55
	B) 228 DUE EAST DIPPING CLEAVAGE DATA AT 15, 30, 45, 60, 75, AND >90% AREA.....	54/55
	C) 256 OTHER CLEAVAGE DATA AT 7, 14, 21, 28, 35, AND >42% AREA. NOTE ORIENTATIONS TO 105° AND 080°.....	54/55
	D) 73 FAULT AND SHEAR DATA AT 2, 4, 6, 8, 10, AND >12% AREA. NOTE CONCENTRATIONS AT 110 TO 140°, 050° TO 080° AND THE LOW ANGLE FAULTS TO 340°.....	54/55
	E) 96 FOLD AXIS (L0/3) PLUNGE DATA AT 4, 8, 12, 16, 20, AND >24% AREA.....	54/55
	F) 31 STRETCHING LINEATION (L2/3) DATA AT 15, 30, 45, 60, 75, AND >90% AREA.....	54/55

FIGURE 4.9	ORIENTATED DRILL CORE FROM HOLE DDHCM46 SHOWING QUARTZ FILLED CLEAVAGE AND ASSOCIATED FOLD STRUCTURES, LOOKING NORTH.....	56
FIGURE 4.10	SET 6 ORIENTATED VEINS WITH SENSE OF MOTION EQUIVALENT TO R' SHEARS (SEE FIG. 4.11, 4.14). FIELD OF VIEW ABOUT 1 METRE LOOKING NORTH. NOTE EAST DIPPING BEDDING. LOCATED NEAR WESTERN SYSTEM ON MAP 1.....	57
FIGURE 4.11	EAST DIPPING BEDDING, TENSION GASHES AND FAULTS EXPOSED NEAR THE WESTERN SYSTEM ON 11 LEVEL (SEE MAP 1). NOTE THE RELATIONSHIP TO THE D3 STRUCTURES. FIELD OF VIEW ABOUT 3 METERS.....	58
FIGURE 4.12	IDEALISED STRUCTURAL MODEL (CROSS SECTION) SHOWING ROTATION OF BEDDING INTO INTENSELY CLEAVED ZONES WITH MINERALISATION. FROM SCOTT AND PHILLIPS (1990).....	59
FIGURE 4.13	D2 STRUCTURAL FEATURES IN PLAN. ALSO REFER TO MAP 1.....	60
FIGURE 4.14	D3 STRUCTURAL FEATURES IN CROSS SECTION LOOKING NORTH.....	61
FIGURE 4.15	SURFACE STRUCTURAL DATA FROM THE PEAK SUMMIT AND CONQUEROR-BROWN SUB AREAS. FROM HINMAN AND SCOTT (1990).....	62
FIGURE 5.1	COBAR BASIN, STRUCTURAL FEATURES AND ACORP SEISMIC SURVEY LINES. FROM GLEN (1992).....	75
FIGURE 5.2	COBAR BASIN, CROSS SECTION ALONG ACORP SEISMIC SURVEY LINE 2. FROM GLEN (1992).....	76
FIGURE 5.3	NORTH TO SOUTH SERIES OF CROSS SECTION THROUGH STRUCTURAL ZONE 1. FROM GLEN (1990).....	77
FIGURE 5.4	COBAR REGIONAL GRAVITY SURVEYS.....	79
FIGURE 5.5	COBAR REGIONAL GRAVITY MODEL.....	80
FIGURE 5.6	CSA BASIN WIDE GRAVITY MODEL.....	81
FIGURE 5.7	SURFACE GEOCHEMICAL ANOMALIES RELATED TO SHEARING.....	82
FIGURE 5.8	SURFACE MAGNETIC AND GRAVITY TRENDS.....	83
FIGURE 6.1	CSA DEPOSIT δS_{34} ISOTOPE DATA. FROM BRILL,	

	SECCOMBE AND CHIVAS (UNPUB).....	96
FIGURE 6.2	Cu/Au DEPOSIT $\delta^{34}\text{S}$ DATA. FROM SECCOMBE (UNPUB).....	97
FIGURE 6.3	ELURA DEPOSIT $\delta^{34}\text{S}$ DATA. FROM SECCOMBE (1990)..	98
FIGURE 6.4	SULFUR ISOTOPE VARIATIONS IN DIFFERENT ROCK TYPES. FROM OHMOTO AND RYE (1979).....	98
FIGURE 6.5	CSA DEPOSIT OXYGEN AND CARBON ISOTOPE DATA. FROM BRILL, SECCOMBE AND CHIVAS (UNPUB).....	99
FIGURE 6.6	CSA DEPOSIT HYDROGEN ISOTOPE DATA. FROM BRILL SECCOMBE AND CHIVAS (UNPUB).....	99
FIGURE 6.7	OXYGEN AND CARBON ISOTOPE VARIATIONS IN DIFFERENT ROCK TYPES. FROM FRITZ (1976).....	100
FIGURE 6.8	CSA DEPOSIT FLUID INCLUSION DATA. FROM BRILL AND SECCOMBE (UNPUB).....	101
FIGURE 6.9	Cu/Au DEPOSIT FLUID INCLUSION DATA BY DEPOSIT. FROM SECCOMBE (UNPUB).....	102
FIGURE 6.10	Cu/Au DEPOSIT COMBINED FLUID INCLUSION DATA. DATA FROM SECCOMBE (UNPUB).....	103
FIGURE 6.11	ELURA DEPOSIT FLUID INCLUSION DATA. FROM SECCOMBE (1990).....	104
FIGURE 6.12	CSA DEPOSIT CHLORITE TYPES. FROM BRILL AND SECCOMBE (UNPUB).....	105
FIGURE 7.1	CSA DEPOSIT DEPLETION HALOES FOR THE ALKALI AND ALKALINE EARTH ELEMENTS. FROM ROBERTSON (1983).....	109

LIST OF TABLES

		PAGE
TABLE 2.1	PREVIOUS COBAR STRATIGRAPHIC MODELS. FROM BAKER (1975).....	14
TABLE 2.2	CURRENT COBAR STRATIGRAPHIC MODEL.....	15
TABLE 4.1	SUMMARY OF STRUCTURAL HISTORY.....	63
TABLE 5.1	COBAR AREA ROCK DENSITIES.....	78
TABLE 6.1	ELURA DEPOSIT FLUID INCLUSION DATA. FROM SECCOMBE (1990).....	104
TABLE 8.1	SUMMARY OF THE NEW PROPOSED STRUCTURAL MODEL FOR THE CSA DEPOSIT AND HENCE THE COBAR BASIN.....	114

LIST OF MAPS

MAP 1	CSA MINE GEOLOGY COMPILATION FROM 9 LEVEL TO 11 LEVEL
MAP 2	CSA MINE SURFACE GEOLOGY PLAN
MAP 3	SURFACE GEOLOGY SPOTTED LEOPARD AREA, COBAR
MAP 4	COBAR REGIONAL GRAVITY MAP
MAP 5	COBAR 1:100 000 GEOLOGY MAP
MAP 6	COBAR MINES P/L GRAVITY SURVEY OF THE CSA DEPOSIT

ABSTRACT

Since the discovery of base and precious metals in Cobar during the latter part of last century much time and effort has been spent researching the geological origins of and factors influencing the Cobar style of deposit. Models have taken three forms, epigenetic, syngenetic, and structural. Problems faced by those working in the Cobar District include

- 1) relating structures to mineralisation and mineralising events,
- 2) understanding the source of sulfides and quartz veining, and the relationship between the two, and
- 3) using geophysics to enhance the knowledge of the basin.

The first of these problems has been clarified by the author conducting detailed surface and underground mapping of the CSA deposit and comparing the results with those of previous workers. The structural mapping showed a pattern consistent with other Cobar deposits and identified structural elements not previously recorded. As a result the timing relationships of these structures was redefined such that three deformation events were identified, D1 being basin closure, D2 being sulfide injection into pipe like fracture zones formed by sinistral deformation, and D3 being simultaneous strike slip west block up movement and quartz injection.

The problem of the significance of quartz veining has been resolved by review of a range of isotopic and geochemical data. Isotopic and geochemical data confirmed sulfide remobilisation by

D3, a metamorphic origin for the quartz, but either a sedimentary or igneous origin for the sulfides. Previous work had suggested the sulfides to be of metamorphic origin based on their being hosted by quartz filled structures. However the structural reinterpretation clearly demonstrates that the quartz occupies structures that displace and hence post date mineralisation.

Regional and local gravity models presented are based on the recovery of an old gravity survey not previously compiled and systematically interpreted. It is shown through the models that it is possible for the mineralised systems to have a relief of more than 2km given certain geological parameters, some of which are based on assumption. Consequently, there is still a need to review and refine the models and assumptions used as there is likely to be more than one valid geological solution to the Cobar Basin geometry. Future use of this data, coupled with some increase in coverage may well change existing regional assumptions about the Cobar Basin.