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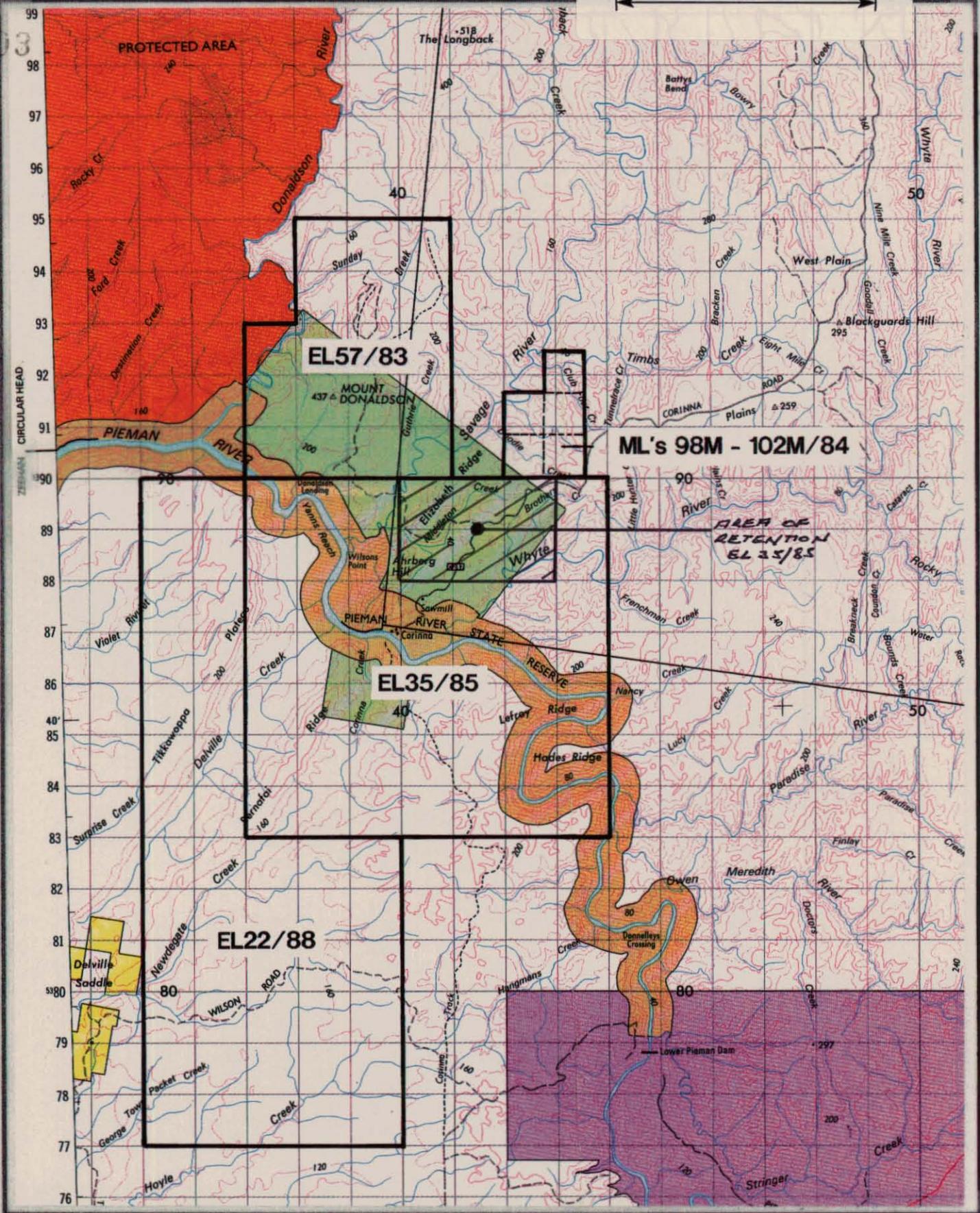
1. TENEMENT INFORMATION

Mining Leases 98-102M/84 (Brookside) and Exploration Licences 35/85 (Corinna), 22/88 (Newdegate Creek) and 57/83 (Mount Donaldson) totalling 96.2 square kilometres, are centred around the township of Corinna, Western Tasmania (see Plate BKS 8). Both the lease and licence areas are rugged and heavily vegetated with rainforest and eucalypt species.

Exploration has been conducted over most of the JV area although concentrated in the northwest portion of the ML's where significant concentrations of crystalline gold have been discovered in dolomitic soils. The majority of the JV area north of the Pieman River, may be accessed by logging and government tracks, which in some cases have been upgraded to facilitate transportation of commercial quality silica flour from two open pits within the ML's.

Since the 28 February, 1989 the lease area has been explored under the terms of the Brookside Joint Venture with H.D. and A.N. Nolan who have caveats on the ML's securing mineral rights.

5 cm



Aberfoyle Resources Limited
EXPLORATION DIVISION

432004

NORTH WEST TASMANIA
BROOKSIDE J.V.
LOCALITY PLAN

Compiled : RJE
Drawn : Lands Dept.
Traced :
Checked : RJH
Plate No. : BKS 8

REVISIONS			
Init.	Date	Init.	Date

Location Code :

Scale : 1 : 100,000

Date : July , 1990

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2. EXPLORATION HISTORY

2.1 Corinna EL 35/85

Pre 1985

The Corinna district has been subject to a number of phases of alluvial mining for Au during the 1800's and later in the 1930's. A number of syndicates and individuals worked the extensive cover of Tertiary gravels for alluvial gold and osmiridium by hydraulic sluicing and other conventional methods.

Limited modern exploration has been conducted over the area. Regional airborne magnetic surveys were conducted by Rio Tinto (1956) and the Department of Mines (1982).

During the early 1980's the area received minor attention from the Mount Lyell Mining and Railway Company in their search for alluvial diamonds.

Cominex (1985-1989)

The majority of exploration was directed toward the recognition of silica flour deposits in the Corinna Dolomite. Following the discovery of several commercial quality deposits of silica flour in the region, ML 62M/85 was pegged within the licence boundary. Test sampling of silica flour contained within this ML has been undertaken.

More recent work has been directed toward gold and base metal exploration using geological mapping, rockchip and stream sediment sampling throughout the licence.

2.2 Mount Donaldson EL 57/83

Pre 1983

Limited modern exploration was conducted on the EL 57/83 prior to 1983. Airborne magnetic surveys conducted by Rio Tinto (1956) and Mines Department (1982) formed much of the basis for target selection and ground investigation. As such, none of the geophysical anomalies investigated were contained within the current EL boundaries.

During the early 1980's the licence received minor attention from the Mount Lyell Mining & Railway Company in their search for alluvial diamonds. Most of this exploration however, was conducted outside the current licence boundaries.

Geopeko (1983-1988)

Exploration by Geopeko involved reconnaissance gridding and soil sampling over airborne magnetic highs east of Interview Pinnacle and west of The Longback for Sn and Pb, Zn mineralisation. Both anomalies lie outside the current licence boundary. No follow up work was recommended at either site.

Cominex (1985-1989)

The majority of exploration was targeted at recognition of commercial quality silica flour deposits in the Savage Dolomite similar to those occurring elsewhere in the district.

More recent work has been directed toward gold and base metal exploration with stream sediment sampling and geological mapping in the southeast portion of the licence.

2.3 Newdegate Creek EL 22/88

CRA Exploration Pty Ltd (1977-1986)

Ground investigations were limited to follow-up of anomalies generated by examination of the Rio Tinto (1956) and Mines Department (1982) airborne magnetic surveys.

On this basis no modern ground investigations were conducted within the boundaries of EL 22/88.

The Alpine and Gourlays Creek Prospects lie south-east and south of the licence boundary. Drilling at both prospects intersected low grade base-metal mineralisation.

A limited stream sediment survey was conducted west of the licence boundary on the western slopes of Tikkawoppa Plateau with no significant anomalies generated.

Approximately 3.7km of gridding was cut on the southern portion of the licence in the vicinity of Hoyle Creek as an extension to the Alpine Prospect grid. Although the grid lies over a significant magnetic high, no ground investigations appear to have been done.

Kingston Minerals (1986-1987)

Mines Department research indicates no exploration was carried out by Kingston Minerals for the period the licence was held.

3. EXPLORATION PHILOSOPHY

Cominex (1985-1989)

The majority of exploration was directed toward the recognition of silica flour deposits in the Corinna Dolomite. Following the discovery of several commercial quality deposits of silica flour in the region, ML 62M/85 was pegged within the licence boundary. Test sampling of silica flour contained within this ML has been undertaken.

More recent work has been directed toward gold and base metal exploration using geological mapping, rockchip and stream sediment sampling throughout the licences.

Aberfoyle-Cominex Brookside J.V. (1989-1990)

During this period, exploration was primarily directed at the potential of the calcareous rocks of the Precambrian Sigma Group for possible carbonate hosted Au mineralisation, previously undiscovered in Tasmania.

The occurrence of fine microscopic crystalline Au in weathered dolomite in close proximity to faulting were seen as evidence to support a fault related model for possible Au mineralisation. This model was used as a basis for exploration throughout the ML's, El 57/83, EL 35/85 and EL 22/88.

4. SUMMARY OF EXPLORATION COMPLETED DURING TENURE

4.1 Corinna EL 35/85

Cominex (Pre 1989)

Regional reconnaissance investigation on the potential for high grade silica flour deposits of the type previously identified to the immediate north in EL 37/82. This work which was performed through out the licence tenure period included airphoto and aeromagnetic interpretation with extensive ground traversing. With the exception of an area on the eastern boundary with EL 37/82, the remnant occurrences of silica flour are significantly contaminated by the intrusion of Tertiary gravels.

Attention was also given to alluvial gold which is hosted by the Tertiary gravels. Bulk sampling undertaken resulted in below economic gold grades. This program was not sufficiently comprehensive to be taken as an assessment of the area in general.

Tertiary gravel sampling revealed the presence of free crystalline gold throughout the licence area. Detailed microscopic examination and microprobe analysis of gold grains collected suggested that a high percentage of the gold occurring in the Tertiary gravels was of local derivation. Stream sediment sampling resulted in the identification of a primary source material in Brookside Creek within the silica mining leases.

Aberfoyle-Cominex Brookside J.V. (1989-1990)

Geological mapping was undertaken in the drainage system of Middleton, White and Sailors Creeks in conjunction with a stream sediment sampling program.

No significant alteration was detected other than strong post-diagenetic silicification of the Corinna Dolomite.

Mineralisation in samples of the Corinna Dolomite is dominantly pyritic with some rare chalcopyrite recorded. Minor stratabound pyrite/arsenopyrite mineralisation was noted in samples of mudstone from White Creek.

A total of 34 rock chip samples were taken with results of max. As 160 ppm. Au 0.035 ppm in pyritic silicified dolomite, (max. Zn 1400 ppm). A pyritic mudstone sample gave max. As 1150 ppm. A total of 23, -80 mesh stream sediment samples were collected. Results were generally disappointing with only 2 samples anomalous, 0.298 and 0.060 ppm Au.

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4.2 Mount Donaldson EL 57/83

Geopeko (1984)

An exploration model based on the pyrrhotite/magnetite skarn style of tin mineralisation was used to designate a number of aeromagnetic anomalies for detailed follow-up. Ground follow-up with reconnaissance grid lines, ground magnetics, geological mapping and selected soil sampling was not encouraging.

Cominex (Pre 1989)

Regional reconnaissance investigation on the potential for high grade silica flour deposits of the type discovered by Cominex on the adjacent EL 37/82. This work which continued until licence relinquishment included air-photo and aeromagnetic interpretation with extensive ground traversing. Patchy silica flour occurrences were identified overlying dolomite bedrock, however these occurrences had been significantly contaminated by the intrusion of Tertiary gravels.

As a sequence of Proterozoic dolomites and basic volcanics in adjacent EL 37/82 hosted an occurrence of bedrock gold, panned concentrate sampling commenced over similar geology occurring in the SE portion of this EL.

Aberfoyle-Cominex Brookside J.V. (1989-90)

Geological mapping was undertaken in conjunction with stream sediment sampling in both Guthries and Unnamed Creeks.

No significant alteration was detected in outcrop examined with the exception of the post-diagenetic silicification of the Savage Dolomite and associated sediments.

Weak stratabound pyrite mineralisation was detected in samples of the graphitic mudstone within the Savage Dolomite.

A total of 10 panned concentrates were taken from Guthries, Unnamed and Non Such Creeks. Some crystalline Au and both Fe and Cu sulphides were noted.

A total of 9 rock chips were taken with results generally disappointing (max. Zn 1850 ppm).

A total of 8, -80 mesh stream sediment samples were taken, one sample was considered anomalous at 11 ppb Au.

4.3 Newdegate Creek EL 22/88

Aberfoyle-Cominex Brookside J.V. (1989-90)

Limited creek mapping was undertaken along Newdegate Creek and sections of Hoyles Creek in conjunction with a stream sediment survey over the mudstone/dolomite contacts at Bernafai Ridge and west of Tikkawoppa Plateau. The western extension of CRAE's Alpine Grid was also mapped.

No significant alteration occurred in any of the outcrops examined except for minor chlorite alteration in some of the Precambrian volcanoclastic facies.

The only mineralisation encountered appeared as stratabound pyrite and arsenopyrite in a structurally deformed sample of graphitic shale from the Precambrian Aurther Lineament complex in Hoyle Creek.

Only three rockchips were taken which is a reflection of both their abundance and interest. A total of 21, -80 mesh stream sediment samples were taken, results were generally disappointing (max. 0.021 ppm Au).

5. ENVIRONMENTAL REHABILITATION

The level of exploration on the three Licences was limited to stream sediment sampling, creek mapping, rock chip sampling and soil sampling.

No grids were established and only existing tracks were used for access.

Only bio-degradable flagging tape was used and any litter was removed on completion of the work.

As there was no disturbance to the environment there was no requirement to rehabilitate any areas.

6. SCHEDULE OF REPORTS

6.1 Corinna EL 35/85

Granted April 1986

Reports

- April 1987 - Study on the genesis of silica flour and its potential in the Corinna district (EL's 37/82, 57/83 and 35/85) western Tasmania.
Author Dr. R. R. Large 87-2655
- March 1988 - Annual Report EL 35/85 including mineral leases 98-102M/84.
Author Dr. R. R. Large 88-2787
- March 1989 - Annual Report EL 35/85.
Author H. D. Nolan 89-2934
- April 1990 - Report on Exploration to 20 April 1990
EL 35/85.
Author R. J. Henham 90-3108
- Aug 1990 - Final Report on Exploration.
Brookside Joint Venture.
ML's 98-102M/84
EL 35/85
EL 22/88
EL 57/83
Author R. J. Henham 90-3191A.

*All to be checked
Dated*

6.2 Mount Donaldson EL 57/83

Transferred by Geopeko to H. D. Nolan January 1985

Reports

- April 1987 - Study on the genesis of silica flour and its potential in the Corinna district (EL's 37/82, 57/83 and 35/85) western Tasmania.
Author Dr. R. R. Large 87-2655
- Jan 1988 - Annual Report EL 57/83. 88-2767
Author Dr. R. R. Large
- Dec 1988 - Annual Report EL 57/83. 88-2887
Author H. D. Nolan
- Dec 1988 - Partial Relinquishment EL 57/83. 88-2886
Author H. D. Nolan
- Dec 1989 - Report on Exploration to 12 Jan 1990
EL 57/83. 89-3066
Author R. J. Henham
- Aug 1990 - Final Report on Exploration.
Brookside Joint Venture.
ML's 98-102M/84
EL 35/85
EL 22/88
EL 57/83
Author R. J. Henham

All to other files
D.H.D.

6.3 Newdegate Creek EL 22/88Reports

- Sept 1989 - Report on Exploration to 14 Oct 1989.
Author R. J. Henham 89-3015
- Aug 1990 - Final Report on Exploration.
Brookside Joint Venture.
ML's 98-102M/84
EL 35/85
EL 22/88
EL 57/83
Author R. J. Henham 90-31914

All to other files

APPENDIX A

Exploration During Final Reporting Period

Aberfoyle Resources Limited
EXPLORATION DIVISION

BROOKSIDE JOINT VENTURE

CORINNA DISTRICT, WESTERN TASMANIA

ML's 98-102M/84 Brookside, EL 35/85 Corinna,
EL 22/88 Newdegate Creek and EL 57/83 Mt. Donaldson.

FINAL REPORT ON EXPLORATION

TO 1st AUGUST, 1990

DISTRIBUTION

DEPT. RESOURCES & ENERGY	1/4
H.D. & A.N. NOLAN	2/4
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ABERFOYLE - BURNIE	4/4

COPY NO.

PREPARED BY:

R.J. HENHAM,
GEOLOGIST.

ISSUED BY:

D.B. WALLACE,
REGIONAL MANAGER.

AUGUST, 1990.

C O N T E N T S

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4. CONCLUSIONS	4
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6. REFERENCES	6

A P P E N D I C E S

- A. ASSAY RESULTS
 - A.1 DIV. OF MINES AND MINERAL RESOURCES DRILLHOLE COREGRINDS
 - A.2 LOW-LEVEL Au ANALYSIS
- B. PETROLOGICAL REPORTS - DR. A. CRAWFORD
- C. FLUID INCLUSION STUDY - KHIN ZAW, CODES

P L A T E S

- BKS 8 / BROOKSIDE JV LOCALITY PLAN 1:100,000 SCALE
- BKS 9 / BROOKSIDE JV CORINNA DISTRICT DOLOMITES - GOLD VS SiO₂
- BKS 10 / BROOKSIDE JV CORINNA DISTRICT DOLOMITES - GOLD VS CaO
- BKS 11 / BROOKSIDE JV CORINNA DISTRICT DOLOMITES - ROCKCHIP SAMPLE LOCATIONS

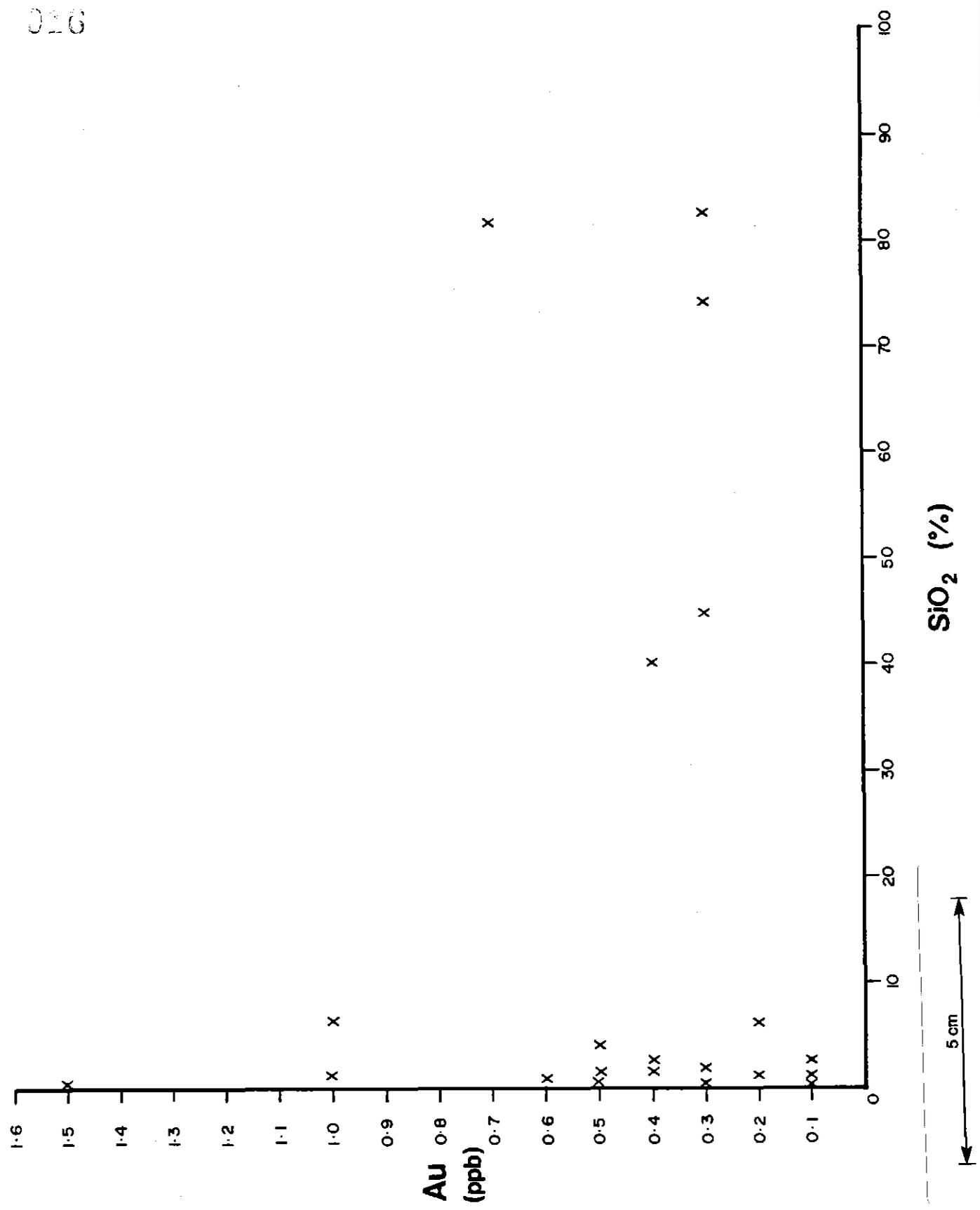
1. LOW-LEVEL Au ANALYSIS

A total of 24 samples of dolomite from throughout the Corinna district were selected for low-level Au determination. The samples were selected so as to represent the various styles of silicification present in dolomites of this area (see Plate BKS 11 for sample locations). Au analyses were performed by X-Ray Assay Laboratories in Toronto, Canada, using a radiochemical neutron activation technique (Large & Stoltz (1988)).

The same samples were also assayed for SiO_2 and CaO content. It was hoped results from this work would suggest a positive correlation between SiO_2 content, depletion in CaO content and increase in Au. Such a correlation could be seen as evidence to suggest the regional silicification of dolomites in the Corinna District may have also introduced precious metals during hydrothermal replacement of carbonate.

Results from this work were disappointing with no correlation observed between Au and either SiO_2 or CaO (see Plates BKS 9 & 10). For assay results see Appendix A.2.

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Aberfoyle Resources Limited
EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date

NORTH WEST TASMANIA
BROOKSIDE JOINT VENTURE
CORINNA DISTRICT DOLOMITES
GOLD vs SILICA CONTENT

Compiled : RJH
 Drawn : RJH
 Traced : RJE
 Checked :

Location Code :

Scale : As shown

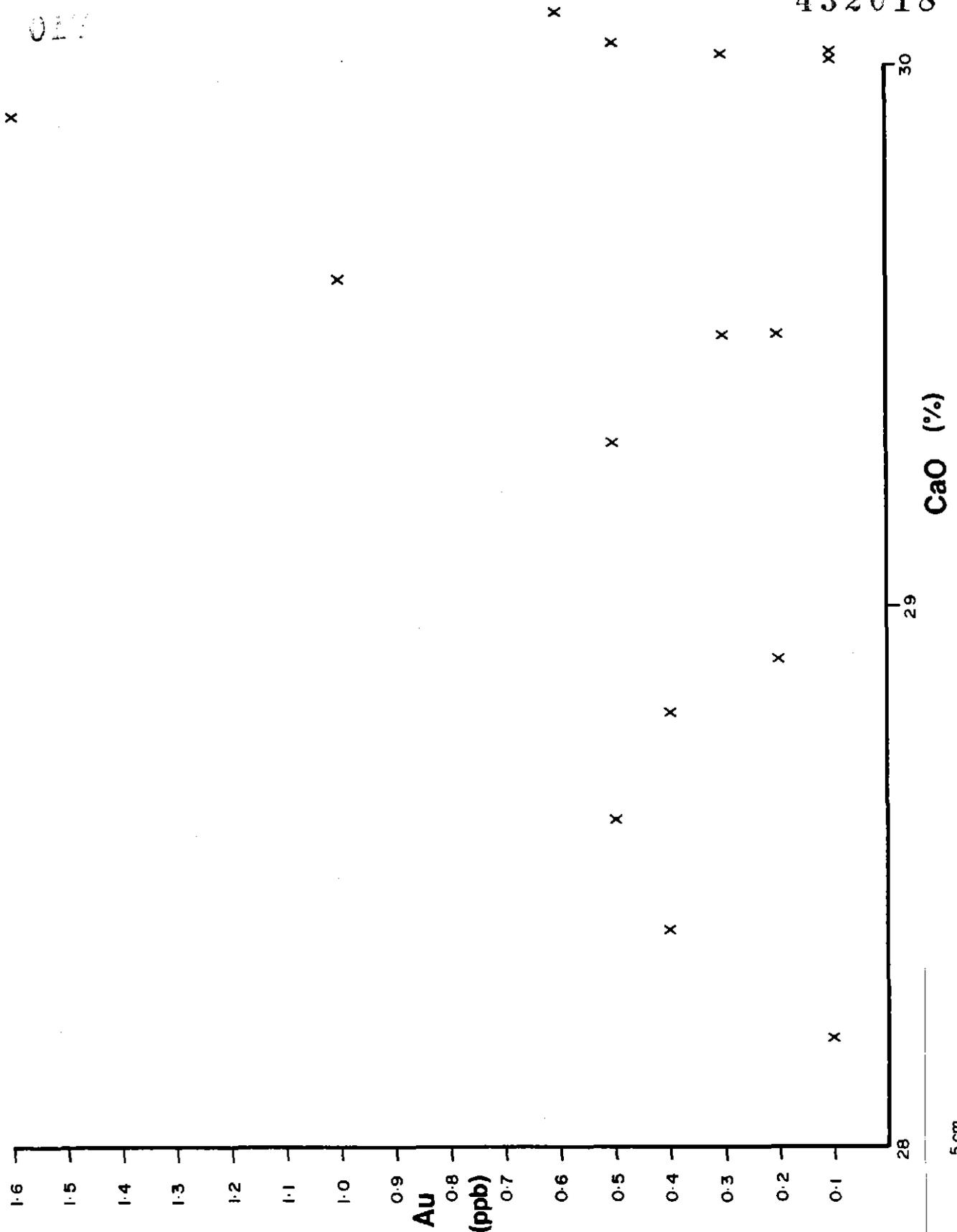
Date : August , 1990

Plate No. : BKS 9

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Aberfoyle Resources Limited
EXPLORATION DIVISION

REVISIONS			
Init.	Date	Init.	Date

NORTH WEST TASMANIA
BROOKSIDE JOINT VENTURE
CORINNA DISTRICT DOLOMITES
GOLD vs CaO CONTENT

Compiled :	RJH
Drawn :	RJH
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Checked :	

Location Code :

Scale : As shown

Date : August, 1990

Plate No. : BKS 10

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2. FLUID INCLUSION STUDIES

A number of dolomite samples representing the various styles of silicification present in the Corinna District were submitted to Khin Zaw at the Centre for Ore Deposit and Exploration Studies at the University of Tasmania, Hobart. These samples were to be examined for fluid inclusions and the temperatures of homogenisation and fluid chemistry determined. A number of samples of crystalline gold from the Brookside Prospect were also submitted for microprobe analysis to determine trace element geochemistry.

Results from this study have confirmed earlier work by Allen (1988) which suggested fluid inclusion temperatures up to 313°C. Evidence of boiling however was not detected, precluding the possibility of an epithermal event causing the intense regional silicification of dolomite.

Zaw suggests a progressive cooling of the hydrothermal system in which earlier quartz/carbonate veins appear to have formed from higher temperature fluids of approximately 300°C. These veins were followed by pervasive silica replacement of carbonate at a somewhat cooler temperature range between 150-250°C. The disaggregation of the silicified dolomite to form silica flour can be related to secondary inclusions which yielded filling temperatures of <150°C. These secondary inclusions were apparently misidentified as primary inclusions by Piaszczyk (1989) thus explaining his lower than expected homogenisation temperatures of 125±4°C.

The fluids were enriched in CO₂ suggesting a magmatic source to the fluids, although fluids of metamorphic origin cannot be ruled out.

Microprobe analysis of the gold grains results in average fineness of the crystalline gold of approximately 920. Only minor amount of Hg and As were detected.

Locations for all samples other than drillcore are submitted with Khin Zaw's report in Appendix C.

3. DEPARTMENT OF RESOURCES AND ENERGY DRILLING

Two diamond drillholes were collared at silica flour Sites 1/2 and 3, by the Division of Mines and Mineral Resources in early 1990. The purpose of this drilling was to assist with the geological interpretation of the Precambrian Sigma Group in the Corinna region and to ascertain the thickness and possible mode of emplacement of the silica flour deposits.

With permission from the Department both holes were coreground and submitted for Cu, Au, As, Sb, Hg, SiO₂, and CaO. Coregrind intervals and analysis are given in Appendix A.1. Approximate collar positions are shown on Plate BKS 11.

Both holes were collared in the silica flour deposits and intersected several metres of flour before reaching bedrock. With the exception of Sample No. 431581 all samples taken were from the bedrock zone. Summary logs for both holes are as follows.

Borehole 1: Site 1/2

0.0-46.21m	Silica flour with varying amounts of Fe-oxide and organic contamination. Some lacy agate float. Poor core recovery.
46.21-57.21m	Silicified dolomite. Rubbly, broken core. Poor recovery.
57.21-75.12m (EOH)	Green-grey volcanic mudstones and shales. Minor intersection of siliceous, possibly dolomitic, rubble at bottom of hole.

Borehole 2: Site 3

0.0-54.68m	Silica flour with varying concentrations of organic and Fe-oxide contamination. Some lacy agate float.
54.68-79.68m (EOH)	Yellow-grey silicified dolomite with patches of lacy agate veining and brecciation. Minor amounts of disseminated sulphides, most probably pyrite.

The results for the metallic elements were disappointing with none of samples considered anomalous. The high Cu of 1313 ppm in Sample No. 431581 from Borehole No. 2 is not considered of significance as it was a point sample taken from organically contaminated silica flour.

Sample No. 431583, a brecciated and partially silicified dolomite, taken from approximately 65.0m in Borehole 2 was selected for thin section preparation and examination. The brecciation appears to be related to low temperature diagenetic processes in which silica has invaded fractures in the original dolomite. Subsequent leaching, most likely by humic acid enriched groundwater, has disaggregated the silica grains by removing minor amounts of interstitial carbonate. See Appendix B for details.

Results from a sample of weathered lacy agate veining (Sample No. 431582) taken from a DMR hole drilled at the Pieman River in the proximity of the Corinna township (actual collar location uncertain) were also negative

4. CONCLUSIONS

1. Results from the low-level analysis of silicified dolomites from the Corinna District suggest there is no correlation between Au and SiO₂ or CaO content in the samples tested.
2. Fluid inclusion studies have identified the intense regional silicification of dolomites to have resulted from hydrothermal fluids with temperatures varying from 150-250°C. Although temperatures of this magnitude are known to exist in the Carlin style deposits of Nevada, the poor correlation between silica and gold in samples of silicified dolomite from the Corinna District downgrades the importance of the homogenisation temperatures recorded.
3. Results from coregrinds taken from Department of Minerals and Energy drillcore were negative with none of the samples considered anomalous for the elements tested.
4. The anomalous Cu, Au, As, Sb and Hg in soils at the Brookside Prospect remains unexplained. It is possible the source of this anomalism is somewhat distant from the Brookside Prospect itself. Given the higher homogenisation temperatures recorded from inclusions in early stage silica/carbonate veining in the dolomites and their greater affinity to transport precious metals, it is possible these veins may be the source to both the crystalline gold and anomalous soil geochemistry.
5. The intensive regional silicification of dolomite, although of probable magmatic origin and of sufficient temperatures to transport precious metals, is most likely the result of a "gold poor" hydrothermal system.

5. RECOMMENDATIONS

1. It is recommended Aberfoyle withdraw from the Brookside Joint Venture. Intensive exploration has failed to generate a target of worthy of further expenditure.

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APPENDIX A
ASSAY RESULTS

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APPENDIX A.1

DIVISION OF MINES AND MINERAL RESOURCES DRILLHOLE COREGRINDS

DEPARTMENT OF RESOURCES AND ENERGY & DMR DRILLING

Drillhole No.1: Site 1/2

Sample No.	Sample Type	Depth/Interval
431576	Coregrind	46.21-57.12m
431577	"	57.12-75.12m

Drillhole No. 2: Site 3

Sample No.	Sample Type	Depth/Interval
431581	Point	47.18m
431578	Coregrind	54.68-73.0m
431579	"	73.0-77.5m
431580	"	77.5-79.68m
431582	Point	approx. 65.0m

DMR Hole: Corinna

Sample No.	Sample Type
431583	Point

432027

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999

52 Murray Road, Welshpool, W.A. 6106

Telex AA92560

FAX: 004 31 8890

ANALYTICAL REPORT No. 23.3.08.07147

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

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RESULTS TO

R. de Bonford
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Exploration Division
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RESULTS TO

REMARKS

BROOKSIDE
DOM HOLE
DMR HOLE

STATE OF SAMPLES	ANALYSIS — PREPARATION	ANALYSIS — METHOD
whole core WC	perchloric acid A1	atomic absorption AAS
split core SC	hydrochloric acid A2	x-ray fluorescence XRF
cutting CU	nitric acid A3	spectrophotometry SPEC
rock Ro	aqua regia A4	colorimetry COL
oil SO	nitric-perchloric A5	chromatography CHR
pulp PU	HF mixture A6	titration TTN
water WA	HF under pressure A7	other chemicals means CHEM
issue TI	fusion A8	miscellaneous MISC
stream sediment SS		fluorescence FLUOR
heavy mineral HM		inductively coupled plasma ICP

AUTHORISED OFFICER *Jenkins*

ANALABS

432028

Division of Incharge Inspection and Testing Services Australia Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

23.3.08.07147

04/07/90

9891

1 OF 1

TUBE No.	SAMPLE No.	Cu	Au	AuChk	As	Sb	Hg	CaO	SiO2
1	431576	117	<0.008	<0.008	<2	<3	0.020	0.05	79.5
2	431577	122	<0.008	-	<2	3	0.030	0.19	50.0
3	431578	44	<0.008	-	<2	<3	0.050	17.20	25.2
4	431579	7	<0.008	-	<2	<3	0.005	24.90	15.6
5	431580	17	<0.008	-	<2	<3	<0.005	21.40	34.5
6	431581	1313	<0.008	-	15	<3	0.050	15.80	63.5
7	431582	7	<0.008	-	<2	<3	0.035	3.90	77.5
8	431583	6	<0.008	-	<2	4	0.020	0.06	40.0
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	5	0.008	0.008	2	3	0.005	0.01	0.1
24	UNITS	ppm	ppm	ppm	ppm	ppm	ppm	%	%
25	METHOD	101	309	309	401	401	122	104	109

Results in ppm unless otherwise specified
 T = element present, but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

AUTHORISED OFFICER

Janet...

199

APPENDIX A.2
LOW-LEVEL Au ANALYSIS

SAMPLES SENT TO X-RAY ASSAY LABS FOR LOW-LEVEL Au ANALYSIS

Drillcore

Sample No.	Depth	Drillhole (see Plate BKS 11)
431583	approx. 65.0m	Dept. Resources and Energy. Borehole 2
431584	21.0m	Aberfoyle. DDH BRK-1
431585	26.7m	" " "
431586	8.1m	Aberfoyle. DDH BRK-2
431587	32.9m	" " "
431588	4.5m	Aberfoyle. DDH BRK-3
431589	6.0m	" " "
431590	6.7m	" " "
431591	8.0m	" " "
431592	9.4m	Aberfoyle. DDH BRK-5

Rockchips

Sample No.	Location
431593-595	Silica Flour Site 4 (see Plate BKS 11)
CX8622-24,26-33	Regional Dolomite Samples (see Plate BKS 11)

Standards

Sample No.
431596
CX8625



X-RAY ASSAY LABORATORIES

A DIVISION OF SGS SUPERVISION SERVICES INC.

1885 LESLIE STREET • DON MILLS, ONTARIO M3B 3J4 • CANADA
TEL: (416)445-5755 TELEX: 06-986947 FAX: (416)445-4152

030 432031

CERTIFICATE OF ANALYSIS

REPORT 12231

TO: ABERFOYLE RESOURCES LIMITED
ATTN: R. J. HENHAM
39 RIVER ROAD
WIVENHOE, TASMANIA 7320
AUSTRALIA

CUSTOMER No. 1948

DATE SUBMITTED
8-Jun-90

REF. FILE 7646-s6

Total Pages 1

26 ROCKS

AU PPB	METHOD NA	DETECTION LIMIT 0.1
--------	--------------	------------------------

*** UNLESS INSTRUCTED OTHERWISE WE WILL DISCARD PULPS 90 DAYS ***
AND REJECTS 30 DAYS FROM DATE OF THIS REPORT

DATE 03-JUL-90

CERTIFIED BY 

Philip Boctor, Laboratory Manager



001

SAMPLE AU PPB

431583	0.4
431584	0.1
431585	0.4
431586	1.0
431587	0.5
431588	0.4
431589	0.2
431590	0.5
431591	0.6
431592	0.3
431593	0.3
431594	0.7
431595	0.3
431596	4.1
CX8622	1.0
CX8623	1.6
CX8624	<0.1
CX8625	4.2
CX8626	0.1
CX8627	0.3
CX8628	0.5
CX8629	<0.1
CX8630	0.3
CX8631	0.1
CX8632	0.2
CX8633	0.1

ANALABS

432033

Phone (09) 458 7999

A division of MacDonald Hamilton & Co. Pty. Ltd.
52 Murray Road, Welshpool, W.A. 6106

Telex AA92560

FAX: 004 31 8890

ANALYTICAL REPORT No. 23.3.08.07148

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

ORDER No:	PROJECT
9892	
DATE RECEIVED	RESULTS REQUIRED
06/06/90	ASAP

No. OF PAGES OF RESULTS

DATE REPORTED

No. OF COPIES

TOTAL No. OF SAMPLES

1	28/06/90	1	12
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DATE OF SAMPLES	REFER TO ANALYSIS SECTION	PRE-TREATMENT							ANALYSIS			
		DRY	CRUSH	SPLIT	PUL-VERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHC.	
	431,584/595		RC Prep: 018							CaO, SiO2/104		

RESULTS TO

R. de Bonford
Aberfoyle Resources Limited
Exploration Division
P.O. Box 952
Burnie Tasmania 7320

RESULTS TO

REMARKS

SiO2 CaO
ON LOW AL
DETECTION SAMPS
SENT TO CANADA

STATE OF SAMPLES	ANALYSIS — PREPARATION	ANALYSIS — METHOD
whole core WC	perchloric acid A1	atomic absorption AAS
split core SC	hydrochloric acid A2	x-ray fluorescence XRF
cutting CU	nitric acid A3	spectrophotometry SPEC
rock Ro	aqua regia A4	colorimetry COL
soil SO	nitric-perchloric A5	chromatography CHR
pulp PU	HF mixture A6	titration TTN
water WA	HF under pressure A7	other chemicals means CHEM
tissue TI	fusion A8	miscellaneous MISC
stream sediment SS		fluorescence FLUOR
heavy mineral HM		inductively coupled plasma ICP
	cold acid CA	
	specific sulphide SS	
	other mixed acids Ma	
	alkaline attack AA	
	volatilization VO	
	ignition IG	
	pressed powder (XRF) PP	
	glass fusion (XRF) GF	

AUTHORISED OFFICER *Jenkins*

ANALABS

A Division of Incharge Inspection and Testing Services Australia Pty Ltd.

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No

PAGE

23.3.08.07148

28/06/90

9892

1 OF 1

TUBE No.	SAMPLE No.	CaO	SiO2						
1	431584	28.20	2.40						
2	431585	28.80	2.40						
3	431586	29.60	1.20						
4	431587	28.60	3.70						
5	431588	28.40	1.40						
6	431589	29.50	1.00						
7	431590	29.30	1.40						
8	431591	30.10	0.80						
9	431592	29.50	1.70						
10	431593	0.54	74.30						
11	431594	<0.01	81.60						
12	431595	<0.01	82.70						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	DETECTION	0.01	0.01						
24	UNITS	%	%						
25	METHOD	104	104						

Results in ppm unless otherwise specified
 T = element present; but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

AUTHORISED OFFICER

Gentian

ANALYTICAL DATA

432035

SAMPLE PREENT ORDER No. PAGE FIX REPORT NUMBER REPORT DATE CLIENT ORDER No. PAGE

		1 of 2			999.01.08.04302				25/03/87			2 of 2	
TUBE No.	SAMPLE No.	Al2O3	CaO	Fe2O3	K2O	LOI	MgO	MnO	Na2O	P2O5	SiO2	TOTAL	TiO2
1	8701	-	-	-	-	-	-	-	-	-	-	-	-
2	8622	1.55	27.000	0.52	0.070	44.00	20.70	0.040	0.040	0.213	6.25	100.61	0.030
3	8623	0.40	29.900	1.26	0.060	46.40	21.10	0.080	0.025	0.247	0.40	99.89	0.020
4	8624	0.50	30.000	0.11	0.040	46.60	22.00	0.010	0.005	0.082	1.00	100.70	<0.010
5	8625	0.35	30.100	0.26	0.040	0.20	0.10	0.010	0.015	0.005	98.50	99.62	0.050
6	8626	0.25	30.200	0.24	0.010	46.70	22.00	0.040	0.005	0.179	0.25	99.87	<0.010
7	8627	0.20	17.100	0.38	0.010	25.90	10.80	0.020	0.020	0.183	44.70	99.31	<0.010
8	8628	0.15	30.400	0.06	0.010	46.90	21.10	<0.010	0.015	0.050	0.40	99.10	<0.010
9	8629	0.15	30.000	0.14	0.020	46.90	22.60	0.020	0.015	0.110	0.45	100.36	<0.010
10	8630	0.10	30.200	0.17	0.010	47.10	22.40	0.040	0.015	0.087	0.10	100.22	<0.010
11	8631	0.15	30.200	0.13	0.010	47.10	22.00	0.020	0.015	0.069	0.30	99.99	<0.010
12	8632	0.15	28.900	0.12	0.030	44.00	19.90	0.020	0.005	0.066	6.25	99.44	<0.010
13	8633	0.15	30.200	0.39	0.070	47.10	22.00	0.020	0.015	0.101	<0.05	100.05	<0.010
14													
23	DETECTION	0.05	0.100	0.01	0.010	0.10	0.10	0.010	0.005	0.001	0.05	0.10	0.010
24	UNITS	%	%	%	%	%	%	%	%	%	%	%	%
25	METHOD	408	408	408	408	408	408	408	408	408	408	408	408

Results in ppm unless otherwise specified
 T = element present; but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

AUTHORISED OFFICER

[Signature]

unless otherwise specified present; but concentration too low to measure concentration is below detection limit not determined

AUTHORISED OFFICER

[Signature]

0034

APPENDIX B

PETROLOGICAL REPORTS - Dr. A. CRAWFORD

036

432037

SAMPLE NUMBER: 431583

SUMMARY:

This is a brecciated dolomite with saccharoidal chalcedonic silica filling fractures; it is believed to be a low-T diagenetic process that produced this sample, not epithermal alteration.

HAND SPECIMEN:

This is a fractured and silicified dolomite with clear chalcedonic silica sealing fractures.

THIN SECTION:

This rock is composed of two minerals, dolomite and quartz. The dolomitic section is composed of strongly fractured polycrystalline fine-grained dolomite with grainsize from 0.05-0.1mm, that contains irregular areas in which it has recrystallized to exceptionally fine-grained dolomite. The dolomite is criss-crossed by fractures in which saccharoidal silica has crystallized. These quartz (chalcedony) areas reach one than 1cm thick in places, and are quite clean and clear. The sugary texture of the quartz in fracture fillings coarsens up to ragged and strained larger grains (to around 1mm across) in the central portions of some veins. I don't believe that the quartz is replacing dolomite in this slide: rather, it has been introduced into strongly fractured and brecciated dolomite.

I have discussed these dolomite-silica rocks with Simon Stephens, our lapidarist, who is quite knowledgeable about these rocks and this area. I suggest you speak to him for detailed comments, but he has come up with the following thoughts. He believes that the silica (chalcedony) is introduced into fractured dolomites during diagenesis, and dehydrates to the sugary banded, almost agate-like material often seen in these rocks. Silica is mobilized downward in the section during Tertiary weathering and peneplanation, and is later disaggregated by some unknown process (that doesn't even disrupt banding, but loosens grains one from the other) and this quartz is weathered and concentrated into the Corinna-type silica flour deposits. The process is low-temperature in the case of this sample, and most unlikely to be epithermal system-related. It is essentially a diagenetic, soil-forming process.

087

APPENDIX C

FLUID INCLUSION STUDIES - KHIN ZAW

008

SAMPLES OTHER THAN DRILLCORE SUBMITTED FOR FLUID INCLUSION STUDY

Sample No.	Description	Location
431313	Colloform Quartz/Pyrite Vein	Fogary's Creek EL 35/85
431314A-F	Lacy Agate (Silicified Dolomite Float)	Silica Flour Site 3
431461	Quartz Vein Float in Cu, Au, As, Sb & Hg Anomalous Soils	Brookside Workings
431462	Crystalline Gold Grains	Brookside Workings
431583	Partially Silicified Dolomite Breccia	Dept. Resources & Energy Borehole No. 2 @ approx. 65.0m

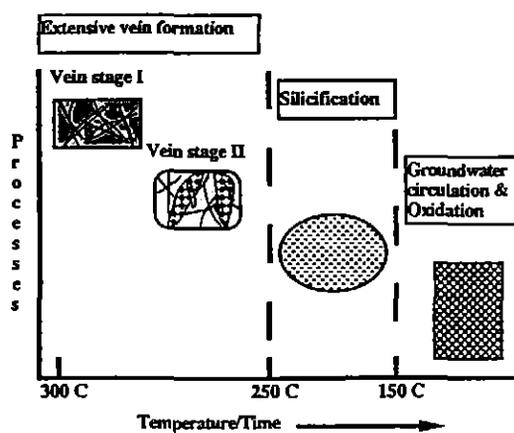


CENTRE FOR ORE DEPOSIT AND EXPLORATION STUDIES

A National Key Centre at the University of Tasmania

AN INVESTIGATION ON THE FLUID INCLUSION CHARACTERISTICS AND GOLD GEOCHEMISTRY OF SILICA FLOUR DEPOSIT, WESTERN TASMANIA

Submitted to:
ABERFOYLE RESOURCES LIMITED



Khin Zaw
Centre for Ore deposit and Exploration Studies
University of Tasmania
GPO Box 252C, Hobart

August 7, 1990

SUMMARY

Homogenisation temperatures up to 298° C were recorded in this study which verifies the high temperature nature of the fluids responsible for the formation of the Silica Flour deposit as reported by Allen (1988). The lower homogenisation temperature (125.5° ±4° C) obtained by Piaszczyk (1989) was possibly due to misidentification of the fluid inclusion types.

The fluids was enriched in CO₂. A magmatic source is considered likely (e.g. Devoinan granites), although fluids of metamorphic origin cannot be ruled out. No fluid inclusion evidence of boiling was found in this study. The high temperature fluid characteristics suggest that precious metals could have been transported in the fluids.

Freezing point measurement suggests that the Silica Flour forming fluids may have contained dissolved salts other than (e.g. CaCl₂ and MgCl₂) with a gross salinity ranges from 0.1 to 17.3 NaCl equivalent wt %. It is not known whether this salinity variation is due to true salinity variation in the hydrothermal fluids or due to the presence of additional dissolved salts and gases other which results in the formation of different gas clathrates to cause a change in depression of freezing points and, hence, gross salinity.

CAMECA microprobe analyses of gold grains from weathered dolomite in the Silica Flour deposit area indicate that Au content ranges from 91.23 to 98.35 wt % and the fineness (1000Au/Au+Ag wt %) values range from 890 to 951. The morphological characteristics of the gold grains in weathered dolomites from the Silica Flour deposit suggest that these grains were not transported too far away from the source region. The lack of Ag-rich rims in the gold grains also supports this interpretation.

INTRODUCTION

The Silica Flour deposits are located in the Corinna district, western Tasmania. Geological relationships and the style of mineralisation have been described by Spry (1964), Large (1987), Wallace (1988), Piaszczyk (1989), Henham (1990) and Turner (in press). The silica flour occurs as pod-like bodies on the bedrock of dolomite which is a part of the Sigma Group of the Upper Proterozoic age.

Purpose of This Study

Fluid inclusion homogenisation temperature of the quartz samples from the Silica Flour deposit were measured by Allen (1988) and Piaszczyk (1989) but gave differing temperature ranges. Allen (1988) reported that generation II drusy quartz from the Silica Flour deposit yielded homogenisation temperature of 240° C-313° C, whereas Piaszczyk (1989) measured homogenisation temperature of $125.5^{\circ} \pm 4^{\circ}$ C for the inclusions in lacy agate samples from the deposit.

The primary purpose of this study is to determine reasons for the differing temperature ranges and to further understand the thermal history of the Silica Flour deposit and its relationships to the transport and deposition of precious metal in the area. The other purpose of this study is to investigate the geochemistry and fineness of the gold grains in the weathered dolomite in the area by electron microprobe and their morphology by SEM techniques.

Background

Several gold grains found in the weathered dolomites were provided by R. J. Henham and a total of (21) samples from the Silica Flour deposit were collected by author. The samples include silica flour samples with lacy agate texture and diamond drill core samples of the silicified dark grey to grey dolomite samples which were cut by various sets of quartz±carbonate vein networks. Two vein sets have been recognised: (1) early thin veinlets of milky quartz±dolomite (<1 cm) which were cross-cut by (2) later thicker veins (>1 cm) with or without pink carbonates.

The carbonates in the veins appear to have been dissolved from the host silicified dolomite. The nature of the quartz±carbonates veins is diagrammatically shown in Fig. 1. This veining was followed by the extensive silicification of the dolomites and disaggregation of the silica flour. Quartz samples with lacy agate (crustiform) texture examined in this study display a wide variety of texture from banded, coarse drusy, colloform to fine-grained, interstitial aggregates, and in places the quartz with lacy agate texture is found in contact with silicified grey dolomite (Fig. 2).

Fluid Inclusion Study

Quartz and carbonate samples from the Silica Flour deposit were investigated and the description of fluid inclusion characteristics are shown in Appendices I and II and heating and freezing data presented in Appendix III.

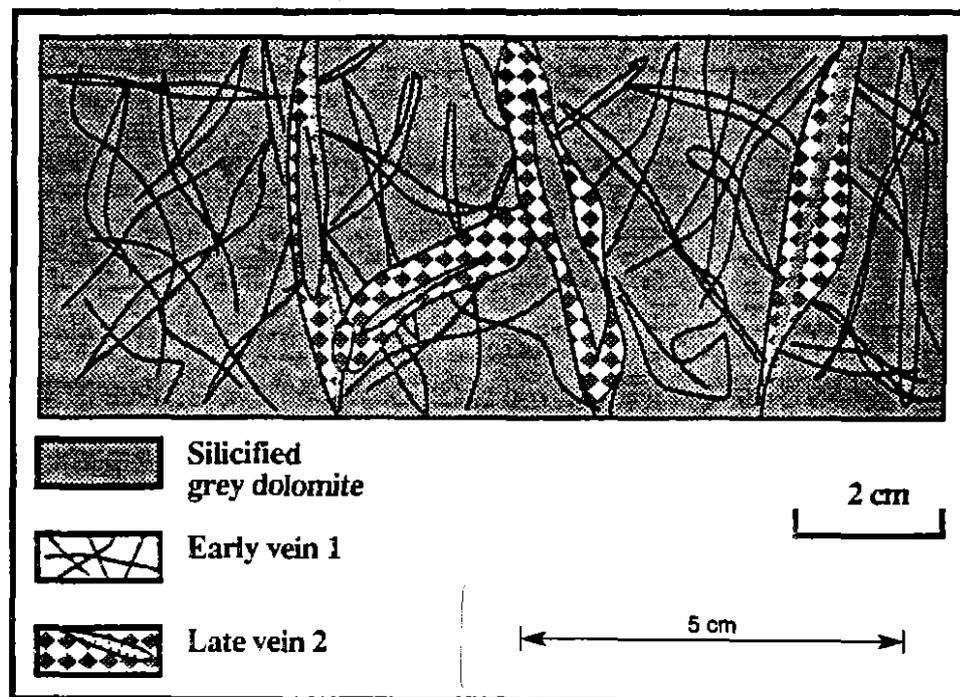


Fig. 1. A sketch showing the quartz±carbonate veining of the grey to dark grey dolomite samples of DDH2.

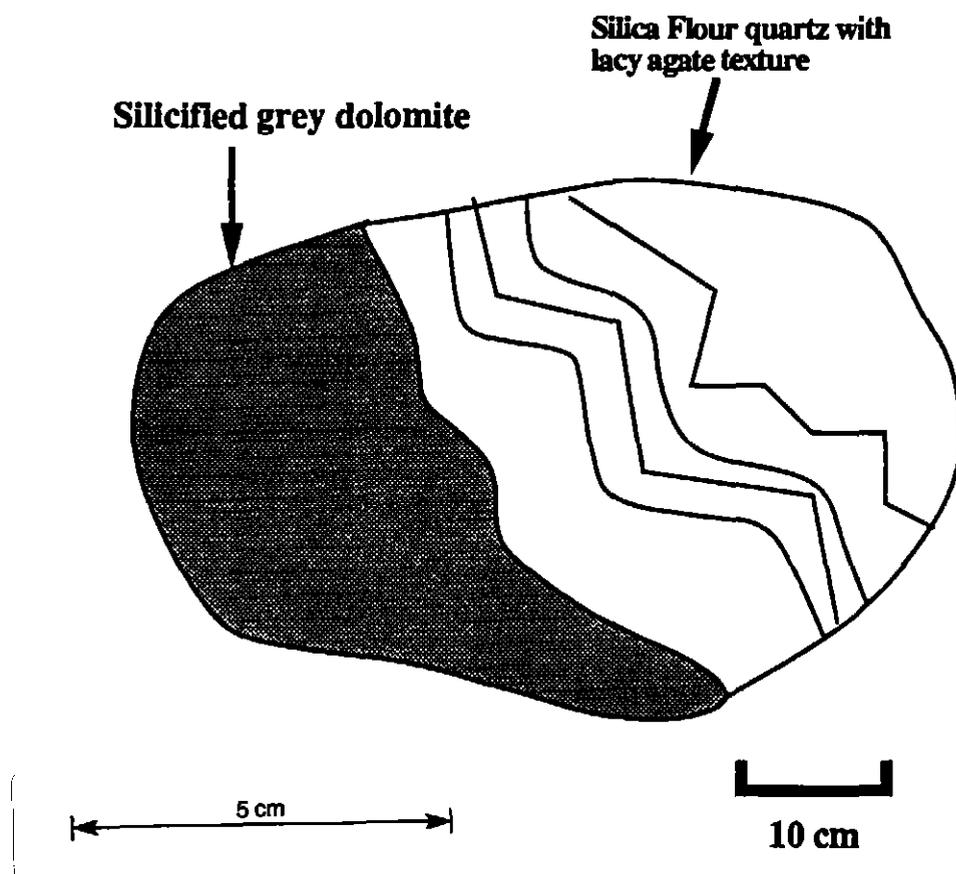


Fig. 2. A sketch showing quartz with lacy agate texture (crustiform texture) in contact with the silicified grey dolomite.

Method of Study

The methods used in this study are described elsewhere (e.g. Khin Zaw, 1984, 1987). A USGS heating/freezing stage was used and the stage was calibrated by means of synthetic fluid inclusions sets. The triple point of CO_2 (-56.6°C), freezing temperature of pure water (0.0°C), freezing point of 10 NaCl equivalent weight percent (-6.6°C), critical temperature of water (374.1°C) were applied. The temperature uncertainty was believed to be $\pm 0.1^\circ\text{C}$. During heating runs a heating rate of $2\text{-}3^\circ\text{C}/\text{minute}$ was applied but a warming rate of about $1^\circ\text{C}/\text{minute}$ was maintained for the CO_2 -rich inclusions which were first supercooled with varying degrees of 5°C to $15^\circ\text{C}/\text{minute}$.

Doubly polished plates were examined in detail under the petrographic microscope prior to the heating and cooling experiments. Freezing experiments were done first to minimize stretching and decrepitation. The fluid inclusions were located under low magnification to

044

record their distribution, origin, and types of inclusions and to determine their spatial and temporal relationships. Phase relations were studied under the high power objectives.

The presence of CO₂ was determined by the techniques and criteria as reported by others (e.g. Collins, 1979). The most recognisable criteria in this study were (1) decrease in volume (or disappearance) of the vapour bubble upon cooling, (2) an irregular interface the gas bubble and the aqueous solutions due to gas hydrate crystals within the aqueous solutions, (3) motion of the gas bubble within the inclusions upon the decomposition of the gas hydrates, (4) gas hydrate crystals apparently in the gas bubble, but actually at the interface between the gas bubble and the aqueous solutions giving rough texture to the gas bubble and (5) platelike crystals of gas hydrates in the aqueous phase and the decomposition temperature.

However, the above criteria (2), (3), (4) and (5) are sometimes not reliably determined due to problems in recognition of hydrates as its refractive index is similar to that of the aqueous solutions and (6) the triple point of CO₂ (-56.6° C) was also used but this criteria also is not always observed particularly for smaller inclusions (<5 μm). The inclusions were freeze-dried and the last ice melting temperature (T_{m0ice}) was measured to calculate the salinity as equivalent NaCl weight percent from equation of Potter et. al., (1978).

As fluid inclusions in this study show evidence of CO₂, the apparent salinity obtained by the freezing of aqueous solutions for the inclusions will be higher than the actual salinity. In the CO₂-bearing inclusions, CO₂ hydrates can be formed upon cooling which extract CO₂ and H₂O from the solutions resulting in an increase in the apparent salinity. Thus, the two-phase, liquid and vapour inclusions which show CO₂ clathration (formation of CO₂ hydrates) were checked for the decomposition temperature of the hydrates, and salinity were determined using the equation of Bozzo et. al., (1973).

The heating and freezing experiments were done at least twice and reproducibility is believed to be better than ± 1° C. Inclusions which show evidence of necking or leakage were rejected.

Classification of inclusion types

For this study, fluid inclusions were classified based on the phases observable in the inclusions at room temperature. The fluid inclusions characteristics in quartz from the Silica Flour deposit are shown in Fig. 3. The following types of inclusions were observed during this study:

Type I: H₂O-dominated, two-phase, liquid and vapour inclusions which homogenise to liquid upon heating (Figs. 3A, 3B & 3C)

Type II: CO₂-bearing inclusions which contain CO₂ (Fig. 3D-G)

Type IIA: CO₂ vapour bubble and H₂O liquid which show evidence of CO₂ upon cooling and melting of solid CO₂ at -56.5° C

Type IIB: CO₂ liquid, vapour bubble and H₂O liquid with liquid CO₂ disappearing upon heating below 37.1° C, the critical temperature of liquid CO₂

Type III: Two-phase, liquid-rich inclusions with variable liquid and vapour ratios (Fig. 3H)

Both Type I and II inclusions may contain daughter minerals (e.g. see Fig. 3I). Fluid inclusions were also classified in a temporal sense as primary, secondary, and pseudosecondary relative to the time of trapping according to the criteria of Roedder (1984). The primary fluid inclusions can be positively selected according to other criteria such as their isolated occurrence as a single, solitary inclusions or group of inclusions away from other inclusions and fractures. Consistencies in homogenisation temperatures and liquid-vapour ratios together with negative crystal in form are used as supporting evidences to be primary in origin.

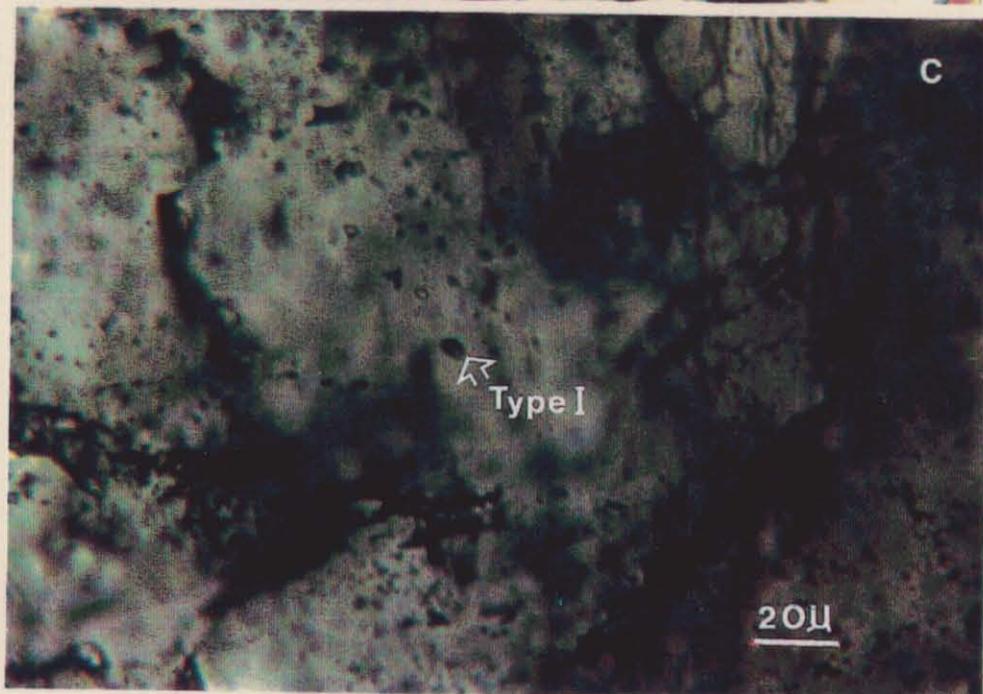
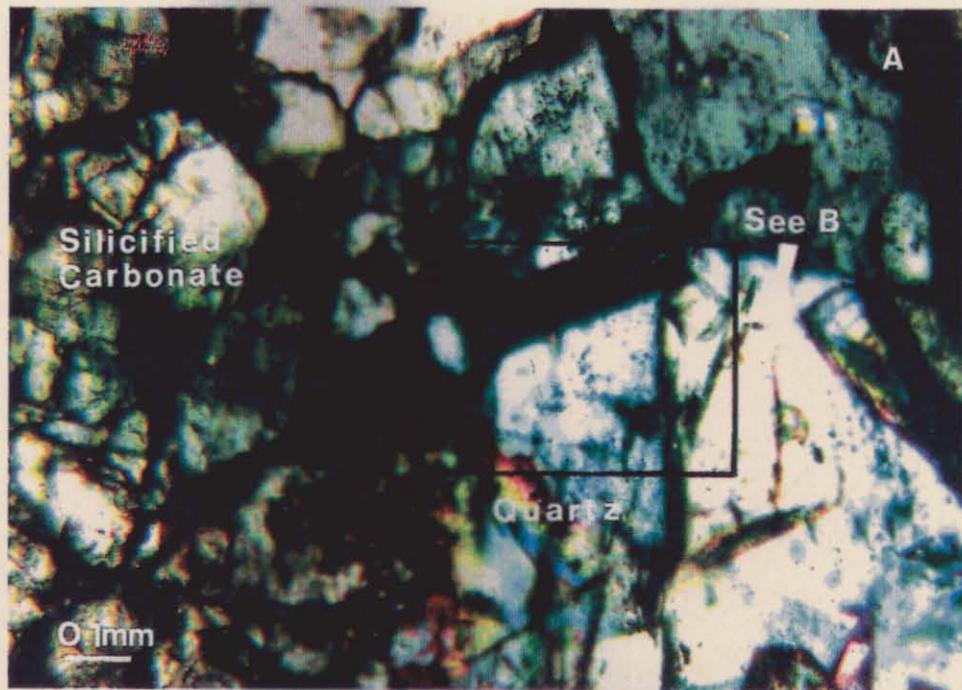
The Type IIA, CO₂-vapour rich and Type IIB, CO₂-liquid rich inclusions are also not readily distinguishable as they mostly occur in the dark grey, silicified dolomites and their poor optical clarity. The Type IIB, CO₂-liquid bearing inclusions (Fig. 2D-F) are very large and mostly occur in the dark grey silicified dolomite in contact with Silica Flour quartz. They sometimes occur along quartz or dolomite grains sealed by epoxy for grinding and polishing purpose. The origin of these inclusions are

Fig. 3A. Photomicrograph showing silicification of dolomite and array of primary inclusions which appears to lie along a growth zone in the core of the quartz crystal. Sample No. BRK2-11 @ 27.6m, Silica Flour deposit, western Tasmania.

Fig. 3B. Enlargement portion of the rectangle area in Fig. 3A showing primary, Type I, H₂O-dominated, two-phase, liquid and vapour inclusion in quartz. Sample No. BRK2-11 @ 27.6m, Silica Flour deposit, western Tasmania.

Fig. 3C. Photomicrograph showing primary, Type I, H₂O-dominated, two-phase, liquid and vapour inclusion in quartz. Sample No. BRK2-11 @ 27.6m, Silica Flour deposit, western Tasmania.

047



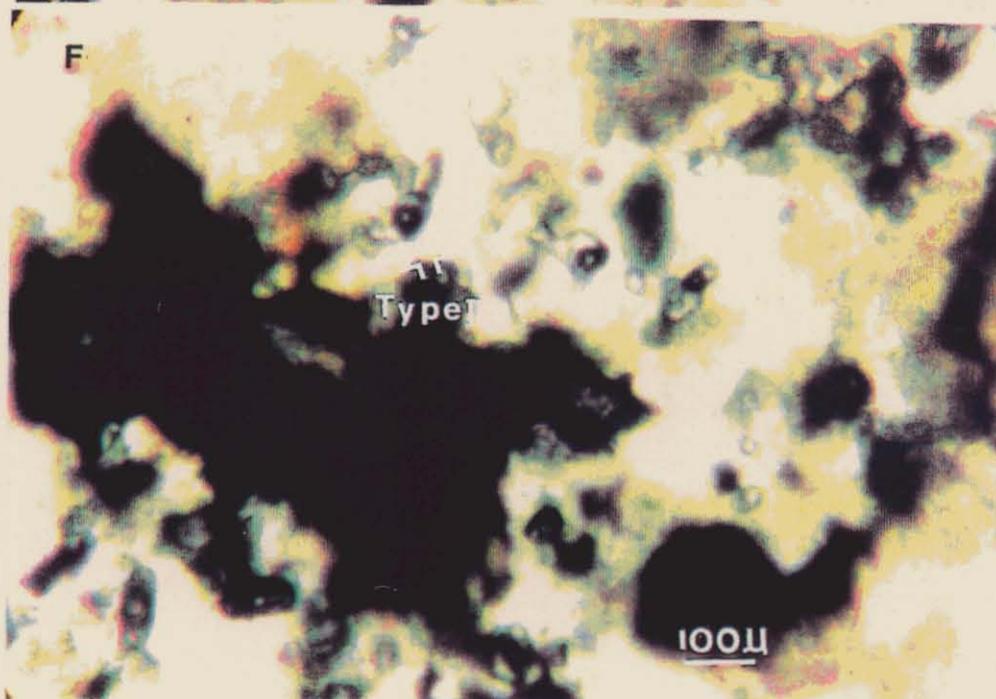
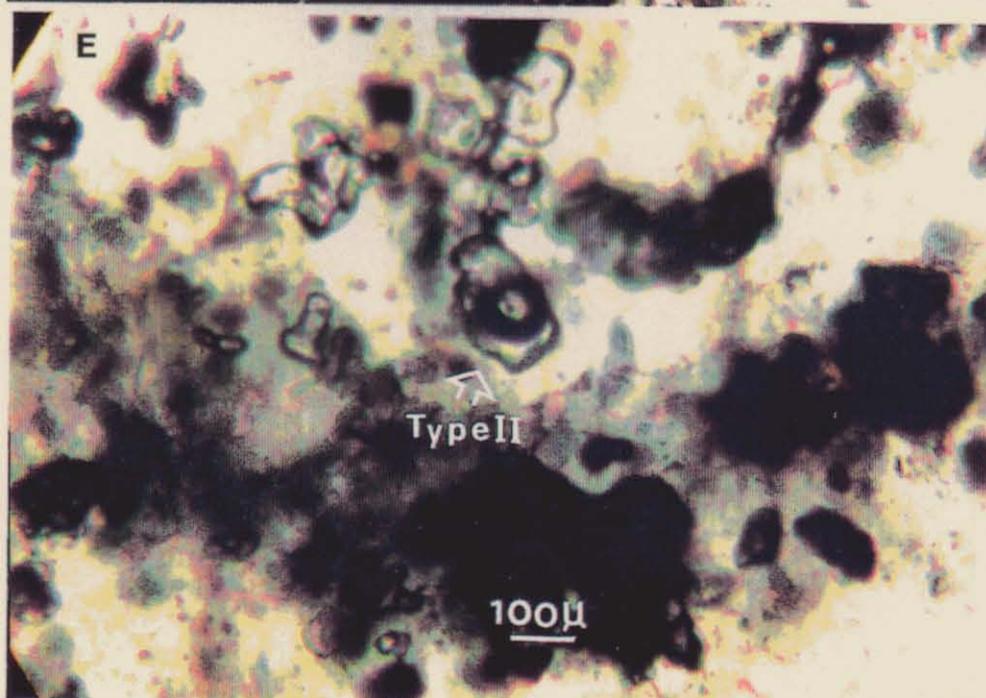
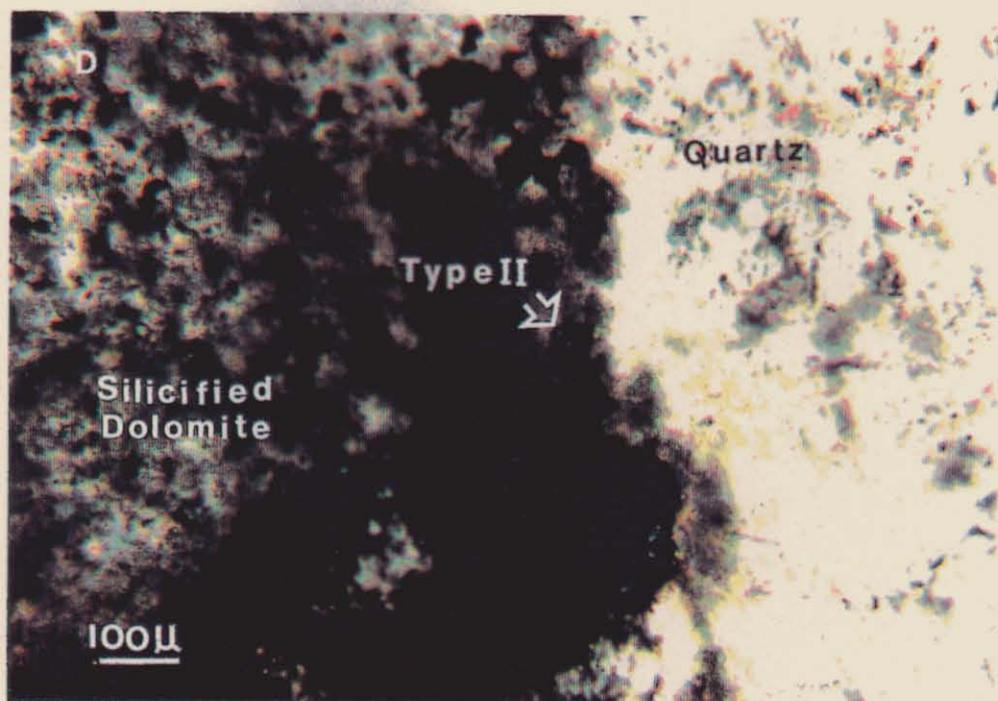
5 cm

Fig. 3D. Photomicrograph showing Type IIB, CO₂-liquid bearing inclusion in the silicified grey dolomite in contact with Silica Flour quartz with lacy agate texture. Sample No. 431314B. Note that these inclusions are confined to the dark grey silicified portion of the sample.

Fig. 3E. Photomicrograph showing Type IIB, CO₂-liquid bearing inclusion in the silicified grey dolomite in contact with Silica Flour quartz with lacy agate texture. Sample No. 431314B. Note dark rim of the inclusions possibly due to liquid CO₂.

Fig. 3F. Photomicrograph showing Type IIB, CO₂-liquid bearing inclusion in the silicified grey dolomite in contact with Silica Flour quartz with lacy agate texture. Sample No. 431314B.

049



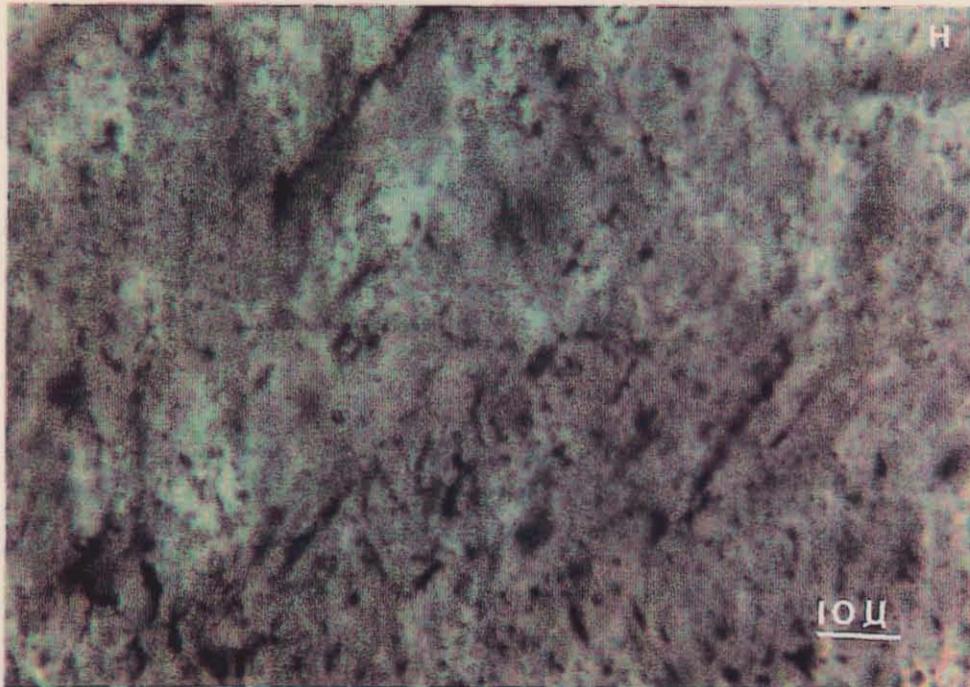
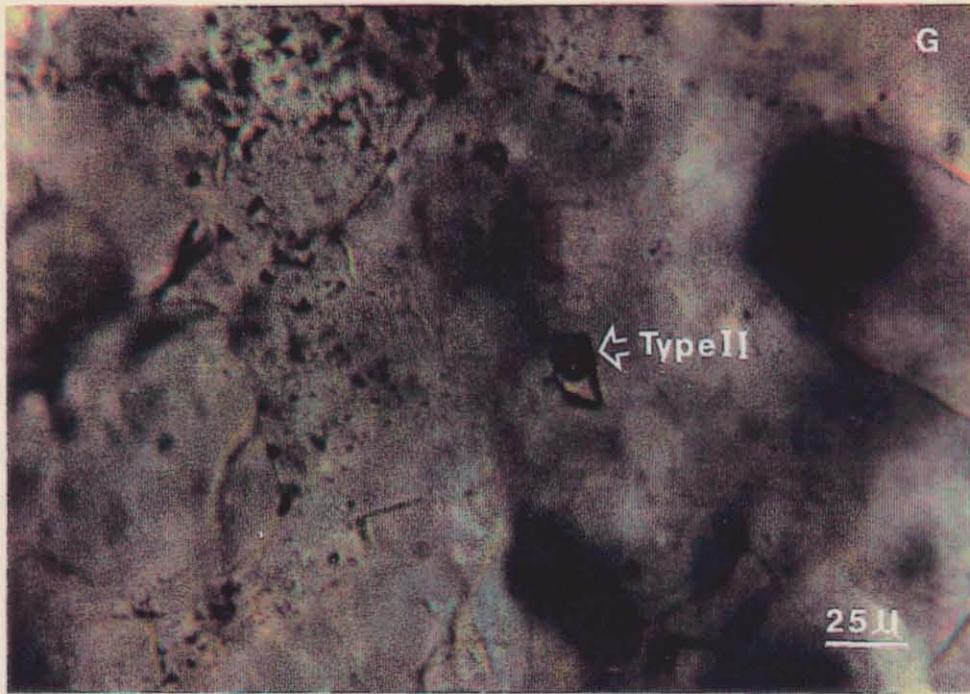
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th

Fig. 3G. Photomicrograph showing Type IIB, CO₂-liquid bearing inclusion in the silicified grey dolomite in contact with Silica Flour quartz with lacy agate texture. Sample No. 431314B.

Fig. 3H. Photomicrograph showing secondary, Type III, two-phase, liquid-rich inclusions in silicified grey dolomite. Sample No. BRK2-11 @ 27.6m, Silica Flour deposit, western Tasmania.

Fig. 3I. Photomicrograph showing Type I inclusion with unidentified daughter mineral possibly MgCl₂ ?. Sample No. 431314A. Note trails of liquid-rich Type III inclusions.

051



d.

unknown. Although the randomly oriented planes of secondary inclusions are the most abundant inclusion type in the quartz from the Silica Flour deposit, in places inclusions along growth zones which were believed to have been trapped during the crystal growth can be located and studied.

The fluid inclusions in the dolomite and calcite (carbonates) are mostly secondary in origin, less than 3 μm in size and not workable for fluid inclusions studies, whereas the fluid inclusions in quartz are large enough (5 μm to 25 μm in size) for fluid inclusions studies.

Homogenisation and decrepitation data

The Type I, H_2O -dominated, primary, two-phase, liquid-vapour inclusions in the quartz from the early thin *vein type I* cutting the grey dolomites gave a homogenisation temperature (hT) range of Th(L-V)-L of 229° C to 298° C, whereas the Type I and Type IIA, two-phase primary inclusions in the quartz from the later, larger *vein type II* cutting the early *vein type I* in the grey dolomite yielded homogenisation temperatures of 169° C to 211° C (see Fig. 4).

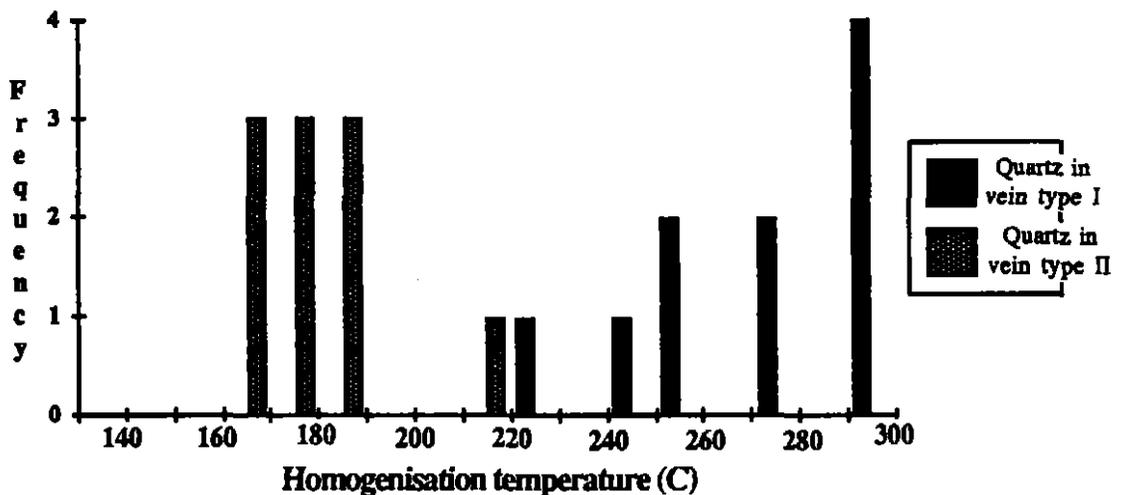


Fig. 4. Frequency-temperature distribution of homogenisation temperature for the Type I and II, primary, two-phase, liquid and vapour inclusions in quartz from the early thin vein type I and late vein type II which are cross-cutting the grey to dark grey dolomite from Silica Flour deposit, western Tasmania.

The Type I inclusions in Silica Flour quartz with lacy agate texture yielded homogenisation temperature between from 166° C to 263° C, whereas the Type IIB, CO₂-rich inclusions in the silicified grey dolomites in contact with lacy agate quartz gave decrepitation temperature (dT) of 118° C - 189° C and Type III, secondary inclusions yielded filling temperature range of 71° C - 144° C (Fig. 5).

Homogenisation temperature cannot be easily obtained for CO₂ bearing inclusions as the internal pressure of the CO₂ increases rapidly during the heating runs and the inclusions decrepitate. The Type IIB, CO₂-rich inclusions in the silicified dolomite samples also yielded ThCO₂ (L-V)-V from 12.5° C to 25.9° C (Fig. 6).

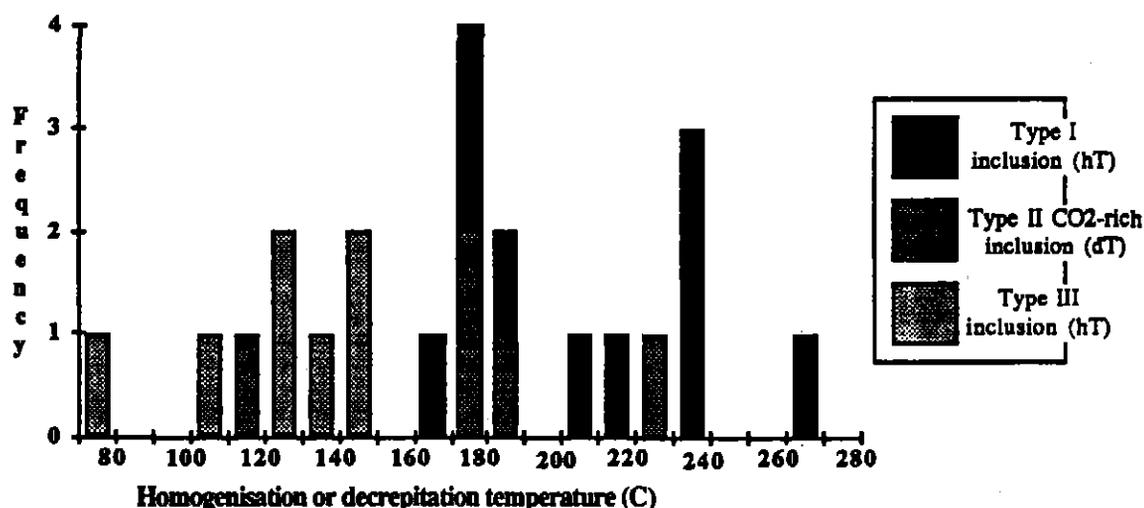


Fig. 5. Frequency-temperature distribution of homogenisation temperature (hT) and decrepitation temperature (dT) for the Type I, H₂O-dominated, Type IIB, CO₂-rich inclusions and Type III, secondary, two-phase, liquid-vapour (liquid-rich) inclusions in lacy agate quartz from Silica Flour deposit, western Tasmania.

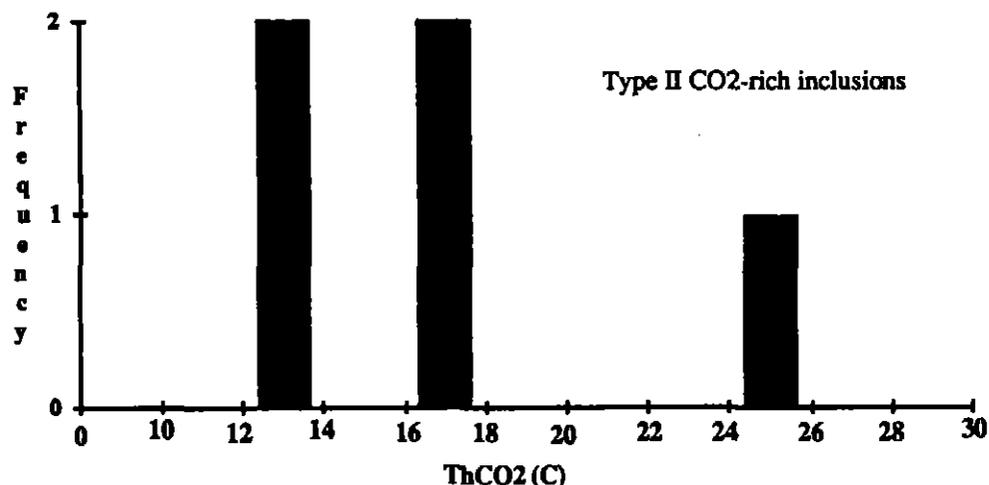


Fig. 6. Frequency distribution of homogenisation temperature of Type IIB CO₂-rich inclusions in silicified, grey dolomite in contact with lacy agate textured quartz, Silica Flour deposit, western Tasmania.

Freezing data

The Type I, H₂O-dominated, two-phase, liquid and vapour inclusions in the quartz from both vein types I and II which are cross-cutting the grey dolomite as well as in the crustiform quartz from the silica flour zone were measured by freezing point depression. The last melting of ice crystals (T_{m-ice}) ranges from -0.4°C to -9.7°C (0.7 to 13.7 NaCl equivalent wt %) for the Type I inclusions, whereas the Type IIA and IIB, CO₂-rich inclusions yielded T_{m-ice} -0.1°C to -13.3°C (0.2 to 17.3 NaCl equivalent wt %) and Type III, secondary inclusions gave T_{m-ice} -2.2°C to -4.8°C (3.7 to 7.6 NaCl equivalent wt %) (Fig. 7).

The salinity of the inclusions from the freezing point depression display up to 17.3 NaCl equivalent wt % which is close to NaCl saturation (20.8 NaCl equivalent wt %). The T_{m-ice} yielded variable results (-0.1°C to -13.3°C) which may be due to the presence of different gaseous components. Hence, chathrate decomposition temperature was applied if chathration was noted. The $T_{e-chathration}$ ranges from 4.1°C to 2.3°C (10.4 to 12.9 NaCl equivalent wt %) for Type I inclusions and for Type II inclusions, 3.5°C - 3.6°C (11.2 - 11.3 NaCl equivalent wt %), and for Type III inclusions, 2.6°C to 7.6°C (4.7-12.5 NaCl equivalent wt %) (Fig. 8).

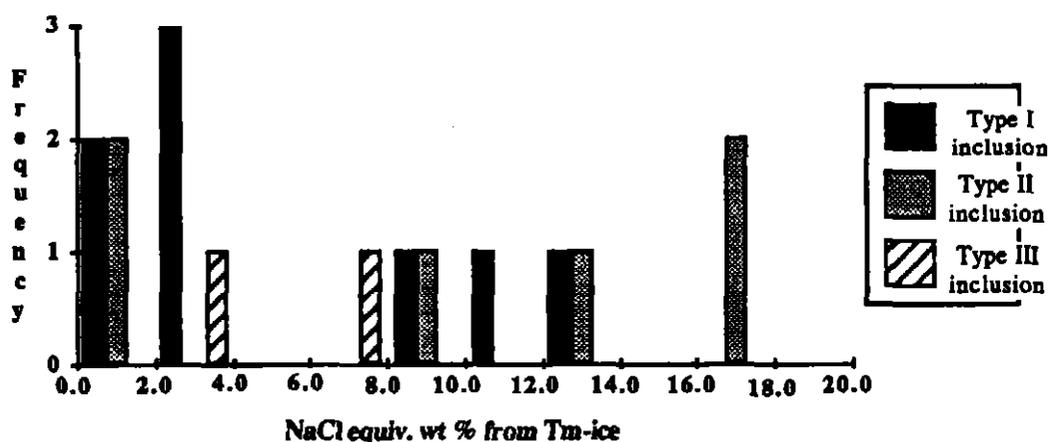


Fig. 7. Frequency-salinity distribution of Type I, primary, two-phase, liquid and vapour inclusions in quartz from the early thin *vein type I* and late *vein type II* which are cross-cutting the grey to dark grey dolomite, and Type II, CO₂-rich inclusions in silicified dolomites, Silica Flour deposit, western Tasmania.

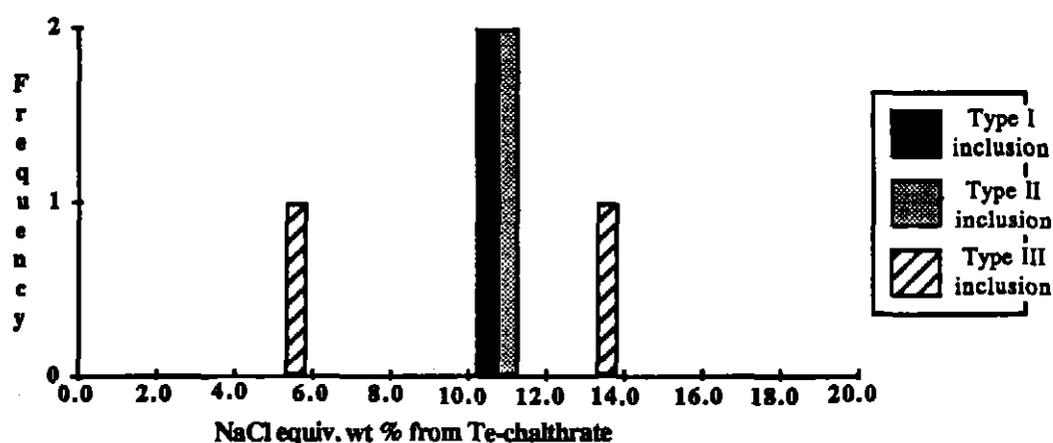


Fig. 8. Frequency-salinity distribution of Types I, II and III in quartz from the early thin *vein type I* and late *vein type II* which are cross-cutting the grey to dark grey dolomite, and quartz with lacy agate texture from Silica Flour deposit, western Tasmania.

The salinity calculated from the Te-chalhydration shows less variable results than those salinity data calculated from the Tm-ice. The apparent salinity obtained by the freezing of aqueous solutions (Tm-ice) in the inclusions will be higher than the actual salinity as CO₂ hydrates will be formed upon cooling by extracting CO₂ and H₂O from the solutions which results in an increase in the apparent salinity. Hence the salinity obtained by

Te-clathration may be close to the actual salinity although formation of other gas clathrates besides CO₂ clathrate can be expected.

Two inclusions display Te-clathration above 10° C, which may indicate the presence of other gas species such as CH₄ and N₂. This interpretation is commensurate with the solid CO₂ melting temperature recorded for the CO₂-rich inclusions from the Silica Flour deposit which gave a range of -59.1° C to -61.8° C. The addition of CH₄ to the system H₂O-CO₂ will lower the triple point of CO₂ (-56.6° C).

First melting temperatures were also determined for the Type I, H₂O-dominated, and Type IIA, CO₂-dominated inclusions in quartz from veins cutting grey dolomite and lacy agate quartz from Silica Flour deposit. The first melting temperature ranges from -20° C to -45° C with a mode of -30° C - -35° C (Fig. 9). First melting temperature below -20.8° C (eutectic temperature for the NaCl-H₂O) indicates the presence of dissolved salts other than NaCl, and the fluid may have a composition close to the cotectic of a NaCl-CaCl₂-MgCl₂-H₂O bearing aqueous system (see Fig. 10).

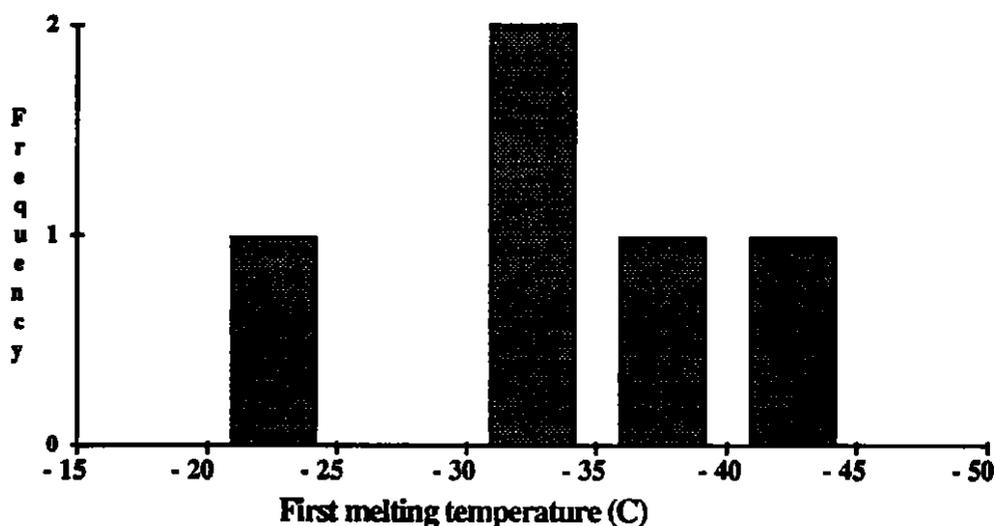
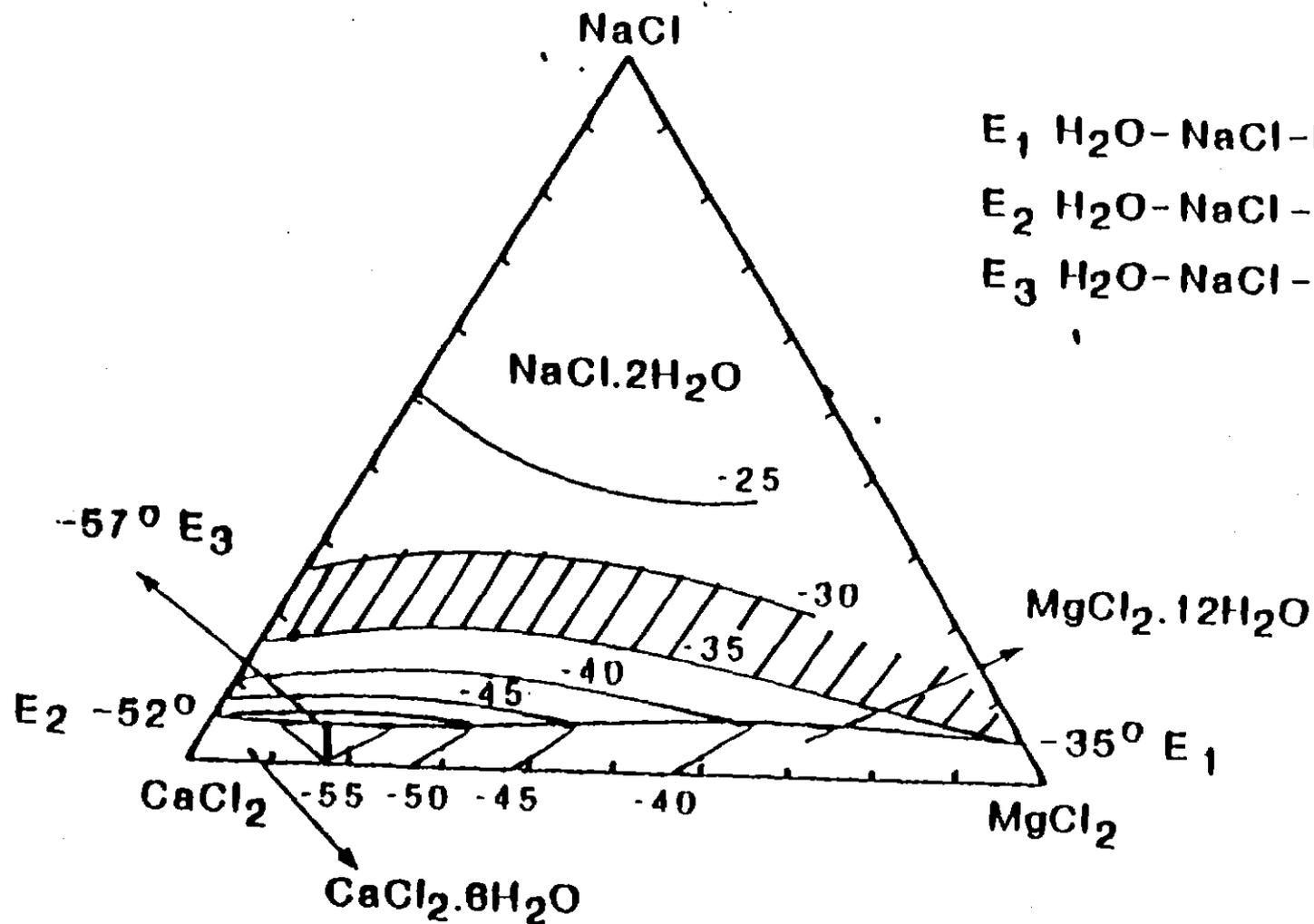


Fig. 9. Frequency-first melting temperature distribution diagram for Type I, H₂O-dominated, and Type IIA, CO₂-dominated inclusions in quartz from veins cutting grey dolomite and lacy agate quartz from Silica Flour deposit, western Tasmania.



- E_1 $H_2O-NaCl-MgCl_2$ eutectic
- E_2 $H_2O-NaCl-CaCl_2$ eutectic
- E_3 $H_2O-NaCl-CaCl_2-MgCl_2$ eutectic

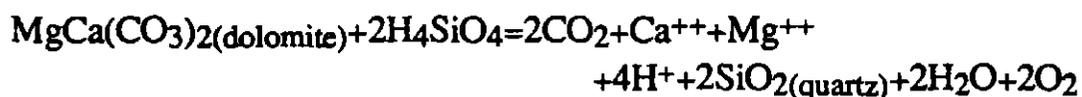
Fig. 10. Solid phases in the system $MgCl_2-NaCl-CaCl_2$ at low temperature projected $NaCl-H_2O$. Isotherms are labelled in $^{\circ}C$ (after Crawford, 1981). The possible vein and Silica Flour depositing fluids composition is shown as hatched area applying the mode of the first melting temperature $-30^{\circ}C$ to $-35^{\circ}C$ shown in Fig. 9.

The presence of Mg^{++} and Ca^{++} ions in the Silica Flour depositing fluids was possible due to the dissolution of dolomites during the silicification process. If Mg^{++} is dominated in the fluids, it will affect the depression of the freezing point (Fig. 11) and consequently the T_m -ice described above. It is important to note that salinity calculated from T_m -ice for most of the fluid inclusion studies are a gross salinity expressed in wt % NaCl only. The relationships of the depression of the freezing point with different salts are shown in Fig. 11.

Estimates of CO_2 concentration and density

The fluid inclusions in the quartz from the Silica Flour deposit do show evidence of CO_2 . The CO_2 -rich inclusions are found in the silicified dolomite in contact with lacy agate textured quartz and the $ThCO_2$ (L-V)-V ranges from 12.5° to 25.9° C with an average of 17.3° C which gave (~55) bars by the liquid-vapour curve of CO_2 by Burruss (1981). If this value is applied to the data of Bodnar et. al., (1986), the CO_2 concentration in the solutions will be ~2.1 mole percent which is equivalent to ~9.3 wt % CO_2 .

$ThCO_2$ (L-V)-V data also provide density of CO_2 inclusions from the Silica Flour deposit to be 0.15 to 0.25 $g\ cm^{-3}$ according to the relationships between $ThCO_2$ and density of CO_2 phases (see Fig. 12). The presence of CO_2 in the Silica Flour hydrothermal system was also accomplished by the silicification of dolomite using the ionic species of Mg^{++} , Ca^{++} , H^+ and CO_2 as follows:



DISCUSSION

The following fluid inclusion characteristics recorded from the Silica Flour deposit should be considered for the future ore genesis and exploration modeling:

- (1) The homogenisation temperatures ranges from 298° C to 169° C for the vein stage and the decrepitation temperature range from 118.0° C- 189.0° C for the later silicification process. The late secondary inclusions gave homogenisation temperatures of $<150.0^\circ$ C.

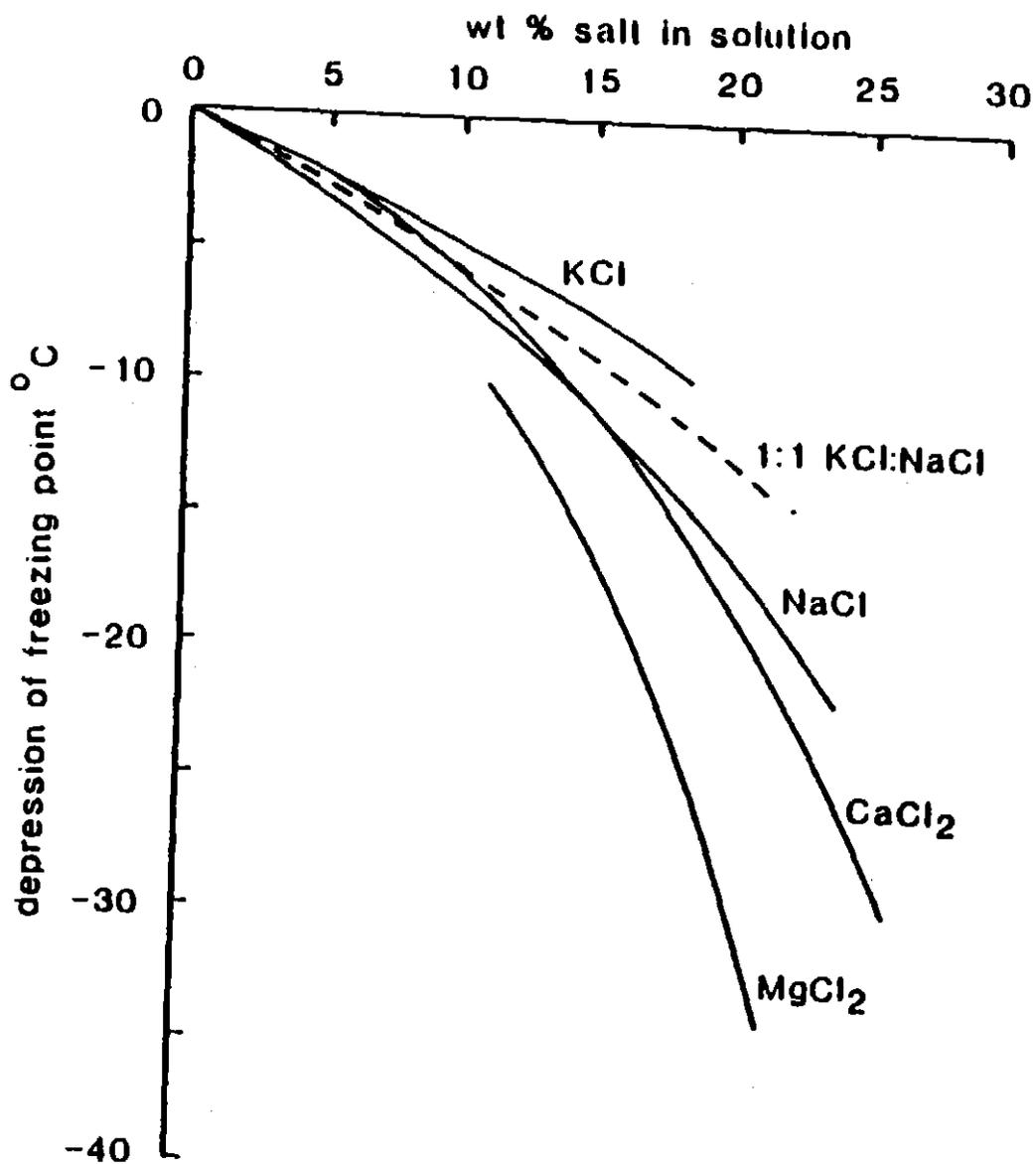


Fig. 11. Depression of the freezing point of pure water as a function of the wt % salts in solution for NaCl, KCl, CaCl₂ and MgCl₂ (after Shepherd et al., 1985).

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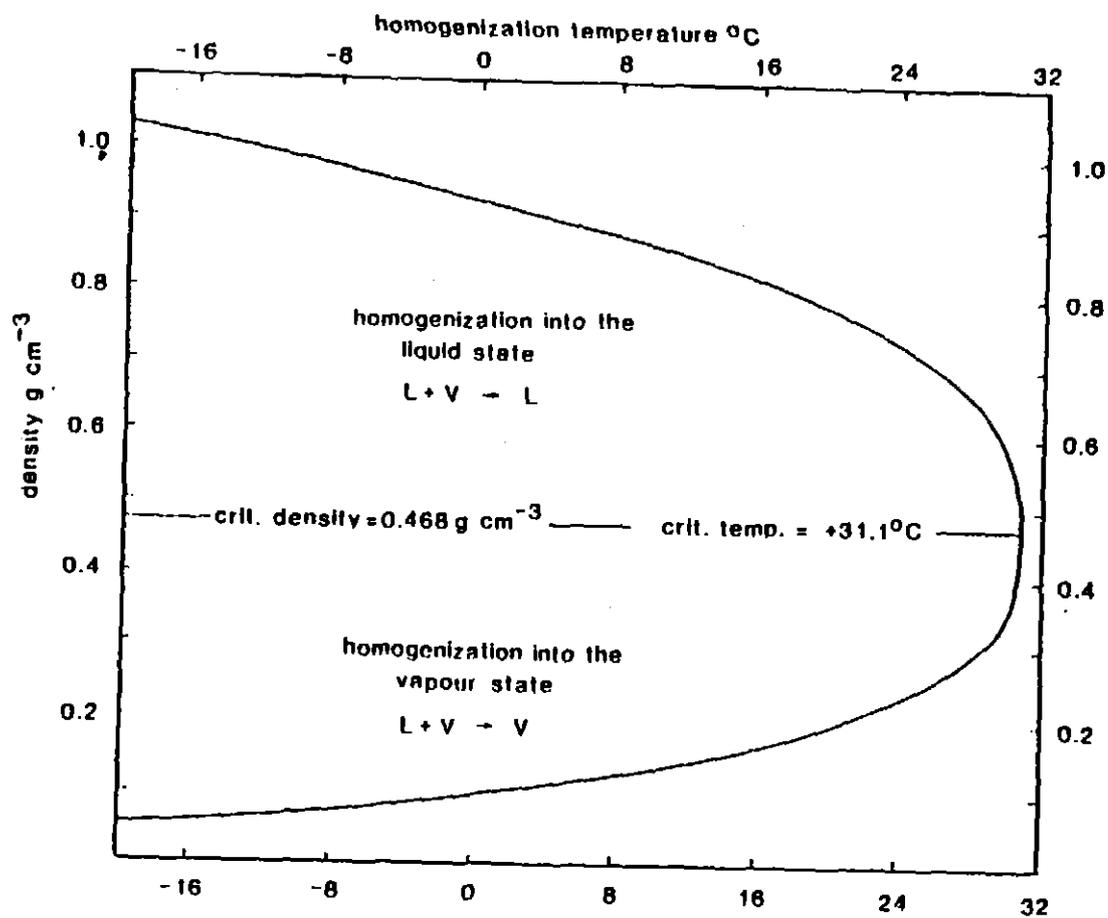


Fig. 12. Relationship between temperature of homogenisation of liquid CO_2 (ThCO_2) and density of CO_2 phase (after Shepherd et al., 1985).

- (2) The fluids were enriched in CO₂ with a concentration of ca.9.3 wt %.
- (3) The fluids responsible for the veining as well as later silicification contained up to 17.3 NaCl equivalent wt %.
- (4) No unambiguous fluid inclusion evidences of boiling of the Silica Flour fluids was found (e.g. both liquid-rich and gas-rich inclusions lying along the same healed fractures which gave broadly similar homogenisation temperature ranges).

The highest homogenisation temperatures of 298° C was recorded for the Type I inclusions in the quartz from the early veins cutting the grey dolomite and the present fluid inclusion study verify the high temperature nature of the fluids (up to 313° C) responsible for the formation of the Silica Flour deposit as initially reported by Allen (1988). The lower homogenisation temperature (125.5° ±4° C) obtained by Piaszczyk (1989) was possibly due to misidentification of the fluid inclusion types. Piaszczyk (1989) apparently recorded the homogenisation temperature of the secondary inclusions instead of primary inclusions which were related to growth zoning, or Piaszczyk (1989) may not have applied the stepwise heating technique which is suitable for tiny inclusions (<5 µm).

(5) Piaszczyk (1989) reported 10.5-12.7 NaCl equivalent wt % in this study the salinity of the fluids appears to be more variable (0.1 to 17.3 NaCl equivalent wt %). It is not known whether this salinity variation is due to actual salinity changes in the original hydrothermal fluids or due to the presence of additional dissolved salts other than NaCl and gases other than CO₂ which results in the formation of different gas clathrates and subsequently causing the changes in depression of freezing points and gross salinity.

Allen (1988) considered that the Silica Flour quartz was deposited from a boiling fluid at about 250° C under epithermal conditions, and it may have formed on the periphery of a more active epithermal system. Although Allen (1988) invoked the boiling condition during the formation of the Silica Flour deposit, he did not provide any fluid inclusion evidence and no fluid inclusion characteristics of boiling was found in this study. The

present investigation suggests a progressive cooling of the system as shown in Fig.6, but no trend with salinity and time cannot be established.

The early veins appear to have formed from higher temperature fluids ($\sim 300^{\circ}\text{C}$) which passed through the dolomites, they were followed by silicification of the dolomites at a cooler temperature around 250°C . The prolonged extensive veining and silicification resulted in the dissolution of dolomites. The late-stage, silica flour formation (disaggregation of the silicified dolomite) can be related to the late-stage, secondary inclusions which yielded filling temperature of ($<150^{\circ}\text{C}$) and may be related to ground water circulation.

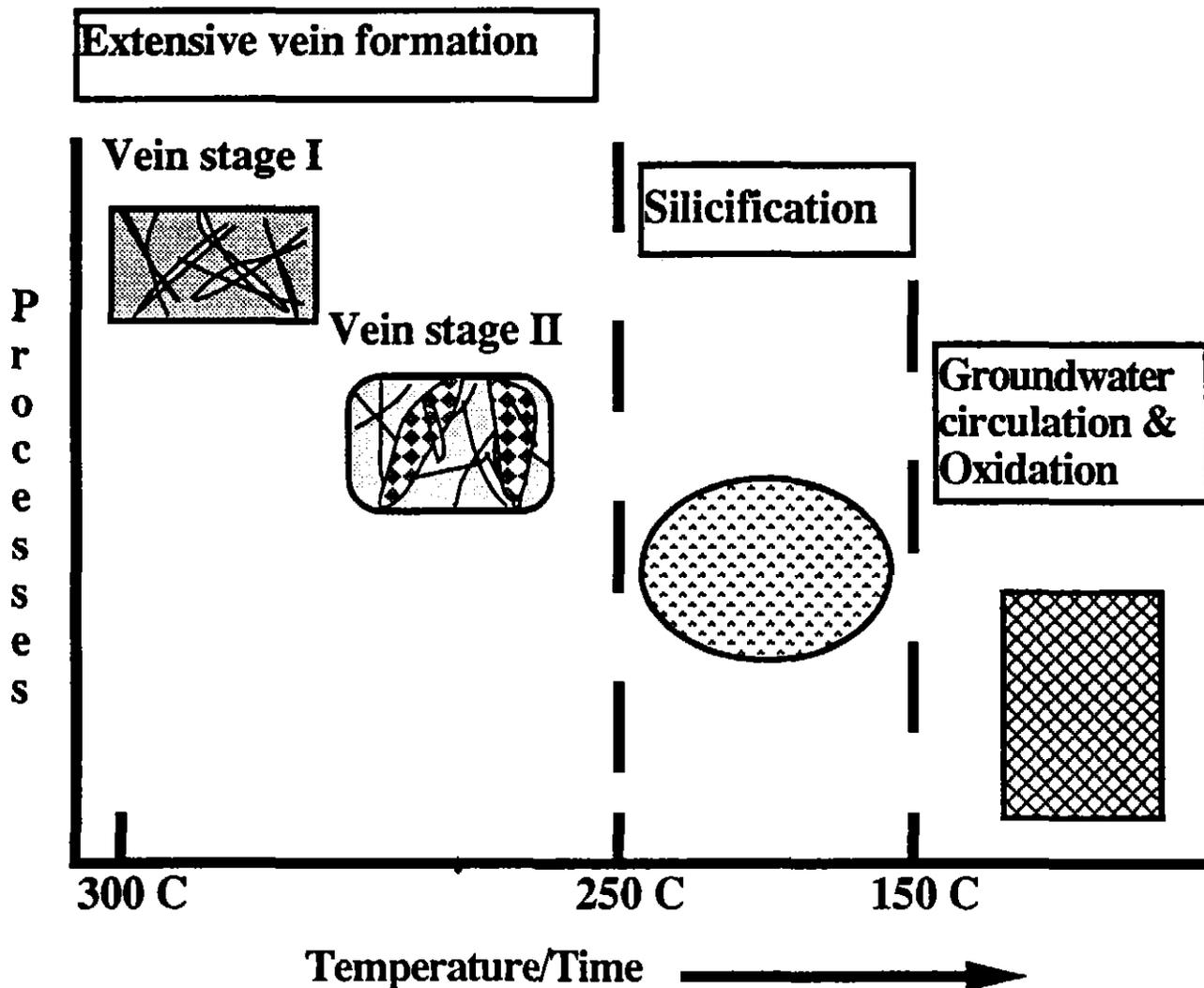


Fig. 11. Diagrammatic presentation for the formation of veining, silicification and later oxidation and ground water circulation of the Silica Flour deposit, western Tasmania.

Further work required

(1) The presence of CH₄ and other gas species were suspected during the cooling experiments and should be tested in details. Pasteris et al., (1986) recently reported that CH₄-CO₂ fluid inclusions with minor N₂ are recorded by Laser Raman Microprobe technique at Carlin-type gold deposits which are commonly hosted by the carbonaceous argillaceous limestones. Some inclusions from Carlin contain up to 89 mole % of CH₄. The detailed characterisation of the inclusion fluids in minerals from the Silica Flour deposits and the Brookside Prospect would provide a strong basis for the possible presence of Carlin-style gold mineralisation in the area.

Detailed study on various gaseous composition of the fluid inclusions in quartz and carbonate minerals from Silica Flour deposits should be carried out by Laser Raman Spectroscopy (LSR) methods. The Laser Raman spectroscopic study should be undertaken in conjunction with Thermodecrepitation mass-spectroscopy (TD-MS) and Infrared Spectroscopy (IR) methods, the new approach which have been recently applied for the fluid inclusion study at Tennant Creek gold deposits (Khin Zaw, 1988; Khin Zaw et al., 1990). The Laser Raman Spectroscopy instrument is available at Bureau of Mineral Resources at Canberra.

(2) The CO₂ inclusions from the Silica Flour deposit are low-density CO₂ bearing inclusions (0.15-0.25 g cm⁻³) giving flat "isochores" on H₂O-CO₂-NaCl system. This implied low pressure-shallow depth environment of formation. Construction of isochores (lines of equal density) for the CO₂-rich inclusions and H₂O-rich inclusions and the intersection of these isochores will give a meaningful pressure estimate and the depth of Silica Flour formation.

(3) As was mentioned previously, the first melting observation suggests that the inclusion fluids contain in addition to NaCl other solutes such as CaCl₂ and MgCl₂. Thus study of variation and changes of inclusion fluid chemistry should be pursued as further works to relate the Silica Flour formation and gold deposition in the area by recent advances in analytical techniques for fluid inclusions (e.g. SEM/EDA method by Haynes and Kesler, 1987; and Decrepitation-ICP method by Lindblom et al., 1989).

Gold Geochemistry and Fineness

(1) CAMECA microprobe analyses of the gold grains from the weathered dolomite from the Silica Flour deposit area indicate that Au ranges from 91.23 to 98.35 wt %. The gold grains contain 4.98 to 11.30 wt % Ag. The fineness ($1000\text{Au}/\text{Au}+\text{Ag}$ wt %) ranges from 890 to 951. Microprobe data are listed in APPENDICES 4 and 5. Figure 13 shows a histogram of the fineness distribution of the gold grains and the fineness values display a mode at 900-950. Variation of Au, Ag and fineness values across an individual gold grain was also checked by the microprobe analysis (see Fig. 14), but do not show any significant variation from the core to the rim.

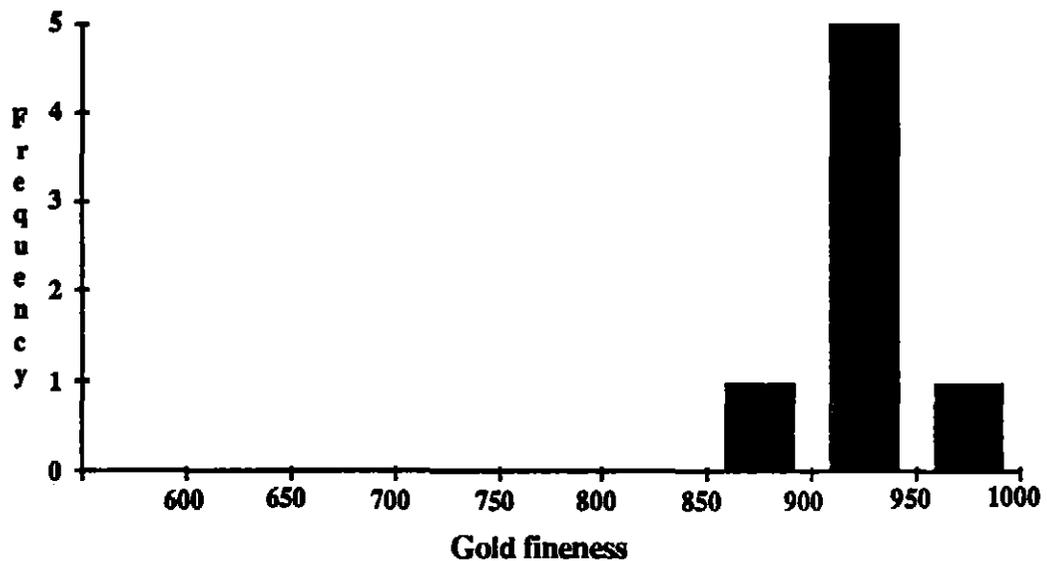


Fig. 13. Fineness of gold grains from the Silica flour deposit, western Tasmania.

(2) Preliminary investigation on the concentration of arsenic and mercury indicates that the gold grains contain very minor As (0.00 to 0.01 wt%) and Hg (0.00 to 0.04 wt%).

(3) The fineness of gold grains from the Silica Flour deposit is shown in Fig. 15 together with the fineness values of alluvial gold grains from the Elliot Bay area and gold from the volcanogenic massive sulphide deposits elsewhere. The fineness values of gold grains in the weathered dolomite from the Silica Flour deposit appear to show the highest fineness values in western Tasmania.

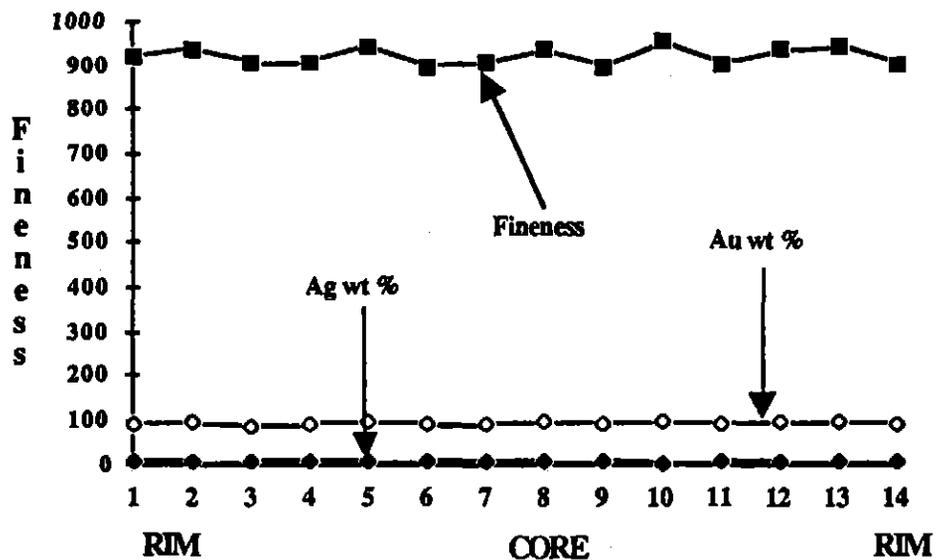


Fig. 14. Au, Ag and fineness values by microprobe analysis across a gold grain from the silica flour deposit, western Tasmania. Note that consistent and uniform Au, Ag and fineness values from the core to the rim.

(4) The Au-Ag composition of gold grains change rapidly towards the Au-rich end-member once the grain is being transported in the fluvial or surficial environment, and factors such as stream velocity, gradient, distance from the source region and pH conditions (acidic in western Tasmania) may control the composition.

(5) Morphology of the gold grains from the Silica Flour deposit were also studied under the SEM and are shown in Fig. 16A & B together with those gold grains which occur within the Hercules ore zone (Khin Zaw, unpub. data). The Hercules gold grains which have been recrystallised in association with fluorite display apparent crystallinity (Fig. 16C & D).

The Silica Flour gold grains are also subhedral and tend to display crystal outlines under SEM and in good agreement with the microscopic crystalline nature of the gold grains reported by Henham (1990). The morphological similarity of the gold grains from the Silica Flour area and those of the recrystallised Hercules gold suggest that the gold grains from the Silica Flour area have not been transported too far away from the source region. The lack of Ag-rich rim in the gold grains from the Silica Flour area also added to support this interpretation.

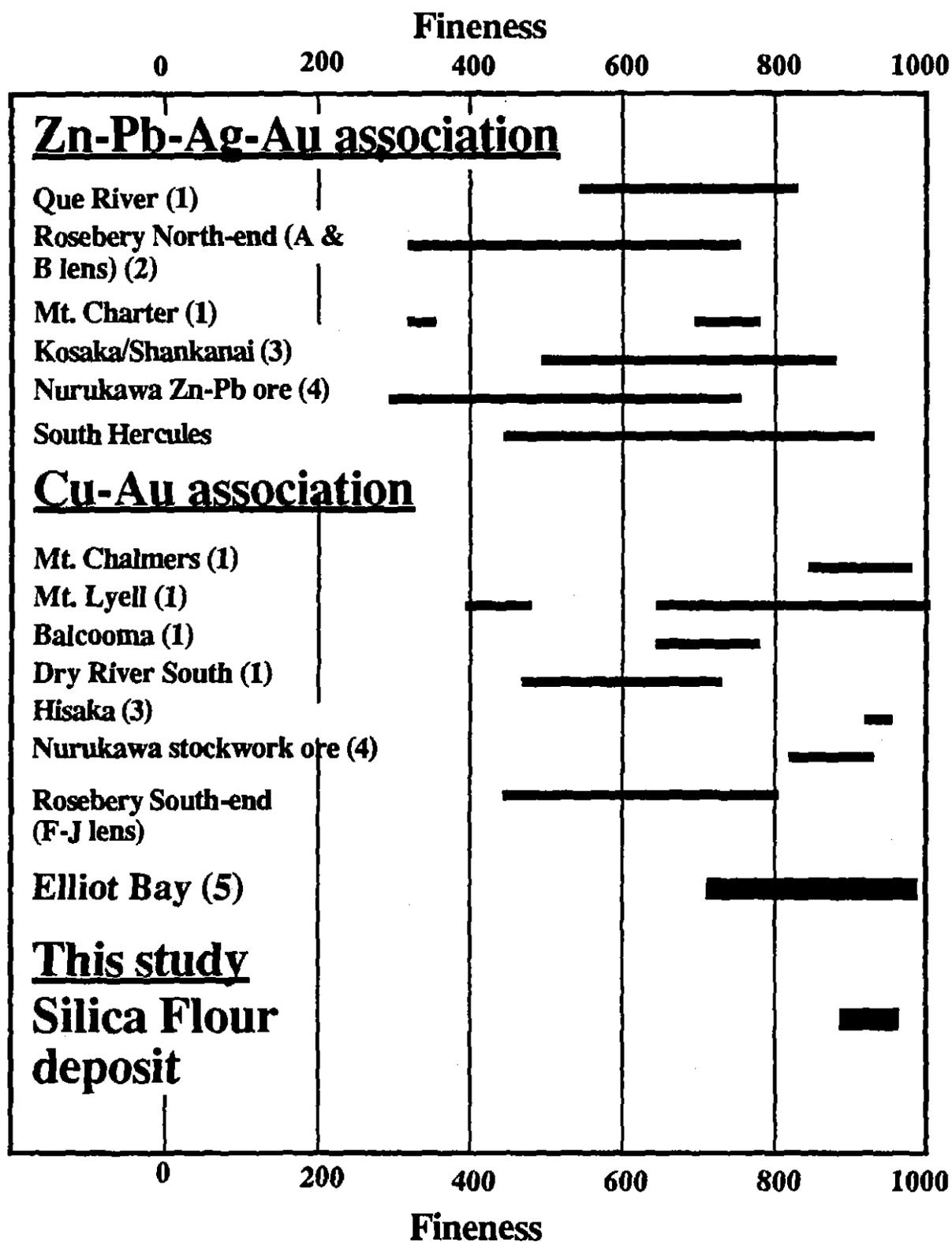


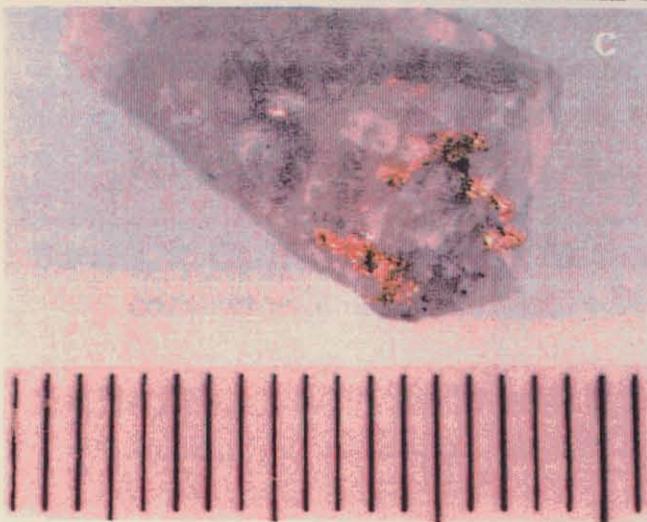
Fig. 15. Variation of fineness of gold grains in weathered dolomite from the Silica Flour deposit area, western Tasmania together with the fineness values of alluvial gold grains from the Elliot Bay, western Tasmania and gold from volcanogenic massive sulphide deposits. Data for (1) from Huston et al., 1990 in preparation, (2) from Huston and Large (1988), (3) from Shimazaki (1974), (4) from Yamada et al., (1988) and (5) from Garrett (1989).

Fig. 16A. SEM photograph showing gold grains in weathered dolomite from Silica Flour deposit, western Tasmania. Sample No. 431462.

Fig. 16B. SEM photograph showing gold grains in weathered dolomite from Silica Flour deposit, western Tasmania. Sample No. 431462. Note subhedral crystal outlines.

Fig. 16C. Photomicrograph showing gold grains in association with fluorite from Hercules ore zone, western Tasmania (Khin Zaw, unpub. data).

Fig. 16D. SEM photograph of the above gold grains with fluorite from Hercules Mine, western Tasmania (Khin Zaw, unpub. data). Note subhedral crystal outlines.



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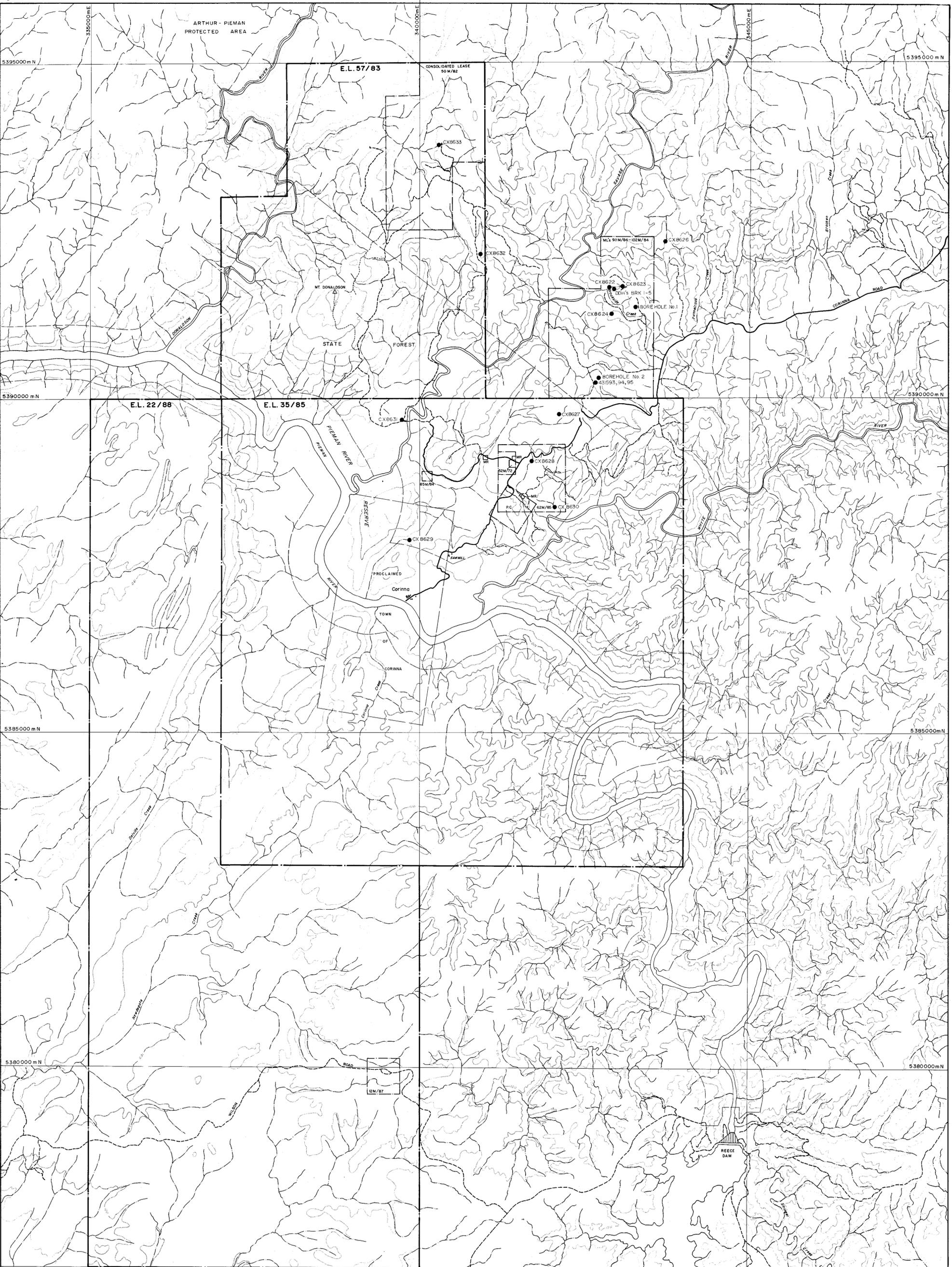
APPENDIX I. Description of fluid inclusions size and types, and vein types (diamond drill core samples) from Silica Flour deposit, western Tasmania.

Sample No.	Mineral studied	Vein type	Inclusion type	Inclusion size	Host rock	Remark
BRK2-3 @ 7.5m (2 slides)	quartz	I	I	3-5 μm	Grey dolomite cut by thin quartz veins < 2mm	
BRK2-4 @ 13.8m	quartz	II	I II	5-7 μm 15-20 μm	Silicified dolomite with iron-stained, thick quartz-carbonate vein - 10 cm	CO ₂ -rich inclusions
	dolomite	II	III	<3 μm		
BRK2-5 @ 14.8m	quartz	I & II	III	<3 μm	Silicified grey dolomite cut by veins	
BRK2-6 @ 15.5m (2 slides)	quartz	II	I	3-15 μm	light grey dolomite cut by veins	
BRK2-7 @ 18.3m	quartz	II	III	<5 μm	grey dolomite cut by veins	
BRK2-9A @ 25.3m	quartz	II	I	5-10 μm	dark grey dolomite cut by veins	
BRK2-10 @ 26.0m	quartz	II	I	<5 μm	grey dolomite cut by veins	
	dolomite	II	III	<3 μm		
BRK2-11 @ 27.6m (2 slides)	quartz	I	I	5 μm	light grey dolomite cut by veins	unidentified daughter
BRK3 @ 1.0m	calcite	-	III	<3 μm	Silicified dolomite cut by pink calcite vein	
BRK5 @ 11.4m	quartz	-	III	<3 μm	Silicified dolomite cut by veins	
431583	milky quartz	-	III	<5 μm	Silicified dolomite cut by veins	
Vein Type I=mostly thin networks (<1cm) and early						
Vein Type II=mostly thick networks (>1 cm) and cross-cutting the Vein type I						
Inclusion Type I=primary, two-phase, liquid-vapour						
Inclusion Type II=primary, CO ₂ -rich, two or three phase inclusions						
Inclusion Type III=secondary, two-phase, liquid-vapour (liquid-rich) inclusions						

APPENDIX III. Fluid inclusion data from Silica Flour deposit, western Tasmania.													
Sample No	Min studied	Vein type	Inclusion type	Th (L-V) L	RI	Th CO2	Tm- CO2	Tm-ice	Te-Chal thrate	NaCl eq. wt % fr. Tm-ice	NaCl eq. wt % fr. Te-Chal	1st melting	Remark
BRK2-3 @ 7.5m	vein quartz	I	I	244.4	290.1								5µm
BRK2-6 @ 15.5m	vein quartz	II	I	168.5				-1.0		1.7			
				169.4				-1.1		1.9			
				169.6				-1.0		1.7			
				171.0									
			IIA	180.9									
				176.3								-20.9	
				210.9									
BRK2-10 @ 26m	vein quartz	II	IIA	180.7									
				185.6					3.5		11.3		3x9µm
				170.8					3.6		11.2		
						25.7	-60.0	-13.3	12.4	17.3		-40.6	
								-13.2		17.2		-30.2	
							-59.1		12.8				
							-61.8						
								-9.3		13.2			
BRK2-11 @ 27.6m	vein quartz	I	I	293.5									
				251.1	310.0								7µm
				298.2									5µm
				297.9									15µm
				228.5				-0.8		1.4			
				275.4				-0.4		0.7			
				295.9									
				256.8									12µm
				279.2									3X6 µm
												-36.9	
									3.5		11.3		
431314B	lacy agate quartz		I	262.5									
				234.0									
				188.4				-6.2		9.5			3x6 µm
			II B			17.6							
						13.7							
						12.5							
						16.7							
								-0.1		0.2			
								-0.8		1.4			
					118.1								
					170.8								
					174.0								
					189.8								
					231.0								
			III	135.8									
				142.5									
				143.7				-2.2	2.6	3.7	12.5		

APPENDIX III Fluid inclusion data from Silica Flour deposit, western Tasmania (Continued).																	
Sample No	Min studied	Vein type	Inclusion type	Th (L-V) L	Td	Th CO2	Tm- CO2	Tm-ice	Te-Chal thrate	NaCl eq. wt % fr. Tm-ice	NaCl eq. wt % fr. Te-Chal	1st melting	Remark				
431314A	lacy agate quartz		I	237.5				-9.7	4.1	13.7	10.4						
				230.3										3x7µm			
				215.8													
				176.9											5µm		
				179.0													
				210.0											4x5µm		
				165.6											2x3µm		
											-4.9	2.3	7.7	12.9	-36.6		
							III	70.8									
								100.5									
				120.8													
				125.6													
								-4.8	7.6	7.6	4.7						

APPENDIX IV. CAMECA microprobe analysis of gold grains from the Silica flour deposit, western Tasmania.										
Sample No/ Section	No. of grains	No. of spots	As wt%	Ag wt%	Au wt%	Hg wt%	Total	Fineness	Grain size	Remark
431462	1	1	0.00	12.78	90.80	0.00	103.58	876.62	860 μm	flake
		2	0.02	11.39	91.73	0.00	103.14	889.55		flake
		3	0.01	8.77	91.37	0.00	100.65	912.86		flake
		4	0.00	12.26	90.51	0.00	102.77	880.70		flake
	average	4	0.01	11.30	91.23	0.00	102.54	889.93		
2	2	1	0.00	7.02	94.71	0.00	101.73	930.99	75 μm	-
		2	0.02	5.95	97.04	0.00	103.01	942.23		-
		3	0.00	7.84	94.79	0.00	102.63	923.61		core
		4	0.00	10.64	92.11	0.13	102.88	896.45		rim
		5	0.00	7.87	95.62	0.00	103.49	923.95		core
		6	0.00	7.15	96.80	0.00	103.95	931.22		rim
	average	6	0.00	7.75	95.18	0.02	102.95	924.74		
3	3	1	0.00	4.99	98.18	0.00	103.17	951.63	50 μm	core
		2	0.00	4.82	98.56	0.00	103.38	953.38		rim
		3	0.00	5.07	98.94	0.00	104.01	951.25		core
		4	0.02	5.17	97.08	0.00	102.27	949.44		rim
	average	5	0.00	4.75	98.97	0.00	103.72	954.20	core	
4	4	1	0.00	5.58	97.18	0.02	102.78	945.70	225 μm	core
		2	0.00	8.60	94.39	0.00	102.99	916.50		rim
		3	0.00	4.95	97.07	0.00	102.02	951.48		core
		4	0.00	5.95	97.22	0.15	103.32	942.33		rim
	average	4	0.00	6.27	96.47	0.04	102.78	939.00		
5	5	1	0.00	4.10	98.94	0.00	103.04	960.21	500 μm	core
		2	0.00	6.32	96.38	0.00	102.70	938.46		rim
		3	0.00	4.34	98.62	0.00	102.96	957.85		core
		4	0.00	9.05	93.63	0.00	102.68	911.86		rim
		5	0.00	14.66	87.36	0.00	102.02	856.30		core
	average	6	0.00	7.73	95.03	0.00	102.76	924.78	rim	
6	6	1	0.00	5.00	97.10	0.00	102.10	951.03	20 μm	core
		2	0.00	5.11	98.49	0.00	103.60	950.68		rim
		3	0.01	5.14	97.71	0.00	102.86	950.02		-
	average	4	0.00	4.98	95.96	0.00	100.94	950.67	-	
7	7	1	0.00	11.64	90.65	0.00	102.29	886.21	750 μm	core
		2	0.00	10.98	91.80	0.08	102.86	893.17		rim
		3	0.01	6.57	96.26	0.00	102.84	936.11		core
		4	0.02	7.27	95.89	0.00	103.18	929.53		rim
	average	4	0.01	9.11	93.65	0.02	102.79	911.25		



432080

Aberfoyle Resources Limited
EXPLORATION DIVISION

NORTH WEST TASMANIA
BROOKSIDE J.V. AREA
CORINNA DISTRICT DOLOMITES
ROCKCHIP SAMPLE LOCATIONS

REVISIONS				Compiled :
Int.	Date	Int.	Date	RJH
				Drawn : RuE
				Traced : RJE
				Checked : RJH
				Plate No : BKS 11

Location Code : Scale : 1:25,000 Date : August, 1990

5 cm